NOTICE TO BIDDERS -
NEW BID SUBMISSION PROCEDURES DUE TO COVID-19

The bid submission and opening procedures for this contract will follow the procedures set forth below.

THE BIDDER MUST CAREFULLY READ THE DATES AND TIMES IN THE PROCUREMENT DOCUMENTS, AS THEY NOW DIFFER FROM PREVIOUS DDC PROJECTS.

Bid Submission Procedures

1. The representative delivering the bid must maintain required social distancing measures – keep at least 6 feet away from others, and a mask or face covering must be worn.
2. The representative delivering the bid must comply with the Covid daily health screening required to enter the DDC office building at 3030 Thomson Ave. The time required to complete this screening must be accounted for in order to submit the bid on time.

   As such, please allow sufficient time for these procedures when arriving to deliver the bid so that the bid may be submitted on time.

   The screening requirements are as follows:

   Any guest visiting DDC will be required to follow the same health and safety measures as DDC staff, which includes wearing a mask and completing the daily Health Screening.

   Upon your arrival to 3030 Thomson Ave, please complete the health screen at the kiosk located by the left hand side of the security desk upon your entry. You will need to provide your name, email address and answer a few questions. Once you complete the health screening, you will need to receive a Green Readiness Score to enter our offices. Should you receive a Red Readiness Score, you will not be allowed to enter our offices. These steps are in place to ensure all precautionary safety measures are followed while in the office, as the health and safety of staff and visitors is our number one priority.

   The screeners will direct you towards the DDC ACCO CSB staff on the opposite side of the security desk, who will receive your bid package. When exiting the lobby, you will exit on the other side of the security desk (in a circular flow).

   If there are issues dropping off the bid, the bidder should email CSB_ProjectInquiries@ddc.nyc.gov for additional instructions.
3. All bids must be delivered by hand within the time shown in the procurement documents. No bids will be accepted by mail or parcel service (USPS, FedEx, UPS, DHL, etc.).

4. Bid submissions must be in a single, sealed envelope and clearly labeled on the outside with the following:
    a. Project ID
    b. Project Name
    c. e-PIN no.
    d. Name of Contractor
    e. Contact person
    f. Email address
    g. Phone number
5. Bid submissions must not contain any staples or paper clips.
6. The ACCO staff will provide a time stamp sticker to be applied to the bid envelope. The person dropping off the bid will be provided an opportunity to take a picture of the time stamped bid package as proof of drop off.
7. Please use the link indicated in the procurement documents to join the virtual bid opening.

NO FURTHER TEXT ON THIS PAGE

Department of Design and Construction

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS
VOLUME 1 – BID BOOKLET

SINGLE PLA CONTRACT VERSION

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Introduction

This Bid Booklet is intended to provide general information necessary for bidding on a DDC public works project and is part of the Contract Documents, as per Article 1.1 of the Standard Construction Contract.

As this contract is solicited via the PASSPort system, the bidder will be required to complete all of the PASSPort forms and questionnaires. These forms and questionnaires, along with the bidder's responses, will become part of the Bid Booklet.

Additional information on the PASSPort system can be found at the following website:
https://www1.nyc.gov/site/mocs/systems/passport-user-materials.page

Bid Submission Requirements

THE FOLLOWING MUST BE COMPLETED AND SUBMITTED FOR THE BID TO BE CONSIDERED RESPONSIVE:

1. Completed electronic bid submission in PASSPort;
    a. All required fields in PASSPort must be completed.
2. One-page signed Bid Submission Form delivered in person to DDC before the bid due date; and
3. Bid security, if required.
    a. If Bid security is in a form of a bid bond, bidders must include it with their electronic PASSPort submission.
    b. If Bid security is in a form of a certified check, bidders must deliver the certified check with the signed Bid Submission Form.

BIDDERS ARE ADVISED THAT PAPER BID SUBMISSIONS WILL BE DEEMED NON-RESPONSIVE. BIDDERS MUST SUBMIT THEIR BIDS ELECTRONICALLY IN PASSPORT, PROVIDE THE BID SECURITY, AND DELIVER TO DDC THE ONE-PAGE SIGNED BID SUBMISSION FOR THE BID TO BE CONSIDERED RESPONSIVE.

THE FOLLOWING MAY RESULT IN THE BID BEING FOUND NON-RESPONSIVE:

1. Any discrepancy between the total bid price listed on the Bid Submission Form and the bid information submitted in PASSPort.
2. Failure to upload required files or documents as part of a mandatory PASSPort Questionnaire response.
3. Uploading an incorrect file as part of a mandatory PASSPort Questionnaire response.
    a. For clarity, this includes uploading the bid breakdown on a form other than the Excel file provided in the PASSPort Questionnaire.

Notices to Bidders

Project Labor Agreement & Single Contract

PROJECT LABOR AGREEMENT: This contract is subject to a Project Labor Agreement ("PLA") entered into between the City and the Building and Construction Trades Council of Greater New York ("BCTC") affiliated Local Unions. By submitting a bid, the Contractor agrees that the PLA is binding on the Contractor and all subcontractors of all tiers. The bidder to be awarded the contract will be required to execute a "Letter of Assent" prior to award.

The Bidder is advised to review the following: (1) Notice regarding the PLA, (2) the PLA, and (3) the Letter of Assent, all of which are set forth at the beginning of Volume 2 of the Contract Documents.

SINGLE CONTRACT: As stated above, this contract is subject to a PLA. The requirements of the Wicks Law for separate prime contractors DO NOT APPLY to any project that is covered by a PLA. Accordingly, the requirements of the Wicks Law for separate prime contractors do not apply to this Project. The Project consists of a single contract.

The Bidder is advised to review the Notice set forth at the beginning of Volume 2 of the Contract Documents. The Notice specifies revisions to the Contract Documents to provide that the Project consists of a single contract and to delete any and all references to separate prime contractors.

Pre Bid Questions (PBQs)

Please be advised that PBQs should be submitted to the Agency Contact Person (CSB_projectinquiries@ddc.nyc.gov) at least five (5) business days (by 5:00 PM EST) prior to the bid opening date as indicated in the PASSPort procurement.

All PBQs must reference the Project ID. If a bidder has multiple PBQs for the same Project ID, the PBQs must be numbered sequentially, even if they are submitted separately.

While the PASSPort system has a facility for submitting inquiries, bidders are directed to send PBQs as directed above instead of using the PASSPort inquiry system.

Inquiries sent using the PASSPort inquiry system will not be considered PBQs.

NYC Contract Financing Loan Fund

Loans at a 3% annual interest rate to perform on New York City contracts

If your business is working as a prime or subcontractor on a project with a City agency or City-funded entity, you may be eligible for a Contract Financing Loan from a participating lender coordinated with the NYC Department of Small Business Services (SBS). Loan repayment terms align with the contract payment schedule.

Loans of up to $500,000 at an annual interest rate of 3% are available to eligible* businesses to perform on New York City contracts. Closing fees apply.

*To be eligible for a loan, you must:

- Have an operating business, AND
- Be applying for financing as a prime or sub-contractor to use toward a contract with a City agency or City-funded entity.
- Additional Eligibility requirements may also apply.

How it works:
Step 1: Fill out the Contract Financing inquiry form at nyc.gov/contractfinancing
Step 2: If Eligible, a participating lender will contact you within two business days.
Step 3: Begin the loan application process
For more information: Call 311 or visit nyc.gov/contractfinancing

NYC Bond Collateral Assistance Fund:

If your business is bidding or planning to bid on a project as a prime or subcontractor with a City agency or the NYC Economic Development Corporation (NYCEDC) and the project requires surety bonding, you may be eligible* to receive up to $500,000 in Collateral Assistance to enhance your surety bond application from a participating bond service provider coordinated with the NYC Department of Small Business Services (SBS).

*To be eligible, you must:

- Have an operating construction business, AND
- Be bidding or planning to bid as a prime or subcontractor on a contract with a City agency or NYCEDC that requires bonding

- Additional Eligibility requirements may apply.

How it works:
Step 1: Fill out the Bond Collateral Assistance Fund inquiry form at nyc.gov/bondfund
Step 2: If Eligible, the bond service provider will contact you within two business days
Step 3: Begin the bond application process
For more information: Call 311 or visit nyc.gov/bondfund

M/WBE Notice to Prospective Contractors

PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS ENTERPRISES IN CITY PROCUREMENT (9/2020 version)

ARTICLE I. M/WBE PROGRAM

Section 6-129 of the Administrative Code of the City of New York ("Section 6-129") establishes the program for participation in City procurement ("M/WBE Program") by minority-owned business enterprises ("MBEs") and women-owned business enterprises ("WBEs"), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6-129, the intent of the program is to address the impact of discrimination on the City's procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "M/WBE Utilization Plan") and are detailed below. Contracts solicited through the Procurement and Sourcing Solutions Portal (PASSPort) will contain a Schedule B in the format outlined in the Schedule B – M/WBE Utilization Plan & PASSPort rider. The provisions of this notice will apply to contracts subject to the M/WBE Program established by Section 6-129 regardless of solicitation source.

The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129.

References to MBEs or WBEs shall also include such businesses certified pursuant to the executive law where credit is required by section 311 of the New York City Charter or other provision of law.

Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts.

Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A

PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD

AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS

1. The **MBE and/or WBE Participation Goals** established for this Contract or Task Orders issued pursuant to this Contract, ("**Participation Goals**"), as applicable, are set forth on Schedule B, Part 1 to this Contract (see Page 1, Line 1 Total Participation Goals) or will be set forth on Schedule B, Part 1 to Task Orders issued pursuant to this Contract, as applicable.

The **Participation Goals** represent a percentage of the total dollar value of the Contract or Task Order, as applicable, that may be achieved by awarding subcontracts to firms certified with DSBS as MBEs and/or WBEs, and/or by crediting the participation of prime contractors and/or qualified joint ventures as provided in Section 3 below, unless the goals have been waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation Goals**, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

3. If **Participation Goals** have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant **Participation Goal**, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant **Participation Goal**. In accordance with Section 6-129, the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

4. A. If **Participation Goals** have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part 2 (see Pages1-2) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end; as well as the name, addresses, and telephone numbers of the M/WBE subcontractors if required by the solicitation; and (d) the prospective contractor's required certification and affirmations. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals**, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the **Participation Goals** in accordance with Section 6-129 and Part A, Section 10 below.

B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE **Participation Goals**, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part 2 (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified **Participation Goals** by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals** that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed non-responsive.

(ii) **Participation Goals** on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If **Participation Goals** have been established on a Task Order, a contractor shall be required to submit a Schedule B – M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part 2 (see Pages 1-2) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end; as well as the name, addresses, and telephone numbers of the M/WBE subcontractors if required by the solicitation; and (d) the prospective contractor's required certification and affirmations. The contractor must engage in good faith efforts to meet the **Participation Goals** as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the **Participation Goals** in accordance with Section 6-129 and Part A, Section 10 below.

C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART 2). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART 3). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi-year contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below $3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work.** In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.

6. MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the

firms' commencement of work. A list of city-certified MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6451, or by visiting or writing DSBS at One Liberty Plaza, New York, New York, 10006, 11th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).

7. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to,: the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's **M/WBE** Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its **M/WBE** Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.

9. Where an **M/WBE** Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or $500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the **Participation Goals** should be modified.

10. Pre-award waiver of **the Participation Goals**.

(a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the Participation Goals in accordance with Section 6-129, which requests that Agency change one or more **Participation Goals** on the grounds that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.

(b) To apply for a full or partial waiver of the **Participation Goals**, a bidder, proposer, or contractor, as applicable, must complete Part 3 of Schedule B **and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at MWBEModification@ddc.nyc.gov. Full or partial waiver requests that are received later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due may be rejected as untimely**. Bidders, proposers, or contractors, as applicable, who have submitted timely requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an

Agency response will be provided by close-of-business on the business day before such weekend or holiday date.

(c) If the Agency determines that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

(d) Agency may grant a full or partial waiver of the **Participation Goals** to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of

subcontracting in its **M/WBE** Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the **Participation Goals**. In making such determination, Agency may consider whether the **M/WBE** Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.

11. Modification of **M/WBE** Utilization Plan. (a) A Contractor may request a modification of its **M/WBE** Utilization Plan after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below $3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission.** The Agency may grant a request for Modification of a Contractor's **M/WBE** Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the **Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

(i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;

(ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;

(iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;

(iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the **M/WBE** Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;

(v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;

(vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;

(vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;

(viii) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's M/WBE officer shall provide written notice to the Contractor of the determination.

(b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its **M/WBE Utilization Plan** would be awarded to subcontractors.

12. If the Contractor was required to identify in its bid or proposal the MBEs and/or WBEs they intended to use in connection with the performance of the Contract or Task Order, substitutions to the identified firms may only be made with the approval of the Agency, which shall only be given when the Contractor has proposed to use a firm that would satisfy the **Participation Goals** to the same extent as the firm previously identified, unless the Agency determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts. In making such determination, the Agency shall require evidence of the efforts listed in Section 11(a) above, as applicable, along with any other relevant factors.

13. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an **M/WBE** Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Participation Goals**, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

14. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its **M/WBE** Utilization Plan, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

15. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

PART B

MISCELLANEOUS

1. The Contractor shall take notice that, if this solicitation requires the establishment of a **M/WBE** Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the **M/WBE** Utilization Plan.

2. Pursuant to DSBS rules, construction contracts that include a requirement for a **M/WBE** Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.

3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.

4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).

5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required **Participation Goals**.

ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.

2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any **M/WBE** Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.

3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any **M/WBE** Utilization Plan, Agency may determine that one of the following actions should be taken:

(a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;

(b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;

(c) making a finding that the Contractor is in default of the Contract;

(d) terminating the Contract;

(e) declaring the Contractor to be in breach of Contract;

(f) withholding payment or reimbursement;

(g) determining not to renew the Contract;

(h) assessing actual and consequential damages;

(i) assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;

(j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or

(k) taking any other appropriate remedy.

4. If an **M/WBE** Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its **Participation Goals** contained in its **M/WBE** Utilization Plan or the **Participation Goals** as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the **Participation Goals** and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the **Participation Goals**, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6-129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its **M/WBE** Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an **M/WBE** Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in PASSPort as caution data.

Affirmation

The Bidder affirms and declares:

1. The said bidder is of lawful age and the only one interested in this bid; and no person, firm or corporation other than hereinbefore named has any interest in this bid, or in the Contract proposed to be taken.

2. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (1) the prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (2) unless otherwise required by law, the prices quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (3) no attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

3. No councilman or other officer or employee or person whose salary is payable in whole or in part from the City Treasury is directly or indirectly interested in this bid, or in the supplies, materials, equipment, work or labor to which it relates, or in any of the profits thereof.

4. The bidder is not in arrears to the City of New York upon debt or contract or taxes, and is not a defaulter, as surety or otherwise, upon any obligation of the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York or State of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except as disclosed in PASSPort.

5. The bidder hereby affirms that is has paid all applicable City income, excise and other taxes for all it has conducted business activities in New York City.

6. The bidder, as an individual, or as a member, partner, director or officer of the bidder, if the same be a firm, partnership or corporation, executes this document expressly warranting and representing that should this bid be accepted by the City and the Contract awarded to him, he and his subcontractors engaged in the performance:

   (1) will comply with the provisions of Section 6-108 of the Administrative Code of the City of New York and the non-discrimination provisions of Section 220a of the New York State Labor Law, as more expressly and in detail set forth in the Agreement; (2) will comply with Section 6-109 of the Administrative Code of the City of New York in relation to minimum wages and other stipulations as more expressly and in detail set forth in the Agreement; (3) have complied with the provisions of the aforesaid laws since their respective effective dates, and (4) will post notices to be furnished by the City, setting forth the requirements of the aforesaid laws in prominent and conspicuous places in each and every plant, factory, building and structure where employees engaged in the performance of the Contract can readily view it, and will continue to keep such notices posted until the supplies, materials and equipment, or work labor and services required to be furnished or rendered by the Contractor have been finally accepted by the City. In the event of any breach or violation of the foregoing, the Contractor may be subject to damages, liquidated or otherwise, cancellation of the Contract and suspension as a

bidder for a period of three years. (The words, "the bidder", "he", "his", and "him" where used shall mean the individual bidder, firm, partnership or corporation executing this bid).

7. Compliance Report

   The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, (1) represents that his attention has been specifically drawn to Executive Order No. 50, dated April 25, 1980, on Equal Employment Compliance of the contract, and (2) warrants that he will comply with the provisions of Executive Order No. 50. The Employment Report must be submitted as part of the bid.

8. The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, executes this document expressly warranting that he will comply with: (1) the provision of the contract on providing records, Chapter 8.

9. By submission of this bid, the bidder certifies that it now has and will continue to have the financial capability to fully perform the work required for this contract. Any award of this contract will be made in reliance upon such certification. Upon request therefor, the bidder will submit written verification of such financial capability in a form that is acceptable to the department.

10. In accordance with Section 165 of the State Finance Law, the bidder agrees that tropical hardwoods, as defined in Section 165 of the State Finance Law, shall not be utilized in the performance of this Contract, except as the same are permitted by the foregoing provision of law.

11. The bidder has visited and examined the site of the work and has carefully examined the Contract in the form approved by the Corporation Counsel, and will execute the Contract and perform all its items, covenants and conditions, and will provide, furnish and deliver all the work, materials, supplies, tools and appliances for all labor and materials necessary or required for the hereinafter named work, all in strict conformity with the Contract, for the prices set forth in the Bid Schedule.

12. M/WBE UTILIZATION PLAN: By signing its bid, the bidder agrees to the M/WBE Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted.

    I hereby:

    1) acknowledge my understanding of the M/WBE participation requirements as set forth in this Contract and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York and the rules promulgated thereunder;

    2) affirm that the information supplied in support of the M/WBE Utilization Plan is true and correct;

    3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract;

    4) agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and

    agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or If a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.

1

BID SUBMISSION FORM

Bidder Name: Lo Sardo General Contractors, Inc.
Procurement Title: 85021B0135-S136-383N - DSNY BK 17/18 Garage Roof and HVAC Upgrade
RFx Name: 85021B0135-S136-383N - DSNY BK 17/18 Garage Roof and HVAC Upgrade

The above-named bidder affirms and declares:

1. The bidder has completed and submitted all required information for the above procurement in the PASSPort system;
2. Any discrepancy between the bid price listed on this Bid Submission Form and the bid information submitted in PASSPort may result in the agency finding the bid non-responsive; and
3. This bid is being submitted in accordance with New York State General Municipal Law § 103.

BAB 9/21/21

Total Bid Price: (a/k/a Total Proposal Amount) $ 25,654,000.

Bidder Signature

EIN (if applicable): 11-2250515
(EIN must match the EIN of the entity that submitted bid information in PASSPort)

Bidder Name: Lo Sardo General Contractors, Inc.

By: Silvio C. Lo Sardo
(Name of Partner of Corporate Officer)

Signature:
(Signature of Partner of Corporate Officer)

Bid Price

item_code	item_label	itype_label	Bid Price
1	Lump Sum Bid Amount	Required Item	25639000.00000000

Allowances

item_code	item_label	itype_label	Additions	YOU MUST ENTER 1 IN THE BOXES BELOW	Additions _1
i2_1	ALLOWANCE for Incidental Asbestos Abatement (Section 028013 of the Specifications)	Additional Fees	15000.0000000000	1.00000000	15000.00000000

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, LoSardo General Contractors, Inc
35 Crescent Street, Brooklyn, NY 11208

hereinafter referred to as the "Principal", and United Fire & Casualty Company
118 2nd Ave SE, Cedar Rapids, IA 52401

hereinafter referred to as the "Surety" are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "CITY", or to its successors and assigns in the penal sum of

Ten percent of amount bid----------

($ 10% of amount bid), Dollars lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the Principal is about to submit (or has submitted) to the City the accompanying proposal, hereby made a part hereof, to enter into a contract in writing for

DSNY Brooklyn 17 and 18 Garage Roof and HVAC Upgrades

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall not withdraw said Proposal without the consent of the City for a period of forty-five (45) days after the opening of bids and in the event of acceptance of the Principal's Proposal by the City, if the Principal shall:

(a) Within ten (10) days after notification by the City, execute in quadruplicate and deliver to the City all the executed counterparts of the Contract in the form set forth in the Contract Documents, in accordance with the proposal as accepted, and

(b) Furnish a performance bond and separate payment bond, as may be required by the City, for the faithful performance and proper fulfillment of such Contract, which bonds shall be satisfactory in all respects to the City and shall be executed by good and sufficient sureties, and

(c) In all respects perform the agreement created by the acceptance of said Proposal as provided in the Information for Bidders, bound herewith and made a part hereof, or if the City shall reject the aforesaid Proposal, then this obligation shall be null and void; otherwise to remain in full force and effect.

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to the Principal the Surety hereunder agrees subject only to the payment by the Principal of the premium therefore, if requested by the City, to write the aforementioned performance and payment bonds in the form set forth in the Contract Documents.

It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

There shall be no liability under this bond if, in the event of the acceptance of the Principal's Proposal by the City, either a performance bond or payment bond, or both, shall not be required by the City on or before the 30th day after the date on which the City signs the Contract.

The surety, for the value received, hereby stipulates and agrees that the obligations of the Surety and its bond shall in no way be impaired or affected by any postponements of the date upon which the City will receive or open bids, or by any extensions of the time within which the City may accept the Principal's Proposal, or by any waiver by the City of any of the requirements of the Information for Bidders, and the Surety hereby waives notice of any such postponements, extensions, or waivers.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the 17 day of September, 2021.

(Seal)

LoSardo General Contractors, Inc (L.S.)

Principal

By: _____

(Seal)

United Fire & Casualty Company

Surety

By: _____

Tara Laverdiere, Attorney-in-Fact

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Kings ss:
On this 17 day of September, 2021, before me personally came Silvio C. Lo Sardo to me known, who, being by me duly sworn, did depose and say that he/she/they resides at 254 Links Drive West, Oceanside, New York 11572 that he/she/they is the President of Lo Sardo General Contractors, Inc. the corporation described in and which executed the foregoing instrument; that he/she/they knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he/she/they signed his name thereto by like order.

LUCY ROMANO
Notary Public, State of New York
No. 01RO5016372
Qualified in Queens County
Commission Expires Aug 9, 2025

Lucy Romano
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:
On this _____ day of _____, _____, before me personally appeared _____ to me known and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument, and he/she/they acknowledged to me that he/she/they executed the same as and for the act and deed of said firm.

_____
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:
On this _____ day of _____, _____, before me personally appeared _____ to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he/she/they executed the same.

_____
Notary Public

AFFIX ACKNOWLEDGMENTS AND JUSTIFICATION OF SURETIES

Surety Acknowledgment

State of **New York**

County of **Nassau**

On the 17 day of September 2021 personally came Tara Laverdiere to me known , who being by me duly sworn did depose and say that he/she is an Attorney-in-Fact, of United Fire & Casualty Company which executed the above Instrument know(s) the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he/she/they signed the said instrument and affixed the said seal as Attorney-in-fact by authority of the Board of Directors of said corporation and by authority of this office under the standing resolution thereof.

My commission expires _____

Notary Public

DENISE THOMPSON
NOTARY PUBLIC-STATE OF NEW YORK
No. 01TH6023817
Qualified in Nassau County
My Commission Expires 02-28-2023

UNITED FIRE & CASUALTY COMPANY, CEDAR RAPIDS, IA
UNITED FIRE & INDEMNITY COMPANY, WEBSTER, TX
FINANCIAL PACIFIC INSURANCE COMPANY, LOS ANGELES, CA
CERTIFIED COPY OF POWER OF ATTORNEY
(original on file at Home Office of Company – See Certification)

Inquiries: Surety Department
118 Second Ave SE
Cedar Rapids, IA 52401

KNOW ALL PERSONS BY THESE PRESENTS, That United Fire & Casualty Company, a corporation duly organized and existing under the laws of the State of Iowa; United Fire & Indemnity Company, a corporation duly organized and existing under the laws of the State of Texas; and Financial Pacific Insurance Company, a corporation duly organized and existing under the laws of the State of California (herein collectively called the Companies), and having their corporate headquarters in Cedar Rapids, State of Iowa, does make, constitute and appoint

DENESE THOMPSON, WILLIAM HAAS, THERESA LANFRANCO, LOUIS SPINA, BENEDICT TOCKARSHEWSKY, JR., TARA LAVERDIERE, EACH INDIVIDUALLY

their true and lawful Attorney(s)-in-Fact with power and authority hereby conferred to sign, seal and execute in its behalf all lawful bonds, undertakings and other obligatory instruments of similar nature provided that no single obligation shall exceed $50,000,000.00 and to bind the Companies thereby as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Companies and all of the acts of said Attorney, pursuant to the authority hereby given and hereby ratified and confirmed.

The Authority hereby granted shall expire the9th day of April, 2023 unless sooner revoked by United Fire & Casualty Company, United Fire & Indemnity Company, and Financial Pacific Insurance Company.

This Power of Attorney is made and executed pursuant to and by authority of the following bylaw duly adopted by the Boards of Directors of United Fire & Casualty Company, United Fire & Indemnity Company, and Financial Pacific Insurance Company.

"Article VI – Surety Bonds and Undertakings"

Section 2, Appointment of Attorney-in-Fact. "The President or any Vice President, or any other officer of the Companies may, from time to time, appoint by written certificates attorneys-in-fact to act in behalf of the Companies in the execution of policies of insurance, bonds, undertakings and other obligatory instruments of like nature. The signature of any officer authorized hereby, and the Corporate seal, may be affixed by facsimile to any power of attorney or special power of attorney or certification of either authorized hereby; such signature and seal, when so used, being adopted by the Companies as the original signature of such officer and the original seal of the Companies, to be valid and binding upon the Companies with the same force and effect as though manually affixed. Such attorneys-in-fact, subject to the limitations set forth in their respective certificates of authority shall have full power to bind the Companies by their signature and execution of any such instruments and to attach the seal the Companies thereto. The President or any Vice President, the Board of Directors or any other officer of the Companies may at any time revoke all power and authority previously given to any attorney-in-fact.

IN WITNESS WHEREOF, the COMPANIES have each caused these presents to be signed by its vice president and its corporate seal to be hereto affixed this 9th day of April, 2021

UNITED FIRE & CASUALTY COMPANY
UNITED FIRE & INDEMNITY COMPANY
FINANCIAL PACIFIC INSURANCE COMPANY

By: Dennis J. Richmann
Vice President

State of Iowa, County of Linn, ss:

On 9th day of April, 2021, before me personally came Dennis J. Richmann to me known, who being by me duly sworn, did depose and say; that he resides in Cedar Rapids, State of Iowa; that he is a Vice President of United Fire & Casualty Company, a Vice President of United Fire & Indemnity Company, and a Vice President of Financial Pacific Insurance Company the corporations described in and which executed the above instrument; that he knows the seal of said corporations; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporations and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporations.

Patti Waddell
Iowa Notarial Seal
Commission number 713274
My Commission Expires 10/26/2022

Patti Waddell
Notary Public
My commission expires: 10/26/2022

I, Mary A. Bertsch, Assistant Secretary of United Fire & Casualty Company and Assistant Secretary of United Fire & Indemnity Company, and Assistant Secretary of Financial Pacific Insurance Company, do hereby certify that I have compared the foregoing copy of the Power of Attorney and Affidavit, and the copy of the Section of the bylaws and resolutions of said Corporations as set forth in said Power of Attorney, with the ORIGINALS ON FILE IN THE HOME OFFICE OF SAID CORPORATIONS, and that the same are correct transcripts thereof, and of the whole of the said originals, and that the said Power of Attorney has not been revoked and is now in full force and effect.

In testimony whereof I have hereunto subscribed my name and affixed the corporate seal of the said Corporations this 17 day of September, 2021

By: Mary A. Bertsch
Assistant Secretary
UF&C & UF&I & FPIC

BPOA0045 122017

UNITED FIRE AND CASUALTY COMPANY

P.O Box 73909, Cedar Rapids, IA. 52407

Statement of Financial Condition
As Of December 31, 2020

ASSETS

Bonds	$802,039,910
Stocks	479,001,640
Real Estate and Equipment	42,759,356
Cash in Banks and Offices and Short Term Investments	161,593,676
Premiums in Course of Collection (less than 90 days old)	337,918,023
Reinsurance and Other Accounts Receivable	53,809,652
Deposits and Other Non Invested Assets	138,436,096
Total Admitted Assets	**$2,015,558,353**

LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Unearned Premiums		$289,369,670
Reserve for Claims and Claim Expense		992,102,435
Reserve for Taxes and Expense		62,486,927
Total Liabilities		**$1,343,959,032**
Capital Stock and Paid In Capital	$214,332,965	
Surplus Notes	50,000,000	
Surplus	407,266,356	
Surplus as regards Stockholders		671,599,321
Total		**$2,015,558,353**

Securities carried at $7,367,791 in the above statement are deposited as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2020 market quotations for all bonds and stocks owned, the Company's total admitted assets would be $2,015,558,353 and surplus as regards shareholders $671,599,321.

I, Janice A. Martin, Treasurer of United Fire and Casualty Company, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2020

Treasurer

State of Iowa
City of Cedar Rapids } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Iowa in the City of Cedar Rapids, this 4th day of March, 2021

Notary Public

SHERI FENTON
Commission Number 222621
My Commission Expires

Notice to Bidders
Bidder's Identification of Subcontractors

Please be advised that pursuant to GML § 101(5) each bidder is required to submit with its bid the names of subcontractors it intends to use to perform the following work on this contract, as well as the agreed-upon amount to be paid to each subcontractor:

- plumbing and gas fitting;
- steam heating, hot water heating, ventilating and air conditioning apparatus; and
- electric wiring and standard illuminating fixtures.

The list of subcontractors is to be submitted by completing the Bidder's Identification of Subcontractors form ("BIDS Form") on the next page. The BIDS Form provides for the identification of any subcontractors intended to be used in any of the three trades listed above. If the bidder intends to use its own forces for any of the above listed work, the bidder should so indicate on the BIDS Form.

The completed BIDS Form must be uploaded in the Sealed Subcontractor List subtab of the Subcontractors and Joint Ventures tab of the RFx. Failure to submit the properly completed BIDS Form including the names of subcontractors and the agreed-upon amounts to be paid to each may result in the rejection of the bid as non-responsive.

Please Note: For any contract that is subject to M/WBE Participation Goals under Section § 6-129 of the Administrative Code of the City of New York, if the bidder's intention to use its own forces to do any of the above-referenced work would result in failure to attain the Participation Goals identified in the M/WBE Utilization Plan, the bidder must request and obtain a full or partial waiver of the Participation Goals (Schedule B – Waiver) in advance of bid submission. The bidder must submit the approved waiver determination or otherwise agree to the Participations Goals as stated in the Schedule B (Parts I and II) as part of a responsive bid submission.

After the low bid is announced, the sealed list submitted by the low bidder will be opened and the names of the subcontractors will be announced. The sealed lists of subcontractors submitted by all other bidders shall be maintained by the Agency unopened unless such bidder shall become the low bidder (e.g., the initial low bidder is found non-responsive). All unopened lists of subcontractors will be deleted from PASSPort after the contract is awarded.

After bid submission, any change of subcontractor or agreed-upon amount to be paid to each shall require approval of the Agency upon a showing of a legitimate construction need which shall include, but not be limited to, a change in project specifications, a change in project material costs, a change to subcontractor status as determined pursuant to NYS Labor Law § 222(2)(e), or if the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

Bidder's Identification of Subcontractors (BIDS Form)

Please list the subcontractors and agreed-upon amounts to be paid to each. Please note if any trade is not applicable to this project. If any of the work in the trade categories below is split between two or more subcontractors, please provide a description of the work to be performed by each subcontractor. If self-performing, please list your own name.

Please Note: Bidder may satisfy any required M/WBE Subcontractor Participation Goals by proposing one or more M/WBE subcontractors for any portion of the work to be performed by the below trades.

1. Plumbing and Gas Fitting Contractor(s):

Louis L. Bottermark & Sons
(Subcontractor Name)

$ 107,926.00
(Agreed-upon amount to be paid to Subcontractor)

_____
(Subcontractor Name)

$ _____
(Agreed-upon amount to be paid to Subcontractor)

Description of work for each subcontractor:

Plumbing Work

2. Steam Heating, Hot Water Heating, Ventilating and Air Conditioning Apparatus Contractor(s):

Leviathan Mechanical Corp.
(Subcontractor Name)

$ 4,850,000.00
(Agreed-upon amount to be paid to Subcontractor)

_____
(Subcontractor Name)

$ _____
(Agreed-upon amount to be paid to Subcontractor)

Description of work for each subcontractor:

HVAC

3. Electric Wiring and Standard Illuminating Fixtures Contractor(s):

Rainbow Electric
(Subcontractor Name)

$ 5,500,000.
(Agreed-upon amount to be paid to Subcontractor)

_____
(Subcontractor Name)

$ _____
(Agreed-upon amount to be paid to Subcontractor)

Description of work for each subcontractor:

Electric/FA

SPECIAL EXPERIENCE REQUIREMENTS

Special Experience Requirements apply as indicated below.

Bidder(s):	**General Construction Work**	**___X___ YES**	**_____ NO**
Specific Areas of Work:	**General Construction Work**	**___X___ YES**	**_____ NO**
	Electrical Work	**___X___ YES**	**_____ NO**

(A) **SPECIAL EXPERIENCE REQUIREMENTS FOR THE BIDDER IF APPLICABLE:** The special experience requirements set forth below apply to the bidder only if indicated above. Compliance with such special experience requirements will be determined solely by the City prior to an award of contract. Failure to comply with the special experience requirements will result in the rejection of the bid as non-responsive.

- The bidder must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

(B) **QUALIFICATION FORM**: For each project submitted to demonstrate compliance with the special experience requirements, the bidder(s) indicated above must complete the Qualification Form included in the Bid Booklet. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information on the Qualification Form is provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

(C) **CONDITIONS**: The City may, in determining compliance with the special experience requirements set forth above, consider prior projects completed by principal(s) or other employees of the bidder while affiliated with another entity, subject to the conditions set forth below.

- Any principal or other employee on whose prior experience the bidder is relying to demonstrate compliance with this special experience requirement must have held the following: (a) a significant management role in the prior entity with which he/she was affiliated, and (b) a significant management role in the entity submitting the bid for a period of six months or from the inception of the bidding entity. If the bidder is relying on the prior experience of a principal or employee, it must submit documentation confirming the position held by such principal or employee in the prior entity, as well as in the bidding entity.

- The bidder may not rely on the experience of its principals or other employees to demonstrate compliance with any other requirements, including without limitation, financial requirements or requirements for a specified minimum amount of annual gross revenues.

(D) **JOINT VENTURES**: In the event the bidder is a joint venture, at least one firm in the joint venture must meet the above described experience requirements.

(E) **SPECIAL EXPERIENCE REQUIREMENTS FOR SPECIFIC AREAS OF WORK**: The special experience requirements set forth below apply to the contractor or subcontractor that will perform specific areas of work. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of such award, the contractor will be required to submit the qualifications of the contractor or subcontractor that will perform these specific areas of work. If the bidder intends to perform these specific areas of work with its own forces, it must demonstrate compliance with the special experience requirements. If the bidder intends to subcontract these specific areas of work, its proposed subcontractor(s) must demonstrate compliance with the special experience requirements. Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City. The bidder is advised to carefully review these special experience requirements prior to submitting its bid, as such experience requirements will be strictly enforced.

(1) Special experience requirements apply to the contractor or subcontractor that will perform specific areas of work specified in the section(s) set forth below.

General Construction Work

- Section 075216: SBS Modified Bitumen Roofing

Electrical Work

- Section 263100: Photovoltaic Collectors

(2) Special experience requirements applicable to the contractor or subcontractor who will perform specific areas of work are summarized below.

- For Sections 263100 Photovoltaic Collectors, the contractor or subcontractor performing the work of this section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope, size and type to the required work. In addition, the contractor or subcontractor performing the work must be approved by the manufacturer and by the New York State Energy Research and Development Authority (NYSERDA).

- For Section 075216 SBS Modified Bitumen Roofing, the contractor or subcontractor performing the work of this section must be a company regularly engaged in performing roofing projects with its own workforce and have successfully completed in a timely fashion at least three (3) roofing projects similar in scope, size and type to the required work within the last three (3) consecutive years prior to the bid opening. At least one of those projects must have been performed within the last twelve (12) months. The three (3) qualifying projects must have utilized one or more of the roofing systems specified for the project being bid herein, been installed by the contractor's or subcontractor's company utilizing its own workforce and must have qualified for, and have been issued, the warranty provided by the manufacturer of the roofing system. In addition, the contractor or subcontractor must be a certified or authorized installer for at least one of the manufacturer's roofing systems specified herein and shall submit proof of same

(3) For each project submitted to demonstrate compliance with the special experience requirements for specific areas of work, the contractor or proposed subcontractor will be required to complete the Qualification Form included in the Bid Booklet.

a. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information on the Qualification Form is provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

b. For Section 075216 SBS Modified Bitumen Roofing, the contractor or subcontractor must specify, for each qualifying project submitted, the type of roofing system utilized and provide proof that the manufacturer's warranty for that project was issued. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information required to be provided by the contractor or subcontractor on the Qualification Form is actually provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

QUALIFICATION FORM

Name of Contractor: Lo Sardo General Contractors, Inc.

Name of Project: Sun Building NYC Dept. of Building Headquarters Facade Rehab. 280

Location of Project: 280 Broadway, New York, N.Y 10007

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: Mr. John Demase - NYCDDC

Title: Project Manager Phone Number: 914-525-3638

Brief description of the Project completed or the Project in progress: Restoration of a historical landmark. Rebuild decorative & structural marble elements.

Was the Project performed as a prime, a subcontractor or a sub-subcontractor: Prime

Amount of Contract, Subcontract or Sub-subcontract: $19,813,087.00

Start Date and Completion Date: 3/22/2017 - 06/26/2019

****

Name of Contractor: Lo Sardo General Contractors, Inc.

Name of Project: George Westinghouse High School

Location of Project: 105 Johnson Street, Brooklyn, NY

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: Mr. Eric Tiedemann - NYCSCA

Title: SPO Phone Number: 718-752-5920

Brief description of the Project completed or the Project in progress: Rehab. of a historical landmark building. Replace roof parapets, new cast stone and terracotta to replicate...

Was the Project performed as a prime, a subcontractor or a sub-subcontractor: Prime

Amount of Contract, Subcontract or Sub-subcontract: $9,879,854.00

Start Date and Completion Date: 2/2016 - 2/2018

NYC Mayor's Office of Contract Services

SCHEDULE B – M/WBE Utilization Plan

Part 1: M/WBE Participation Goals

Contract Overview (To be completed by contracting agency)

APT E-Pin# 85021B0135 FMS Project ID# S136-383N

Project Title Roof Replacement/HVAC/Solar Agency PIN# 8502020TR0002C

Contracting Agency Department of Design and Construction Bid/Proposal Response Date 09/21/2021

Agency Address 30-30 Thomson Avenue City Long Island City State NY ZIP 11101

Contact Person Nichole John-Baptiste Title MWBE Outreach and Compliance Analyst

Telephone (718) 391-2127 Email lfillNi@ddc.nyc.gov

Project Description (attach additional pages if necessary)

DSNY Garage Roof Replacement/HVAC/Solar

Bidder or proposer ☐ is required OR ☐ is not required to specifically identify the contact information of all M/WBE firms they intend to use as a subcontractor on this contract, including the M/WBE vendor name, address and telephone number in the space provided below in Part 2 Section 4.

M/WBE Participation Goals for Services

Enter the percentage amount for each category or for an unspecified Goal.

Prime Contract Industry: Construction

Category and Breakdown:

Unspecified ____ %

Black American 27.00 %

Hispanic American 1.00 %

Asian American ____ %

Women ____ %

Total Participation Goals 28.00 %
Line 1

Part 2: M/WBE Participation Plan

(To be completed by the bidder/proposer unless granted a full waiver, which must be submitted with the bid/proposal in lieu of this form)

Section 1: Prime Contractor Contact Information

Tax ID# 11-2250515 FMS Vendor ID# S136-383N

Business Name LO SARDO GENERAL CONTRACTORS, INC. Contact Person SILVIO C. LO SARDO

Business Address 35 CRESCENT STREET City BROOKLYN State NY ZIP 11208

Telephone 718-647-4924 Email SILVIO@LOSARDO.NET

Section 3: Contractor M/WBE Utilization Plan

Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation. Check applicable box. The Proposer or Bidder will fulfill the M/WBE Participation Goals:

☐ As an M/WBE Prime Contractor that will self-perform and/or subcontract to other M/WBE firms a portion of the contract the value of which is at least the amount located on Lines 2 or 3 in the panels in Section 2, as applicable. The value of any work subcontracted to non-M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals. Please check all that apply to Prime Contractor: ☐ MBE ☐ WBE

☐ As a Qualified Joint Venture with an M/WBE partner, in which the value of the M/WBE partner's participation and/or the value of any work subcontracted to other M/WBE firms is at least the amount located on Lines 2 or 3 in the panels in Section 2, as applicable. The value of any work subcontracted to non-M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals.

☒ As a non-M/WBE Prime Contractor that will enter into subcontracts with M/WBE firms the value of which is at least the amount located on Lines 2 or 3 in the panels in Section 2, as applicable.

Section 2: M/WBE Utilization Goal Calculation

Prime Contractor Adopting Agency Participation Goals

For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE Participation Goals.

Total Bid/Proposal Value $ 25,654,000.00

multiplied by x

Total Participation Goals 28.00 %
(Line 1 above)

Calculated M/WBE Participation Amount $ 7,183,120.00
Line 2

OR

Prime Contractor With Partial Waiver Approval Adopting Revised Participation Goals

For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Revised M/WBE Participation Goals.

Total Bid/Proposal Value $ ____

multiplied by x

Total Revised Participation Goals ____ %

Calculated M/WBE Participation Amount $ ____
Line 3

Tax ID# 11-2250515 APT E-Pin# 8502020TR0002C

Section 4: General Contract Information

What is the expected percentage of the total contract dollar value that you expect to award in subcontracts for services, regardless of M/WBE status? 70.00 %

Enter a brief description of the type(s) and dollar value of subcontracts for all services you plan to subcontract if awarded this contract, along with the anticipated start and end dates for such subcontracts. For each item, indicate whether the work is designated for participation by an M/WBE. Where the contracting agency's solicitation has indicated a requirement that the bidder or proposer specifically identify the contact information of all M/WBEs they intend to use on this contract, vendors must also include the M/WBE vendor name, address and telephone number in the space provided below. Use additional sheets if necessary.

	Description of Work	Start Date (MM/YY)	End Date (MM/YY)	Planned $ Amount	Designated for M/WBE Y	Designated for M/WBE N	M/WBE Vendor Name	M/WBE Address	M/WBE Telephone
1.	Asbestos Abatement	TBD /	/	$ 280,000.00	☑	☐	TBD		( ) -
2.	Structural Steel Work	TBD /	/	$ 400,000.00	☑	☐	TBD		( ) -
3.	Roofing Work	TBD /	/	$ 6,000,000.00	☑	☐	TBD		( ) -
4.	Plumbing Work	TBD /	/	$ 107,926	☐	☑	Louis L. Buttermark & Sons, Inc.	16-18 New Dorp Lane, Staten Island, NY 10306	(718) 351 - 4220
5.	Electrical Work	TBD /	/	$ 5,500,000	☐	☑	Rainbow Electric	76-18 Rockaway Boulevard, Woodhaven, NY 11421	(718) 521 - 926
6.	HVAC Work	TBD /	/	$ 4,850,000	☐	☑	Leviathan Mechanical Corp.	35 Crescent Street, Brooklyn, NY 11208	(718) 647 - 4924
7.	Mechanical Support	TBD /	/	$ 1300000	☑	☐	TBD		( ) -
8.	Solar Work	TBD /	/	$ 1,000,000	☑	☐	TBD		( ) -
9.		/	/	$	☐	☐			( ) -
10.		/	/	$	☐	☐			( ) -

Section 5: Vendor Certification and Required Affirmations

I hereby:

1. *acknowledge my understanding of the M/WBE participation requirements as set forth herein and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York ("Section 6-129"), and the rules promulgated thereunder;*
2. *affirm that the information supplied in support of this M/WBE Utilization Plan is true and correct;*
3. *agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract;*
4. *agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such Goals are modified by the Agency; and*
5. *agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or If a partial waiver is obtained or such Goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.*

Signature _____ Date 10/11/21

Print Name SILVIO C. LO SARDO Title PRESIDENT

NYC Mayor's Office of Contract Services

SCHEDULE B – Part 3

Request for Waiver of M/WBE Participation Requirement

Contract Overview

Tax ID#_____ FMS Vendor ID#_____

Business Name_____ Contact Name_____

Email_____ Telephone_____

Contracting Agency_____

APT E-Pin#_____ Bid/Proposal Due Date_____

Basis for Waiver Request: Check appropriate box & explain in detail below (attach additional pages if needed)

☐ Vendor does not subcontract services, and has the capacity and good faith intention to perform all such work itself with its own employees.

☐ Vendor subcontracts some of this type of work but at a lower % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract. Identify your subcontracting plan in the vendor certification section below.

☐ Vendor has other legitimate business reasons for proposing the M/WBE Participation Goal requested here. Explain under separate cover.

Vendor Contract History

Using the attached Excel template, list all contracts (for City and Non-City work) performed within the last 3 years and provide the requested information for each contract.

From the list of all contracts, provide reference information below for the 5 most relevant contracts in size, scale and scope (performed for New York City or any other entity) to the bid or proposal for which you are submitting this waiver request. Provide the requested information for each subcontract awarded during the life of the listed reference contract.

Please make sure to highlight the 5 reference contracts provided below among the comprehensive list of all your contract awards within the attached Excel template.

M/WBE Participation Goals for Services

Defined by AGENCY in bid/ solicitation documents

Percent of the total contract value to be subcontracted to M/WBE vendors for services and/or credited to an M/WBE Qualified Joint Venture.

Unspecified _____ %

Black American _____ %

Hispanic American _____ %

Asian American _____ %

Women _____ %

Total Participation Goals _____ %

Proposed by VENDOR seeking waiver

Percent of the total contract value anticipated in good faith by the bidder/ proposer to be subcontracted to M/WBE businesses for services. Or if M/WBE Qualified Joint Venture, percent of total contract value anticipated to be credited to M/WBE vendor(s).

Unspecified _____ %

Black American _____ %

Hispanic American _____ %

Asian American _____ %

Women _____ %

Total Participation Goals _____ %

Reference 1

Agency/Organization_____ Contract #_____

Reference Contact_____ Telephone_____ Email_____

Contract Start Date _____ Contract End Date_____ Total Contract Value $_____

Prime Contract description

Did the vendor perform as a Prime Contractor or as a Subcontractor? ☐ Prime Contractor ☐ Subcontractor

Was the Prime Contract subject to any Goals? ☐ City M/WBE Goals ☐ State Goals ☐ Federal Goals ☐ No Applicable Goals

Did the Prime Contractor meet Goal requirements? ☐ Yes ☐ No ☐ N/A

If the Prime Contractor did not meet Goal requirements or contract is still ongoing, please explain

If you performed as the Prime Contractor, please provide a description and value of all work subcontracted to other vendors.

_____ $_____

_____ $_____

_____ $_____

_____ $_____

_____ $_____

_____ $_____

_____ $_____

_____ $_____

Percentage of total contract value subcontracted to other vendors _____ %

If you performed as the Subcontractor, please provide a description and value of work areas you self-performed.

_____ $_____

Reference 2

Agency/Organization _____ Contract # _____

Reference Contact _____ Telephone _____ Email _____

Contract Start Date _____ Contract End Date _____ Total Contract Value $ _____

Prime Contract description

Did the vendor perform as a Prime Contractor or as a Subcontractor? ☐ Prime Contractor ☐ Subcontractor

Was the Prime Contract subject to any Goals? ☐ City M/WBE Goals ☐ State Goals ☐ Federal Goals ☐ No Applicable Goals

Did the Prime Contractor meet Goal requirements? ☐ Yes ☐ No ☐ N/A

If the Prime Contractor did not meet Goal requirements or contract is still ongoing, please explain

If you performed as the Prime Contractor, please provide a description and value of all work subcontracted to other vendors.

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

Percentage of total contract value subcontracted to other vendors _____ %

If you performed as the Subcontractor, please provide a description and value of work areas you self-performed.

_____ $ _____

Reference 3

Agency/Organization _____ Contract # _____

Reference Contact _____ Telephone _____ Email _____

Contract Start Date _____ Contract End Date _____ Total Contract Value $ _____

Prime Contract description

Did the vendor perform as a Prime Contractor or as a Subcontractor? ☐ Prime Contractor ☐ Subcontractor

Was the Prime Contract subject to any Goals? ☐ City M/WBE Goals ☐ State Goals ☐ Federal Goals ☐ No Applicable Goals

Did the Prime Contractor meet Goal requirements? ☐ Yes ☐ No ☐ N/A

If the Prime Contractor did not meet Goal requirements or contract is still ongoing, please explain

If you performed as the Prime Contractor, please provide a description and value of all work subcontracted to other vendors.

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

Percentage of total contract value subcontracted to other vendors _____ %

If you performed as the Subcontractor, please provide a description and value of work areas you self-performed.

_____ $ _____

Reference 4

Agency/Organization _____ Contract # _____

Reference Contact _____ Telephone _____ Email _____

Contract Start Date _____ Contract End Date _____ Total Contract Value $ _____

Prime Contract description

Did the vendor perform as a Prime Contractor or as a Subcontractor? ☐ Prime Contractor ☐ Subcontractor

Was the Prime Contract subject to any Goals? ☐ City M/WBE Goals ☐ State Goals ☐ Federal Goals ☐ No Applicable Goals

Did the Prime Contractor meet Goal requirements? ☐ Yes ☐ No ☐ N/A

If the Prime Contractor did not meet Goal requirements or contract is still ongoing, please explain

If you performed as the Prime Contractor, please provide a description and value of all work subcontracted to other vendors.

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

Percentage of total contract value subcontracted to other vendors _____ %

If you performed as the Subcontractor, please provide a description and value of work areas you self-performed.

_____ $ _____

Reference 5

Agency/Organization _____ Contract # _____

Reference Contact _____ Telephone _____ Email _____

Contract Start Date _____ Contract End Date _____ Total Contract Value $ _____

Prime Contract description

Did the vendor perform as a Prime Contractor or as a Subcontractor? ☐ Prime Contractor ☐ Subcontractor

Was the Prime Contract subject to any Goals? ☐ City M/WBE Goals ☐ State Goals ☐ Federal Goals ☐ No Applicable Goals

Did the Prime Contractor meet Goal requirements? ☐ Yes ☐ No ☐ N/A

If the Prime Contractor did not meet Goal requirements or contract is still ongoing, please explain

If you performed as the Prime Contractor, please provide a description and value of all work subcontracted to other vendors.

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

_____ $ _____

Percentage of total contract value subcontracted to other vendors _____ %

If you performed as the Subcontractor, please provide a description and value of work areas you self-performed.

_____ $ _____

Vendor Certification

Identify/list all the work areas you intend on subcontracting on the current anticipated contract for which you are submitting this waiver request.

I hereby affirm that the information supplied in support of this waiver request is true and correct, and that this request is made in good faith. I further affirm that the work that I did not list as work that will be subcontracted on this contract for which I am submitting this waiver request is work that I have performed on past contracts and will not subcontract if awarded this contract.

Signature _____ Date _____

Print Name SILVIO C. LO SARDO Title PRESIDENT

Approvals (for Agency completion only)

ACCO Signature _____ Date _____

CCPO Signature _____ Date _____

Waiver Determination

☐ Full Waiver Approved

☐ Waiver Denied

☐ Partial Waiver Approved

Revised Participation Goal _____ %

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	CONTRACT #1 GENERAL CONSTRUCTION							
1000	**DIVISION 01 - GENERAL & SUPPLEMENTARY REQUIREMENTS**							
	Mobilization	1	LS	$25,500.00	$25,500	$49,500.00	$49,500	**$75,000.00**
	Bond & Insurance	1	LS	$173,400.00	$173,400	$336,600.00	$336,600	**$510,000.00**
	Project supervision & Project management	1	LS	$91,429.40	$91,429	$177,480.60	$177,481	**$268,910.00**
	Submittals, Samples, Shop drawings, Site safety plan, etc.	1	LS	$8,500.00	$8,500	$16,500.00	$16,500	**$25,000.00**
	Temporary facilities & controls incl. DDC/CM Trailer	1	LS	$91,800.00	$91,800	$178,200.00	$178,200	**$270,000.00**
	Project schedule	1	LS	$13,600.00	$13,600	$26,400.00	$26,400	**$40,000.00**
	Office overheads	1	LS	$7,480.00	$7,480	$14,520.00	$14,520	**$22,000.00**
	Closeout procedures	1	LS	$8,500.00	$8,500	$16,500.00	$16,500	**$25,000.00**
	Permits	1	LS	$15,300.00	$15,300	$29,700.00	$29,700	**$45,000.00**
	Subtotal							
02 00 00	**EXISTING CONDITIONS**							
02 41 13	**Selective Removals & Demolitions**							
	Remove existing ballasted roofing assembly to top of existing steel deck; remove all associated cap and base flashings, Expansion joint covers, pitch pockets, crickets and cants Note: Base flashing is under ACM. Coordinate w/ ACM contractor.	149,290	SF	$0.41	$60,563	$0.79	$117,563	**$178,125**
	Remove existing masonry parapets assembly incl. coping, face-brick & back-up CMU in its entirety (1278 CFT)	1,300	SF	$1.31	$1,700	$2.54	$3,300	**$5,000.00**
	Remove existing (8"x12") interlock brick coping, flashing and reinforcement	2,146	LF	$0.20	$428	$0.39	$832	**$1,260**
	Remove existing face brick (Item included above)	N/A	N/A					
	Remove existing thru-wall flashing Note: Base flashing is under ACM. Coordinate w/ ACM contractor.	595	LF	$3.40	$2,023	$6.60	$3,927	**$5,950**
	Remove existing expansion joint cover and filler	795	LF	$1.05	$833	$2.03	$1,617	**$2,450**
	Remove existing wall mounted light fixtures	w/260000						
	Remove existing roof drain assemblies	w/220000						
	Remove existing roof drain assembly; remove portion of leaders as required to relocate drain minimum 3' away from mechanical	w/220000						
	Remove portion of existing metal deck for installation of new mechanical equipment (21 EA)	400	SF	$4.68	$1,870	$9.08	$3,630	**$5,500**
	Remove existing roof hatch	2	EA	$1,011.50	$2,023	$1,963.50	$3,927	**$5,950**

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Remove existing equipment curbs (93 EA) Note: Base flashing is under ACM. Coordinate w/ ACM contractor.	1,575	LF	$0.34	$536	$0.66	$1,040	**$1,575**
	Existing skylight to remain, Remove flashings around skylight curb Note: Base flashing is under ACM. Coordinate w/ ACM contractor.	270	LF	$0.68	$184	$1.32	$356	**$540**
	Remove existing roof ladder	2	EA	$110.50	$221	$214.50	$429	**$650**
	Remove flashing at vent stack	58	LOC	$6.16	$357	$11.95	$693	**$1,050**
	Remove existing pitch pockets	33	LOC	$8.04	$265	$15.60	$515	**$780**
	Remove existing 2 piece cap flashing at chimney	28	LF	$7.89	$221	$15.32	$429	**$650**
	Remove existing suspended gypsum board ceiling and supports to allow for mechanical work @District 17 & 18	1,125	SF	$0.76	$850	$1.47	$1,650	**$2,500**
	Remove existing acoustic ceiling tiles and grids, supports to allow for mechanical work @District 17	2,990	SF	$0.40	$1,190	$0.77	$2,310	**$3,500**
	Remove existing acoustic ceiling tiles and grids to allow for mechanical work @District 18	3,270	SF	$0.44	$1,428	$0.85	$2,772	**$4,200**
	Remove existing metal deck (35 LOC)	1,200	SF	$0.34	$408	$0.66	$792	**$1,200**
	Remove approx. 2"H portion of CMU wall to top of steel beam (1A/A302)	893	LF	$0.38	$340	$0.74	$660	**$1,000**
	Remove mechanical equipment pads	60	SF	$0.85	$51	$1.65	$99	**$150**
	Misc. Demolition, protection and cart away debris	1	LS	$238.00	$238	$462.00	$462	**$700**
	Sidewalk bridging (Approx. 1865 LF)	1	LS	$153,000.00	$153,000	$297,000.00	$297,000	**$450,000**
	Rental (4% of sidewalk bridging) - Time of Substantial Completion = 885 CCD	1	LS	$816.00	$816	$1,584.00	$1,584	**$2,400**
	PIPE SCAFFOLDING. - For parapet replacement at corners per detail 2B,3B/A301 = 8000 SF - For Raising existing parapet per detail 1B,2B/A302 = 29700 SF	37,700	SF	$1.82	$68,544	$3.53	$133,056	**$201,600**
	PIPE SCAFFOLDING. - As required for raising existing parapet per detail 1B,5B/A301,4/A302 (Approx. facade area = 24000 SF)	1	LS	$15,300.00	$15,300	$29,700.00	$29,700	**$45,000**
	MPT							
	Flagger (1 Flagger for Each Phase)	1	LS	$1,700.00	$1,700	$3,300.00	$3,300	**$5,000**
	Channelizing device (For Each Phase)	30	EA	$28.33	$850	$55.00	$1,650	**$2,500**
	Traffic signs (For Each Phase)	9	EA	$94.44	$850	$183.33	$1,650	**$2,500**
	Truck wash area- District 17							

Department of Design and Construction

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DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Remove existing grating at trench @Truck wash area-District 17	105	SF	$19.43	$2,040	$37.71	$3,960	**$6,000**
	Remove existing 6" CMU walls partition walls & overhead roll-up doors @Truck wash area-District 17 (2 Roll Up doors)	800	SF	$4.14	$3,315	$8.04	$6,435	**$9,750**
	Remove existing 8" high concrete curb @Truck wash area-District	121	LF	$15.30	$1,851	$29.70	$3,594	**$5,445**
	Remove existing bollards @Truck wash area-District 17	8	EA	$43.35	$347	$84.15	$673	**$1,020**
	Remove roll-up door (12'x14') @Truck wash area-District 17	2	EA	$119.00	$238	$231.00	$462	**$700**
	Remove truck wash equipment & accessories in their entirety (2 LOC)	1	LS	$1,700.00	$1,700	$3,300.00	$3,300	**$5,000**
	Misc. Demolition, protection and cart away debris	1	LS	$346.80	$347	$673.20	$673	**$1,020**
02 80 13	**General Contractor Work Allowance for incidental Asbestos Abatement** (See spec. sec. 028013 pg. 1)	1	LS	$5,100.00	$5,100	$9,900.00	$9,900	**$15,000**
02 82 13	**Asbestos Abatement** (See spec. sec. 028213 pg. 3-5) - Roof Flashing/Tar (Black) = 4540 SF - Roof Drain Flashing/Tar (Black) = 114 SF - Roof Vent Flashing/Tar (Black) = 165 SF - Roof Flue/Stack Flashing/Tar (Black) = 140 SF - Roof Skylight Flashing/Tar (Black) = 560 SF - Roof A/C Unit Flashing/Tar (Black) = 355 SF - Roof TEF/EF Exhaust Flashing/Tar (Black) = 540 SF - Roof TPE/Roof Vent Exhaust Flashing/Tar (Black) = 120 SF - Roof UEF Exhaust Flashing/Tar (Black) = 1500 SF	1	LS	$85,289.00	$85,289	$165,561.00	$165,561	**$250,850**
	Subtotal Existing Conditions							
03 00 00	**CONCRETE**							
03 00 00	**Concrete**	w/033000						
03 11 00	**Concrete Formwork**	w/033000						
03 15 00	**Concrete Accessories**	w/033000						
03 20 00	**Concrete Reinforcing**	w/033000						
03 21 00	**Reinforcement Bars**							
	New #4 reinforcement bar welded to existing steel at every 12" (L=1'7") @ 8" CMU parapet	895	EA	$46.72	$41,810	$90.68	$81,161	**$122,971**

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	New #4 reinforcement bar welded to existing steel at every 12" (L=4'3") @6" CMU parapet	270	EA	$50.37	$13,600	$97.78	$26,400	**$40,000**
	RFI: Line items given in section "032100 Reinforcement Bars" of BID Breakdown Form states "New reinforcement bar welded to existing steel at every 12" @ 6" CMU parapet" but details 6/A301 & 3/A302 calls for reinforcement bars @ 24" O.C. Please clarify on-center spacing of reinforcement bars?							
	#4 Dowel @ 24" O.C. w/ MIN 16" embedment, set in epoxy grout (965 LF)	605	EA	$33.72	$20,400	$65.45	$39,600	**$60,000**
	Truck wash area- District 17							
03 30 00	**Cast in Place Concrete**							
	Provide 6" concrete slab over entire elec service room w/ reinforcement @Truck wash area-District 17 - (6") Concrete slab, reinf. w/ wwm (21 CY) - (6") Crushed stone base (23 CY)	1120	SF	$53.32	$59,721	$103.51	$115,929	**$175,650**
	Grout above steel beam (1B,3/A302)	3	CY	$2,266.67	$6,800	$4,400.00	$13,200	**$20,000**
	Patch and level existing concrete slab	N/A	N/A					
	Misc. Concrete	1	LS	$3,400.00	$3,400	$6,600.00	$6,600	**$10,000**
	Subtotal Concrete							
04 00 00	**MASONRY**							
04 20 00	**Unit Masonry**							
	New face brick to match existing @parapet (A-301,A-302) - Face brick per detail 2B,3B,6/A301 = 1316 SF - 2-courses of face brick per DTL 1B,4B,5/A301 = 1181 LF - 1-courses of face brick per DTL 2B,4/A302 = 72 LF - 6-Courses of face brick per DTL 1B,3/A302 = 1786 SF	3,715	SF	$25.64	$95,251	$49.77	$184,899	**$280,150**
	New 8" CMU; Grout solid at cells with reinforcement (A-302)	1,786	SF	$20.00	$35,717	$38.82	$69,333	**$105,050**
	New 6" CMU (A-301)	1,150	SF	$28.67	$32,972	$55.66	$64,004	**$96,975**
	One course of 8"Hx6"W CMU (A-301)	1,181	LF	$27.83	$32,871	$54.03	$63,809	**$96,680**
	One course of 4"Hx6"W Back-up CMU	72	LF	$46.51	$3,349	$90.29	$6,501	**$9,850**
	Remove & replace 3-courses of face brick to match existing, for counter flashing work.	530	LF	$30.50	$16,167	$59.21	$31,383	**$47,550**

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CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Truck wash area- District 17							
	New 8" CMU Wall (H=15')	375	SF	$89.06	$33,398	$172.88	$64,832	**$98,230**
	New face brick to match existing	375	SF	$63.01	$23,630	$122.32	$45,870	**$69,500**
	Dowels at the end of CMU bond beam into existing wall	20	EA	$12.75	$255	$24.75	$495	**$750**
04 43 50	**Cast Stone**							
	New 13"x8" precast conc. Coping w/ New SS eye rod dowel and pins @36" each	2,406	LF	$47.51	$114,308	$92.22	$221,892	**$336,200**
	Subtotal Masonry							
05 00 00	**METALS**							
	6", 16GA Steel stud joist at electrical room roof. Note: Joist On-center spacing is not given on DWGs.	660	SF	$10.05	$6,630	$19.50	$12,870	**$19,500**
05 12 10	**Structural Steel**							
	Structural Steel - Galv. Steel dunnage framing = 4.2 TON - Opening support framing = 0.4 TON - New steel beams = 3.1 TON - (2) L6x4x3/8 Steel lintel = 8 LF - 3x3x3/8" Steel bent plate angle = 25 LF	8	TONS	$8,296.00	$66,368	$16,104.00	$128,832	**$195,200**
	Provide Galv. Steel Ladder with step over platform (13' high) - Cut ship ladder stringer for new connection - 10"x24"x1/2" Plates = 8 EA - Stiffener plates = 8 EA - W12x30 = Approx. 8 LF	2	EA	$5,100.00	$10,200	$9,900.00	$19,800	**$30,000**
	Misc. Metals	1	LS	$2,856.00	$2,856	$5,544.00	$5,544	**$8,400**
05 30 00	**Metal Deck**							
	(MIN 20GA.) New metal deck	14,265	SF	$4.56	$65,001	$8.85	$126,179	**$191,180**
	Provide metal deck closure at existing roof openings of mechanical equipment to be removed	200	SF	$7.65	$1,530	$14.85	$2,970	**$4,500**
	Remove & replace/ reinstall metal deck for beam installation as required (Total Beams = 333 LF, 26 EA)	1	LS	$6,800.00	$6,800	$13,200.00	$13,200	**$20,000**
	22GA, 1" Corrugated metal deck	660	SF	$5.98	$3,944	$11.60	$7,656	**$11,600**
	Subtotal Metals							
06 00 00	**WOODS, PLASTICS & COMPOSITES**							
06 10 00	**Rough Carpentry**	1	LS	$2,805.00	$2,805	$5,445.00	$5,445	**$8,250**

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Subtotal Woods, Plastics & Composites							
07 00 00	**THERMAL MOISTURE PROTECTION**							
	MIN R-11.4 I.C. Rigid insulation Board & Air/ vapor barrier at wall infill	375	SF	$83.87	$31,450	$162.80	$61,050	**$92,500**
	Rigid insulation at base of face-brick (MIN R-11.4)	390	SF	$85.00	$33,150	$165.00	$64,350	**$97,500**
	Copper fabric flashing at base of face brick at parapet.	390	SF	$85.00	$33,150	$165.00	$64,350	**$97,500**
07 27 00	**Firestopping/Smokeseals**	1	LS	$3,740.00	$3,740	$7,260.00	$7,260	**$11,000**
07 52 16	**SBS Modified Bituminous Roofing**							
	Provide new SBS Modified Bitumen Roofing assembly as: - SBS Granule surfaced cap sheet - 3 Ply SBS roof membrane - 1/2" Cover board - Min5" Polyisocyanurate tapered rigid insulation R30 - Vapor barrier - 1/2" Cover board	149,290	SF	$13.38	$1,997,296	$25.97	$3,877,104	**$5,874,400**
	Provide roof walkway pavers (2425 LF) (Precast concrete ballast pavers with bearing pads)	9,700	SF	$8.24	$79,900	$15.99	$155,100	**$235,000**
	Provide insulated aluminum roof hatch with guardrails at existing roof opening (12 SF each)	2	EA	$1,020.00	$2,040	$1,980.00	$3,960	**$6,000**
	Prefabricated Curbs and Equipment Supports							
	Provide premanufactured insulated curb and flashing around existing duct penetration openings (6 EA)	90	LF	$28.33	$2,550	$55.00	$4,950	**$7,500**
07 60 00	**Flashing and Sheet Metal**							
	Liquid applied flashing membrane over entire inside face parapet	8,045	SF	$13.41	$107,859	$26.03	$209,374	**$317,233**
	Cut reglet in CMU & SS thru-wall coping cap w/ interlock flashing	579	LF	$17.62	$10,200	$34.20	$19,800	**$30,000**
	Metal counter flashing at duct penetration curb (6 EA)	90	LF	$5.67	$510	$11.00	$990	**$1,500**
	Provide flashing around new equipment curb (Curb provided by equipment manufacture)	1,515	LF	$3.40	$5,151	$6.60	$9,999	**$15,150**
	Provide liquid applied flashings around skylight curb	270	LF	$3.40	$918	$6.60	$1,782	**$2,700**
	Provide liquid applied flashing around existing/ new roof vents and pipe penetrations	90	LOC	$3.40	$306	$6.60	$594	**$900**
	Provide Liquid applied flashing at existing CMU Chimney stack	29	LF	$3.40	$99	$6.60	$191	**$290**

Department of Design and Construction

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CONTRACT 1 - GENERAL CONSTRUCTION

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Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Flashing at roof to roof expansion joint.	242	LF	$3.40	$823	$6.60	$1,597	**$2,420**
	Flashing at roof drain.	40	EA	$3.40	$136	$6.60	$264	**$400**
	Roof to roof expansion joint cover over wood blocking per DTL 8/A401	242	LF	$3.40	$823	$6.60	$1,597	**$2,420**
	Roof to wall expansion joint cover over wood blockings per DTL 8/A401	550	LF	$0.34	$187	$0.66	$363	**$550**
	Install curbs/ rails for equipment & ducts (83 EA) Note: Coordinate w/ MC.	1,605	LF	$12.71	$20,400	$24.67	$39,600	**$60,000**
07 72 00	**Roof Accessories**	w/075216						
07 90 00	**Joint Sealers**							
	Provide Expansion joint with compressible filler	795	LF	$3.40	$2,703	$6.60	$5,247	**$7,950**
	Remove and replace insulation as needed (7/A301)	470	SF	$3.40	$1,598	$6.60	$3,102	**$4,700**
	Provide min. R30 insulation at MU units (18 units)	1	LS	$1,700.00	$1,700	$3,300.00	$3,300	**$5,000**
07 92 00	**Joint Sealants for Concrete Work**							
	Misc. Caulking and sealing	1	LS	$2,550.00	$2,550	$4,950.00	$4,950	**$7,500**
	Subtotal Thermal Moisture Protection							
08 00 00	**OPENINGS**							
08 11 00	**Steel Doors and Frames**							
	Truck wash area- District 17							
	New HM door- SINGLE @Truck wash area-District 17	2	EA	$1,020.00	$2,040	$1,980.00	$3,960	**$6,000**
	New HM door- DOUBLE @Truck wash area-District 17	1	EA	$1,020.00	$1,020	$1,980.00	$1,980	**$3,000**
	New HM door Exterior - DOUBLE @Truck wash area-District 17	1	EA	$850.00	$850	$1,650.00	$1,650	**$2,500**
08 71 00	**Finish Hardware**	w/081100						
	Hardware set # 1 as: - Butts 3 each McKinney TA314 - Lockset 1 each Sargent 8204 LW1B - Cylinder 1 each Corbin - Door Closer 1 each LCN 411 EDA - Silencers 3 each Glynn Johnson 64 - Smoke Seal 1 each Pemko S44D	1	EA	$2,040.00	$2,040	$3,960.00	$3,960	**$6,000**

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Hardware set # 2 as: -. Butts 3 each McKinney TA314 - Exit Device 1 each Von Duprin 33A-L - Cylinder 1 each Corbin - Door Closer 1 each LCN 411 EDA - Silencers 3 each Glynn Johnson 64 - Smoke Seal 1 each Pemko S44D	1	EA	$2,040.00	$2,040	$3,960.00	$3,960	**$6,000**
	Hardware set # 3 as: - Butts 6 each McKinney TA314 - Exit Device 1 each Von Duprin 9847NL - Exit Device 1 each Von Duprin 9847EO - Cylinder 1 each Corbin - Door Closer 1 each LCN 411 EDA - Silencers 6 each Glynn Johnson 64 - Smoke Seal 1 each Pemko S44D	1	EA	$2,040.00	$2,040	$3,960.00	$3,960	**$6,000**
	Hardware set # 4 as: - Butts 6 each McKinney TA314 - Exit Device 1 each Von Duprin 9847NL - Exit Device 1 each Von Duprin 9847EO - Cylinder 1 each Corbin - Door Closer 1 each LCN 411 EDA - Silencers 6 each Glynn Johnson 64 - Rain Drip 2 each NGP 16A - Weather Strips 2 each NGP 152V - Sweeps 2 each NGP 97V	1	EA	$1,530.00	$1,530	$2,970.00	$2,970	**$4,500**
	Subtotal Openings							
09 00 00	**FINISHES**							
09 26 00	**Gypsum Board Assemblies**							
	Truck wash area- District 17							
	New GWB Wall partition (H=14') @Truck wash area-District 17 - 2-Layer of 5/8" Type X GWB on both side of wall - 5-1/2" 16GA, Steel studs @ 24" O.C. - Top & bottom track - (2) 3-5/8" 18GA Steel stud header - Sealant at top & bottom	975	SF	$10.24	$9,988	$19.88	$19,388	**$29,375**

Department of Design and Construction

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CONTRACT 1 - GENERAL CONSTRUCTION

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Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	New GWB ceiling @Truck wash area-District 17 - 3-Layers of 1/2" Type C GWB on one side - 1-Layer of 1" Gypsum liner panel on other side - 2-1/2" 20GA. C-H Studs @ 24" O.C.	660	SF	$10.05	$6,630	$19.50	$12,870	**$19,500**
09 51 00	**Acoustical Ceilings**							
	Provide new acoustic ceiling tiles and grids to match existing @District 17	2,990	SF	$9.10	$27,200	$17.66	$52,800	**$80,000**
	Provide new acoustic ceiling tiles and grids to match existing @District 18	3,270	SF	$13.70	$44,812	$26.60	$86,988	**$131,800**
09 91 00	**Painting**							
	Misc. Painting, and finishing, cutting and patching	1	LS	$2,210.00	$2,210	$4,290.00	$4,290	**$6,500**
	Truck wash area- District 17							
	Paint new GWB Wall partition (H=14') @Truck wash area-District 17	2000	SF	$6.17	$12,349	$11.99	$23,971	**$36,320**
	Paint new GWB Ceiling @Truck wash area-District 17	1800	SF	$2.42	$4,352	$4.69	$8,448	**$12,800**
	Flooring							
	Epoxy finish at new 6" high conc slab	865	SF	$2.20	$1,904	$4.27	$3,696	**$5,600**
	Misc. Painting, and finishing, cutting and patching	1	LS	$340.00	$340	$660.00	$660	**$1,000**
	Subtotal Finishes							
21 00 00	**FIRE PROTECTION**							
21 05 00	**Common Work Results for Fire Suppression**							
	Cutting, Patching, Inspection and Testing	1	LS	$680.00	$680	$1,320.00	$1,320	**$2,000**
21 05 18	**Escutcheons for Fire Suppression Piping**	w/210500						
21 05 53	**Identification of Fire Suppression Systems**	w/210500						
21 13 13	**Wet Pipe Sprinkler Systems**							
	New 2" sprinkler pipe to be connected to existing sprinkler main	1	EA	$1,700.00	$1,700	$3,300.00	$3,300	**$5,000**
	New sprinkler head and distribution piping	40	EA	$108.80	$4,352	$211.20	$8,448	**$12,800**
	Subtotal Fire Protection							
22 00 00	**PLUMBING**							
22 05 00	**Common Work Results for Plumbing**							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Demo							
	Existing 2" Natural gas line to be demolished back into first floor men's room cut and cap	1	LOC	$1,208.00	$1,208	$2,344.00	$2,344	**$3,552**
	Existing 1" gas pipe to be removed							
	Disconnect and Remove existing roof drains	39	EA	$76.96	$3,002	$149.40	$5,826	**$8,828**
	Disconnect and Remove existing Vent to roof	29	EA	$109.49	$3,175	$212.54	$6,164	**$9,339**
	New Work							
	New Roof drain	39	EA	$263.52	$10,277	$511.53	$19,950	**$30,227**
	Core drill	1	LS	$1,700.00	$1,700	$3,300.00	$3,300	**$5,000**
	Additional roof drain piping	60	LS	$46.10	$2,766	$89.50	$5,370	**$8,136**
	Additional vent roof piping	500	LS	$17.64	$8,818	$34.24	$17,118	**$25,936**
	Cutting, Patching, Inspection and Testing	1	LS	$893.52	$894	$1,734.48	$1,734	**$2,628**
	Truck Wash area - Existing drain, fixtures and associated piping in truck wash to be demolished							
	Truck Wash area - Existing 3" cw line to be demolished back into first floor men's room cut and cap	1	LOC	$726.24	$726	$1,409.76	$1,410	**$2,136**
22 05 29	**Hangers and Supports for Plumbing and Equipment**	w/220500						
22 05 53	**Identification of Plumbing Piping and Equipment**	w/220500						
22 07 00	**Plumbing Insulation**	w/220500						
22 08 00	**Commissioning of Plumbing**	w/220500						
22 13 16	**Vent Piping**	w/220500						
22 14 13	**Facility Storm Drainage Piping**	w/220500						
22 70 00	**Natural Fuel Gas Systems - Plumbing**							
	1" Gas piping and supports	170	LF	$46.84	$7,962	$90.92	$15,456	**$23,418**
	Connect to new RTU unit	2	EA	$340.00	$680	$660.00	$1,320	**$2,000**
	CTE	19	EA	$35.79	$680	$69.47	$1,320	**$2,000**
	Subtotal Plumbing							
23 00 00	**HEATING, VENTILATING AND AIR CONDITIONING**							
23 01 30	**HVAC Air Duct Cleaning**							
	Cleaning & Identification	1,000	HRS	$60.69	$60,690	$117.81	$117,810	**$178,500**

Department of Design and Construction

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
23 05 00	**Common Work Results for HVAC**							
	Demolition							
	Remove Make-Up Air Unit	18	EA	$3,033.56	$54,604	$5,888.67	$105,996	**$160,600**
	Remove HV Unit	2	EA	$1,088.00	$2,176	$2,112.00	$4,224	**$6,400**
	Remove Roof Fan	45	EA	$1,473.52	$66,309	$2,860.37	$128,717	**$195,025**
	Remove Relief Hood	13	EA	$576.69	$7,497	$1,119.46	$14,553	**$22,050**
	Remove Inline Exhaust Fan	28	EA	$170.00	$4,760	$330.00	$9,240	**$14,000**
	Remove AC Unit	18	EA	$566.67	$10,200	$1,100.00	$19,800	**$30,000**
	Remove Cabinet Unit Heater	2	EA	$510.00	$1,020	$990.00	$1,980	**$3,000**
	Remove Unit Heater Vent	45	EA	$433.50	$19,508	$841.50	$37,868	**$57,375**
	Remove OA Intake	N/A	EA					**$0**
	Remove Roof Vent	N/A	EA					**$0**
	Remove Ductwork	1,980	LF	$15.70	$31,093	$30.48	$60,357	**$91,450**
	Cap the Duct	1	EA	$6,800.00	$6,800	$13,200.00	$13,200	**$20,000**
	New work							
	Unit Heater UH-1: 30 MBH	1	EA	$2,983.50	$2,984	$5,791.50	$5,792	**$8,775**
	Unit Heater Vents	45	EA	$688.50	$30,983	$1,336.50	$60,143	**$91,125**
	Miscellaneous							
	Mobilization	172	HRS	$258.36	$44,439	$501.53	$86,263	**$130,702**
	Rigging/Lifting/Hoisting	500	HRS	$119.00	$59,500	$231.00	$115,500	**$175,000**
	Shop drawing & Submittals	200	HRS	$102.00	$20,400	$198.00	$39,600	**$60,000**
23 05 13	**Common Motor Requirements for HVAC Equipment**							
	VFD - 5 HP (furnish only; install by EC)	28	EA	$8,559.00	$239,658			**$239,658**
	VFD - 3 HP (furnish only; install by EC)	4	EA	$2,720.00	$10,880	$5,280.00	$21,120	**$32,000**
23 05 29	**Hangers and Supports for HVAC Piping and Equipment**	w/238136						
23 05 48	**Vibration and Seismic Controls for HVAC Piping and Equipment**							
	Seismic restraints	50,000	LS	$0.50	$25,092	$0.97	$48,708	**$73,800**
	Vibration control	70,000	LS	$2.14	$150,000			**$150,000**
23 05 53	**Identification for HVAC Piping and Equipment**							
	Cutting, patching, sealing	100	HRS	$60.69	$6,069	$117.81	$11,781	**$17,850**
23 05 93	**Testing, Adjusting, And Balancing For HVAC**							

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Balancing	200	HRS	$73.27	$14,654	$142.23	$28,446	**$43,100**
23 07 13	**Duct Insulation**							
	Fiberglass Insulation	17,000	SF	$2.47	$41,905	$4.79	$81,345	**$123,250**
	Acoustic Lining	4,500	SF	$2.38	$10,710	$4.62	$20,790	**$31,500**
23 08 00	**Commissioning of Mechanical**							
	Testing & Commissioning	80	HRS	$146.63	$11,730	$284.63	$22,770	**$34,500**
23 09 00	**Instrumentation and Control for HVAC**							
	DDC Controls							
	Control Points	660	EA	$238.50	$157,410	$495.00	$326,700	**$484,110**
	Programming, Head-End Equipment, Tie-In	1	LS		$215,000			**$215,000**
	Truck Wash Area - DDC Control Points	12	EA	$272.00	$3,264	$528.00	$6,336	**$9,600**
23 09 93	**Sequence of Operations for HVAC Controls**	w/230900						
23 23 00	**Refrigerant Piping**	w/238136						
23 31 13	**Metal Ducts**							
	Galvanized Ductwork	45,000	LBS	$3.33	$149,940	$6.47	$291,060	**$441,000**
23 33 00	**Air Duct Accessories**							
	Connect new Duct to Existing Ductwork	75	EA	$799.00	$59,925	$1,551.00	$116,325	**$176,250**
23 34 23	**HVAC Power Ventilators**							
	Heating & Ventilating Units HV-1,2 and Make-Up Units MU-1 to MU-18 (material only; labor below)	1,450,000	LS		$1,450,000			**$1,450,000**
	Heating & Ventilating Unit HV-1 - 1,400 CFM	1	EA	$2,000.00	$2,000	$1,500.00	$1,500	**$3,500**
	Heating & Ventilating Unit HV-2 - 2,400 CFM	1	EA	$880.00	$880	$1,500.00	$3,000	**$3,880**
	Make-Up Units MU-1,2 - 8,500 CFM, 640 MBH Input	2	EA	-$4,000.00	-$8,000	$1,500.00	$15,000	**$7,000**
	Make-Up Units MU-3,4; 11 to 18 - 10,000 CFM, 1,200 MBH Input	10	EA	$2,600.00	$26,000	$1,500.00	$9,000	**$35,000**
	Make-Up Units MU-5 to 10 - 11,000 CFM, 1,200 MBH Input	6	EA	$9,250.00	$55,500	$1,500.00	$1,500	**$57,000**
	Exhaust Fan GEF-1,2 - 6,800 CFM	1	EA	$3,500.00	$3,500	$1,500.00	$1,500	**$5,000**
	Exhaust Fan GEF-3,4 - 8,300 CFM	1	EA	$4,200.00	$4,200	$1,500.00	$1,500	**$5,700**
	Exhaust Fan GEF-5 to 10 - 11,000 CFM	1	EA	$5,000.00	$5,000	$1,500.00	$1,500	**$6,500**
	Exhaust Fan GEF-11 to 18 - 10,000 CFM	1	EA	$4,800.00	$4,800	$1,500.00	$1,500	**$6,300**
	Exhaust Fan UEF-1 to 6 - 16,000 CFM	1	EA	$6,000.00	$6,000	$1,500.00	$1,500	**$7,500**

Department of Design and Construction

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CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Exhaust Fan UEF-7 to 14 - 15,000 CFM	1	EA	$5,000.00	$5,000	$1,500.00	$1,500	**$6,500**
	Exhaust Fan TEF-1 - 960 CFM	1	EA	$1,000.00	$1,000	$1,500.00	$1,500	**$2,500**
	Exhaust Fan TEF-2 - 750 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-3 - 250 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-4 - 1,050 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-5 - 150 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-6 - 550 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-7 - 400 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-8 - 500 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-9 - 650 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-10 - 550 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan TEF-11 - 1,100 CFM	1	EA	$1,500.00	$1,500	$1,500.00	$1,500	**$3,000**
	Exhaust Fan TEF-12 - 600 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan EF-17-1 - 480 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan EF-17-2 - 1,780 CFM	1	EA	$2,000.00	$2,000	$1,500.00	$1,500	**$3,500**
	Exhaust Fan EF-17-3 - 300 CFM	1	EA	$750.00	$750	$1,500.00	$1,500	**$2,250**
	Exhaust Fan EF-18-1 - 2,080 CFM	1	EA	$4,000.00	$4,000	$1,500.00	$1,500	**$5,500**
	Exhaust Fan EF-18-2 - 1,300 CFM	1	EA	$1,500.00	$1,500	$1,500.00	$1,500	**$3,000**
	Exhaust Fan EF-18-3 - 950 CFM	1	EA	$1,500.00	$1,500	$1,500.00	$1,500	**$3,000**
	Exhaust Fan EF-18-4 - 2,000 CFM	1	EA	$4,000.00	$4,000	$1,500.00	$1,500	**$5,500**
23 36 00	**Air Terminal Units**							
	CAV Boxes	6	EA	$3,750.00	$22,500	$2,500.00	$15,000	**$37,500**
23 37 13	**Diffusers, Registers, And Grilles**	w/233600						
23 37 23	**HVAC Gravity Ventilators**	w/233600						
23 41 03	**Carbon Monoxide Detection System with Alarm Control**							
	Carbon Monoxide Detection System	1	LS	$18,360.00	$18,360	$35,640.00	$35,640	**$54,000**
23 74 13	**Packaged, Outdoor, Central-Station Air-Handling Units**							
	Equipment							
	Roof Top Units RTU-1,2 (material only; labor below)	1	LS		$250,000			**$250,000**
	Roof Top Unit RTU-1 - 5,700 CFM	1	EA	$2,000.00	$2,000	$6,000.00	$6,000	**$8,000**
	Roof Top Unit RTU-2 - 8,500 CFM	1	EA	$2,000.00	$2,000	$6,000.00	$6,000	**$8,000**
23 81 36	**Truck Wash Bay - Variable Refrigerant Flow Systems**							

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Split System AC-1,2/ACCU-1 - 3 Tons Each	30,000	LS		$30,000			**$30,000**
	Piping							
	Refrigerant Piping	300	LF	$45.00	$13,500			**$13,500**
	Refrigerant Piping Insulation	300	LF	$12.00	$3,600			**$3,600**
	1-1/2" Condensate Drain Piping w/ Insulation	20	LF	$80.00	$1,600			**$1,600**
	1" Condensate Drain Piping w/ Insulation	60	LF	$75.00	$4,500			**$4,500**
	Subtotal Heating, Ventilating and Air Conditioning							
26 00 00	**ELECTRICAL**							
26 05 00	**Common Work Results for Electrical**							
	Demolition - DS/Motor/Circuit/Conduit/Controls	150	EA			$170.00	$25,500	**$25,500**
	Coordinate All Shutdowns with the Authority	3	EA	N/A	N/A	$170.00	$6,800	**$6,800**
	Seismic Restraints		LS		$30,000	$170.00	$13,600	**$43,600**
	Core Drill & Firestop	50	EA	$350.00	$17,500	$170.00	$17,000	**$34,500**
	Shop Drawings, As-Builts, Engineering	120	Hrs	N/A	N/A	$170.00	$10,400	**$20,400**
	Startups and Shutdowns	60	Hrs			$170.00	$10,200	**$10,200**
	Permits	N/A	LS	$15,000.00	$15,000	$170.00	$850	**$15,850**
	Temp Power & Lighting	10,000	LS	$700.00	$70,000	$170.00	$140,250	**$212,500**
26 05 19	**Low-Voltage Electrical Power Conductors and Cables**							
	#3/0	100	LF	$15.00	$1,500	$170.00	$1,700	**$3,200**
	#6	550	LF	$5.00	$2,750	$170.00	$5,100	**$7,850**
	#3	1,460	LF	$7.00	$10,220	$170.00	$3,400	**$13,620**
	#8	850	LF	$3.50	$2,475	$170.00	$3,400	**$6,375**
	#10	1,300	LF	$1.25	$1,625	$170.00	$6,800	**$8,425**
	#4		LF	$8.00		$170.00		
	#500 MCM	1,500	LF	$29.00	$43,500	$170.00	$27,200	**$70,700**
	#12	20,000	LF	$0.50	$10,000	$170.00	$13,600	**$23,600**
	Pull Wire		LF					
	Demo Wireway		FT					
	Cat 6	5,000	LF	$0.50	$2,500	$170.00	$13,600	**$18,600**
26 05 23	**Control Voltage Electrical Power Cables**	w/260519						
26 05 26	**Grounding and Bonding for Electrical Systems**	w/260519						
26 05 29	**Hangers and Supports for Electrical Systems**	w/260519						

Department of Design and Construction

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CONTRACT 1 - GENERAL CONSTRUCTION

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Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
26 05 33	**Raceways and Boxes for Electrical Systems**							
	3/4" RGS	15,000	LF	$3.00	$45,000	$170.00	$108,800	**$153,800**
	1" RGS		LF			$170.00		
	1-1/4" RGS	1,000	LF	$40.00	$4,000	$170.00	$6,800	**$10,800**
	2-1/2" RGS	1,000	LF	$55.00	$5,500	$170.00	$6,800	**$11,300**
	3" RGS		LF					
	& cover		EA					
	Furnish and Install New Con-Edison Vault inc. Excavation	1	EA	$60,000.00	$60,000	$170.00	$13,600	**$73,600**
	Con-Ed Transformer/Network Protector (FBO; IEC)	1	EA				$6,800	**$6,800**
	Empty 2x2 Conduit Ductbank from Manhole to Con-Ed Vault - 4" PVC	1650	LF	$14.15	$23,341	$170.00	$45,309	**$68,650**
	3000A Service Feeder from Vault to SS	6600	LF	$20.00	$132,000	$170.00	$34,000	**$166,000**
26 05 44	**Sleeves and Sleeve Seals for Electrical Raceways and Cabling**	w/260533						
26 05 53	**Identification for Electrical Systems**	w/260533						
26 05 72	**Overcurrent Protective Device Short-circuit Study**		LS					**$25,000**
26 05 73	**Overcurrent Protective Device Coordination Study**	2/260572						
26 08 00	**Commissioning of Electrical**							
	Testing and Commissioning of Motors	40HRS				$170.00	$6,800	**$6,800**
26 24 13	**Truck Wash Area - Switchboards**							
	SSB2-4000A, 277/480V, 3PH, 4W	1	EA	$45,721.50	$45,722	$170.00	$88,754	**$134,475**
26 24 16	**Panelboards**							
	Bldg. Work							
	Shutdown existing panel 20A Ckt Breaker	1	EA	$0.00	$0	$170.00	$1,700	**$1,700**
	PS (100A-120/208V-3PH-42 Pole) - Truck Wash Area	1	EA	$3,145.00	$3,145	$170.00	$3,400	**$6,545**
	DP-PV-2-600A-480/277V-40A(15)-3 Pole - Truck Wash	1	EA	$12,000.00	$12,000	$170.00	$37,000	**$49,000**
	DP-PV-1-600A-480/277V-40A(15)-3 Pole - Truck Wash	1	EA	$12,000.00	$12,000	$170.00	$37,000	**$49,000**
	T-1-XFMR-30kVA-480V-208Y/120V - Truck Wash Area	2	EA	$12,410.00	$24,820	$170.00	$48,180	**$73,000**

Department of Design and Construction

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CONTRACT 1 - GENERAL CONSTRUCTION

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
26 27 26	**Wiring Devices**							
	Duplex	25	EA	$50.00	$1,250	$170.00	$6,800	**$8,050**
	GFI Duplex	21	EA	$85.00	$1,785	$170.00	$1,700	**$3,485**
	3/4"RGS	500	LF	$30.00	$1,500	$170.00	$3,400	**$4,900**
	#12	500	LF	$0.50	$250	$170.00	$850	**$1,100**
26 28 13	**Fuses**							
	400A Fuse for DP-B (RTU-2)	3	EA	$100.00	$300	$170.00	$170	**$470**
	Starter-NEMA-0	N/A	EA	N/A	N/A	N/A	N/A	**N/A**
	30A Fuse	1	EA	$10.00	$10	$170.00	$170	**$180**
	100A Fuse	1	EA	$27.00	$27	$170.00	$170	**$197**
	200A Fuse	1	EA	$35.00	$35	$170.00	$170	**$215**
	60A Fuse	1	EA	$19.00	$19	$170.00	$170	**$189**
	JB							
	JB WP							
	Starter-NEMA-0							
	JB WP	1	EA	$500.00	$500	$170.00	$170	**$670**
	JB	1	EA	$50.00	$50	$170.00	$170	**$220**
	Energy monitoring system with Display	1	EA	$15,000.00	$15,000	$170.00	$4,080	**$19,080**
26 28 16	**Enclosed Switches and Circuit Breakers**							
	Circuit Breakers							
	20A-1PH		EA	$25.00	$25	$170.00	$170	**$195**
	20A-120V-1PH	N/A	EA	N/A	N/A	N/A	N/A	**N/A**
	20A-120V-1PH-NEMA3R	N/A	EA	N/A	N/A	N/A	N/A	**N/A**
	Disconnects							
	Fused DS 30A	1	EA	$150.00	$150	$170.00	$170	**$320**
	Fused DS 60A	1	EA	$250.00	$250	$170.00	$170	**$420**
	30A DS WP - NFD	1	EA	$250.00	$250	$170.00	$170	**$420**
	100A DS WP - NFD	1	EA	$575.00	$575	$170.00	$170	**$745**
	60A DS WP - NFD	1	EA	$450.00	$450	$170.00	$170	**$620**
	200A DS WP - NFD	1	EA	$900.00	$900	$170.00	$170	**$1,070**
	400A DS WP - NFD	1	EA	$1,300.00	$1,300	$170.00	$170	**$1,470**
	Unit heater/motor/switch	57	EA	$175.00	$9,975	$170.00	$6,400	**$16,375**

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26 29 23	**Variable Frequency Motor Controllers**							
	VFD	21	EA	$2,000.00	$42,000	$170.00	$27,200	**$69,200**
26 31 00	**Photovoltaic Collectors**							
	Power Equipment							
	33KW - SMA - Sunny tri Power Core1 Inverter w/ Over current Protection & Associated Controls (Total of 28)	28	EA	$4,614.29	$129,200	$170.00	$250,800	**$380,000**
	PV Modules	1733	EA	$193.89	$336,005	$170.00	$652,245	**$988,250**
	Support Structure							
	Ballast Bays w/ blocks	2024	EA	$45.00	$91,080	$170.00	$76,500	**$168,084**
	Distribution Feeders							
	#1	N/A	LF	N/A	N/A	$170.00	N/A	N/A
	#10	N/A	LF	N/A	N/A	$170.00	N/A	N/A
	#2	N/A	LF	N/A	N/A	$170.00	N/A	N/A
	#2/0	9,100	LF	$29.29	$266,560	$170.00	$517,440	**$784,000**
	#350MCM	4,200	LF	$36.59	$153,680	$170.00	$298,320	**$452,000**
	#4	N/A						
	#500MCM	12,000	LF	$29.00	$348,000	$170.00	$136,000	**$484,000**
	#6	5,000	LF	$11.15	$55,726	$170.00	$108,174	**$163,900**
	#8	N/A	LF	N/A	N/A	$170.00	N/A	N/A
	1-1/2"RGS	2,000	LF	$125.00	$25,000	$170.00	$68,000	**$93,000**
	1-1/4"RGS	N/A	LF	N/A	N/A	$170.00	N/A	N/A
	2"RGS	1,800	LF	$150.00	$27,000	$170.00	$68,000	**$95,000**
	3"RGS	4,000	LF	$250.00	$100,000	$170.00	$136,000	**$236,000**
	3/4"RGS	3,000	LF	$30.00	$9,000	$170.00	$51,000	**$60,000**
	4"PVC	2,000	LF	$75.00	$15,000	$170.00	$42,500	**$257,500**
	Concrete	N/A	CF	N/A	N/A	N/A	N/A	N/A
	Excavation & backfill	N/A	CF	N/A	N/A	N/A	N/A	N/A
	SUBTOTAL FOR SOLAR P/V WORK LUMP SUM							
26 41 13	**Lightning Protection Collectors**							
	Lightning Protection System Copper Cable	7,500	LF	$19.11	$143,310	$170.00	$278,190	**$421,500**
	12" Air Terminal - Aluminum							**$36,000**
	Thru-Roof Cable Penetration to Steel Connection w/ Gnd Rod							**$76,500**
	Lighting Protection System - Testing & Certification	1	EA	$144,500.00	$144,500	$170.00	$280,500	**$425,000**
26 51 00	**Interior Lighting**							

Department of Design and Construction

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	Lighting Fixtures:							
	LT-2	3	EA	$500.00	$1,500	$170.00	$510	**$2,010**
	LT-1	5	EA	$500.00	$2,500	$170.00	$1,700	**$4,200**
	3/4"RGS	2,000	LF	$30.00	$6,000	$170.00	$13,600	**$19,900**
	#12	8,000	LF	$0.50	$4,000	$170.00	$6,800	**$10,800**
	Lighting Controls :							
	Switch	3	EA	$125.00	$375	$170.00	$510	**$885**
	OS	1	EA	$200.00	$200	$170.00	$170	**$370**
	3/4"RGS	500	LF	$30.00	$1,500	$170.00	$3,400	**$4,900**
	#12	2,000	LF	$0.50	$1,000	$170.00	$850	**$1,850**
	LV Wires & Outlet Boxes	25	EA	$20.00	$500	$170.00	$1,700	**$2,200**
	Lighting Fixtures Remove, Store & Reinstall	677	EA	$325.62	$220,446	$170.00	$427,924	**$648,370**
	Subtotal Electrical							
28 00 00	**ELECTRONIC SAFETY AND SECURITY**							
28 31 11	**Digital, Addressable Fire-Alarm System**							
	Fire Alarm System Control SubPanel - DACT w/ Backup Batteries	1	EA	$3,883.82	$3,884	$7,539.18	$7,539	**$11,423**
	Fire Alarm System Terminal Box	1	EA	$884.00	$884	$1,716.00	$1,716	**$2,600**
	Fire Alarm Remote Anunciator	1	EA	$1,190.00	$1,190	$2,310.00	$2,310	**$3,500**
	Strobe Booster Power Supply with Cabinet	1	EA	$1,700.00	$1,700	$3,300.00	$3,300	**$5,000**
	Smoke Detector	1	EA	$3,740.00	$3,740	$7,260.00	$7,260	**$11,000**
	Smoke Detector - Duct (WP)	1	EA	$10,118.06	$10,118	$19,640.94	$19,641	**$29,759**
	Horn/Strobe	1	EA	$408.00	$408	$792.00	$792	**$1,200**
	Strobe	1	EA	$2,559.52	$2,560	$4,968.48	$4,968	**$7,528**
	Gong	1	EA	$1,196.80	$1,197	$2,323.20	$2,323	**$3,520**
	Pull Station	1	EA	$1,550.40	$1,550	$3,009.60	$3,010	**$4,560**
	Control Module/Monitor Module/Relay (WP)	1	EA	$2,671.72	$2,672	$5,186.28	$5,186	**$7,858**
	3/4" RGS Conduit	1	LF	$4,080.00	$4,080	$7,920.00	$7,920	**$12,000**
	2" RGS Riser Conduit (Allow)	1	LF	$23,203.30	$23,203	$45,041.70	$45,042	**$68,245**
	Fire Alarm System Teflon Cable	1	LF	$15,300.00	$15,300	$29,700.00	$29,700	**$45,000**
	Power Feeders	1	LF	$61,540.00	$61,540	$119,460.00	$119,460	**$181,000**
	Cat 6 Cable to Tele/Data Demarc Location	1	LF	$2,650.64	$2,651	$5,145.36	$5,145	**$7,796**
	System Testing and Commissioning	1	LS	$8,500.00	$8,500	$16,500.00	$16,500	**$25,000**
	Subtotal Electronic Safety and Security							
31 00 00	**EARTHWORK**							

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
31 10 00	**Site Clearing**							
	Existing trench to be removed (30 CY)	180	SF	$5.34	$961	$10.36	$1,865	**$2,825**
	Existing slab to be removed w/ gravel (C-001)	1140	SF	$8.82	$10,050	$17.11	$19,510	**$29,560**
	Existing pipe to be abandoned and ends to be capped	1	LOC	$510.00	$510	$990.00	$990	**$1,500**
	Existing curb to be removed	121	LF	$4.21	$510	$8.18	$990	**$1,500**
	Sawcut concrete to subbase	60	LF	$386.75	$23,205	$750.75	$45,045	**$68,250**
	Existing concrete sidewalk to be removed	1295	SF	$0.83	$1,071	$1.61	$2,079	**$3,150**
	Existing steel faced curb to be removed	95	LF	$0.54	$51	$1.04	$99	**$150**
	Sawcut asphalt to subbase	175	LF	$0.76	$133	$1.47	$257	**$390**
	Existing asphalt to be removed (Top 3")	2666	SF	$0.67	$1,777	$1.29	$3,449	**$5,225**
	Existing asphalt incl. gravel base to be removed	195	SF	$0.87	$170	$1.69	$330	**$500**
	Existing tree pit to be removed (40 SF)	1	LOC	$170.00	$170	$330.00	$330	**$500**
31 23 16	**Excavation**	w/310000						
	Excavation for underground electrical manhole/ vaults incl. 20% fluff factor.	100	CY	$32.30	$3,230	$62.70	$6,270	**$9,500**
	Sheeting / shoring. - 15' Deep = 50 LF - 7' Deep = 60 LF	1200	SF	$11.90	$14,280	$23.10	$27,720	**$42,000**
	Dewatering as required. RFI: Provide Geo-technical report for existing water levels.	1	LS	$16,660.00	$16,660	$32,340.00	$32,340	**$49,000**
31 23 23	**Backfilling**	w/312333						
	Backfill at underground electrical manhole/ vaults incl. 20% fluff factor.	35	CY	$66.54	$2,329	$129.17	$4,521	**$6,850**
	Gravel base under manhole incl. 10% fluff factor.	6	CY	$33.43	$201	$64.90	$389	**$590**
31 23 33	**Trenching, Backfilling and Compaction**							
	Fill existing trench with structural fill	30	CY	$5.10	$153	$9.90	$297	**$450**
	Trench excavation for duct bank incl. 20% fluff factor.	65	CY	$28.99	$1,884	$56.27	$3,658	**$5,542**
	8" Gravel base under pavement incl. 10% fluff factor.	5	CY	$34.68	$173	$67.32	$337	**$510**
	(6") Sand Bedding incl. 20% fluff factor.	6	CY	$36.83	$221	$71.50	$429	**$650**
	Backfill incl. 20% fluff factor.	41	CY	$28.90	$1,185	$56.10	$2,300	**$3,485**
31 25 00	**Erosion and Sediment Control**	1	LS	$8,500.00	$8,500	$16,500.00	$16,500	**$25,000**
	Subtotal Earthwork							

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

Project: DSNY 17/18 Garage Roof & HVAC Upgrade
Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
32 00 00	**EXTERIOR IMPROVEMENTS**							
32 11 23	**Aggregate Base Course**	w/321216						
32 11 26	**Asphaltic Base Course**	w/321216						
32 12 13	**Bituminous Tack and Prime Coats**	w/321216						
32 12 16	**Asphaltic Paving**							
	New 3" asphalt pavement to match flush existing pavement, w/ 9" base as: - (1-1/2") Asphaltic concrete overlay - Tack coat - (1-1/2") Asphaltic concrete layer - Prime coat - (8") Dense Graded stone base (5.5 CY)	200	SF	$25.50	$5,100	$49.50	$9,900	**$15,001**
	(3") Asphaltic concrete pavement (25 CY) as: - (1-1/2") Asphaltic concrete overlay - Tack coat - (1-1/2") Asphaltic concrete layer - Prime coat	2670	SF	$15.44	$41,225	$29.97	$80,025	**$121,250**
32 13 13	**Concrete Paving**							
	New concrete sidewalk to match existing as: - (6") Concrete sidewalk, reinf. w/ wwm (25 CY) - (6") Gravel base (27 CY)	1295	SF	$14.44	$18,700	$28.03	$36,300	**$55,000**
	6" High concrete equipment pad (3 EA, 4 CY)	205	SF	$65.01	$13,328	$126.20	$25,872	**$39,200**
32 13 73	**Concrete Paving Joints and Sealants**							
	Proposed expansion joint	280	LF	$8.50	$2,380	$16.50	$4,620	**$7,000**
32 16 13	**Concrete Curbs and Gutters**							
	(8" x 1'6") New steel faced concrete curb (3.6 CY)	95	LF	$32.21	$3,060	$62.53	$5,940	**$9,000**
	Subtotal Exterior Improvements							
33 00 00	**UTILITIES**							
	(2'x2') Reinf. concrete electrical duct bank.	79	LF	$168.84	$13,338	$327.74	$25,892	**$39,230**

Department of Design and Construction

CONTRACTOR'S BID BREAKDOWN FORM

CONTRACT 1 - GENERAL CONSTRUCTION

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Location: 10502 Avenue D, Brooklyn, NY 11236
Bidder: LoSardo General Contractors Inc.

DDC ID: S136-383N
Sponsor Agency: DSNY

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	(6'x6'x4'6"Deep) Electrical Concrete Manhole.	1	EA	$5,780.00	$5,780	$11,220.00	$11,220	**$17,000**
	(14'6" x 7'6" x 11'Deep) Concrete Electrical Vault.	1	EA	$8,460.90	$8,461	$16,424.10	$16,424	**$24,885**
	Cast iron frame & cover at manhole & vault. - Provide bricks as required	2	EA	$884.00	$1,768	$1,716.00	$3,432	**$5,200**
33 05 97.23	**Underground Utility Warning Tape**							
	Warning tape	80	LF	$3.40	$272	$6.60	$528	**$800**
	Subtotal Utilities							
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK							**$25,654,000.00**

Pre-Award Process

The bidder is advised that as part of the pre-award review of its bid, it may be required to submit the information described in Sections (A) through (D) below. If required, the bidder must submit such information within five (5) business days following receipt of notification from DDC that it is among the low bidders. Such notification from DDC will be by email and will specify the types of information which must be submitted directly to DDC.

In the event the bidder fails to submit the required information within the specified time frame, its bid may be rejected as nonresponsive.

****

(A) **Project Reference Form**: If required, the bidder must complete and submit the Project Reference Form set forth in this Bid Booklet. The Project Reference Form consists of 3 parts: (1) Contracts Completed by the Bidder, (2) Contracts Currently Under Construction by the Bidder, and (3) Pending Contracts Not Yet Started by the Bidder.

(B) **Copy of License**: If required, the bidder must submit a copy of the license under which the bidder will be performing the work. Such license must clearly show the following: (1) Name of the Licensee, (2) License Number, and (3) Expiration date of the License. A copy of the license will be required from bidders for the following contracts: Plumbing Work, Electrical Work and Asbestos Abatement.

(C) **Financial Information**: If required, the bidder must submit the financial information described below:

(1) Audited Financial Statements: Financial statements (Balance Sheet and Income Statement) of the entity submitting the bid, as audited by an independent auditor licensed to practice as a certified public accountant (CPA). Audited financial statements for the three most recent fiscal years must be submitted. Each such financial statement must include the auditor's standard report.

If the bidder does not have audited financial statements, it must submit an affidavit attesting to the fact that the bidder does not have such statements. In addition, the bidder must submit the following documentation covering the three most recent fiscal years: signed federal tax returns, unaudited financial statements, and a "certified review letter" from a certified public accountant (CPA) verifying the unaudited financial statements.

Unless the most recent audited or unaudited financial statement was issued within ninety (90) days, the bidder must submit interim financial information that includes data on financial position and results of operation (income data) for the current fiscal year. Such information may be summarized on a monthly or quarterly basis or at other intervals.

(2) Schedule of Aged Accounts Receivable, including portion due within ninety (90) days.

(D) **Project Specific Information**: If required, the bidder must submit the project specific information described below:

(1) Statement indicating the number of years of experience the bidder has had and in what type of construction.

(2) Resumes of all key personnel to be involved in the project, including the proposed project superintendent.

(3) List of significant pieces of equipment expected to be used for the contract, and whether such equipment is owned or leased.

(4) Description of work expected to be subcontracted, and to what firms, if known.

(5) List of key material suppliers.

(6) Preliminary bar chart time schedule

(7) Contractor's expected means of financing the project. This should be based on the assumption that the contractor is required to finance 2X average monthly billings throughout the contract period.

(8) Any other issues the contractor sees as impacting his ability to complete the project according to the contract.

In addition to the information described in Sections (A) through (D) above, the bidder shall submit such additional information as the Commissioner may require, including without limitation, an explanation or justification for specific unit price items.

The bidder is further advised that it may be required to attend a pre-award meeting with DDC representatives. If such a meeting is convened, the bidder will be advised as to any additional material to be provided.

Project References

A. Contracts completed by the bidder

List all contracts substantially completed within the last 4 years, up to a maximum of 10, in descending order of date of substantial completion.

Project & Location	Contract Type	Contract Amount ($000)	Date Completed	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. (if different from owner)

See Attached

LoSardo GENERAL CONTRACTORS INC.

35 Crescent Street
Brooklyn, NY 11208
t. 718.647.4924
f. 718.647.7528

Similar Completed Contracts

Project Name	Contract Number	Contracting Agency	Contract Type	Dollar Amount at Completion	Date Completed	Contact Person	Contact Number
PS 254 (K)	C000013815	NYC School Construction Authority	Prime	$ 4,963,193.03	7/7/2017	Voytek Pitroski	917-745-7830
PS 152 (K)	C000013054	NYC School Construction Authority	Prime	$ 11,976,789.00	7/1/2016	Vincent Tang	347-870-1532
Wavehill House	20111441631	NYC Department of Design and Construction	Prime	$ 7,697,602.88	11/8/2015	Ieva Vanags	718-391-1307
PS 98 (M)	C000012939	NYC School Construction Authority	Prime	$ 2,659,958.21	8/21/2014	Marie Graves	718-472-8633

B. Contracts currently under construction by the bidder

List all contracts currently under construction even if they are not similar to the contract being awarded.

Project & Location	Contract Type	Contract Amount ($000)	Subcontracted to Others ($000)	Uncompleted Portion ($000)	Date Scheduled to Complete	Owner Reference & Tel. No.	Architect/ Engineer Reference & Tel. No. (if different from owner)

See Attached

LoSardo GENERAL CONTRACTORS INC.

35 Crescent Street
Brooklyn, NY 11208
t. 718.647.4924
f. 718.647.7528

Contracts Currently Under Construction

Project Name	Contract Number	Contracting Agency	Prime / JV	Contract Amount	Subcontracted to others	Uncompleted Portion	Expected Date of Completion	Contact Person	Contact Number
PS 103 (X)	C000015006	NYC School Construction Authority	Prime	$ 6,332,000.00	$ 1,139,760.00	$ 2,532,800.00	3/7/2020	Abdur Razzaq	917-617-4033
PS 125 (M)	C000015005	NYC School Construction Authority	Prime	$ 8,744,000.00	$ 1,573,920.00	$ 3,497,600.00	3/6/2020	Peter Avallone	646-345-9229
IS 302 (X)	C000015516	NYC School Construction Authority	Prime	$ 2,289,000.00	$ 412,020.00	$ 2,060,100.00	10/3/2020	Oswaldo Mauricio Ochoa	917-745-6273
PS 81 (X)	C000015464	NYC School Construction Authority	Prime	$ 4,467,000.00	$ 804,060.00	$ 4,020,300.00	7/10/2020	Shoaib Liaqat	718-752-5913

C. Pending contracts not yet started by the bidder

List all contracts awarded to or won by the bidder but not yet started.

Project & Location	Contract Type	Contract Amount ($000)	Date Scheduled to Start	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. (if different from owner)
"None"					

SAFETY QUESTIONNAIRE

The Bidder must include, with its bid, all information requested on this Safety Questionnaire. Failure to provide a completed and signed Safety Questionnaire at the time of bid opening may result in disqualification of the bid as non-responsive. This Safety Questionnaire will be reviewed as per Section V of the Safety Requirements for Construction Contracts, found in Volume 2 of the Contract.

1. Bidder Information:

Company Name: LoSardo General Contractors, Inc.

DDC Project Number: S136-383N

Company Size: ☐ Ten (10) employees or less

☒ Greater than ten (10) employees

Company has previously worked for DDC: ☒ YES ☐ NO

2. Type(s) of Construction Work:

Identify the types of work that the Bidder has performed in the last three years, and the types of work that are part of this Contract.

TYPE OF WORK	LAST 3 YEARS	THIS PROJECT
General Building Construction	☑	☐
Residential Building Construction	☐	☐
Nonresidential Building Construction	☑	☐
Heavy Construction, except building	☐	☐
Highway and Street Construction	☑	☑
Heavy Construction, except highways	☐	☐
Plumbing, Heating, HVAC	☑	☑
Painting and Paper Hanging	☐	☐
Electrical Work	☐	☐
Masonry, Stonework and Plastering	☑	☐
Carpentry and Floor Work	☑	☐
Roofing, Siding, and Sheet Metal	☑	☐
Concrete Work	☑	☑
Specialty Trade Contracting	☐	☐
Asbestos Abatement		
Other (specify) _____	☐	☐

3. Experience Modification Rate:

The Experience Modification Rate (EMR) is a rating generated by the National Council of Compensation Insurance (NCCI). This rating is used to determine the contractor's premium for worker's compensation insurance. The Bidder / Contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the Bidder cannot obtain its EMR, it must submit a written explanation as to why.

The Bidder must indicate its Intrastate and Interstate EMR for the past three years. [Note: For contractors with less than three years of experience, the EMR will be considered to be 1.00].

YEAR	INTRASTATE RATE	INTERSTATE RATE
2020	0.79	-
2019	0.70	-
2018	0.98	-

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the Bidder / Contractor must attach, to this questionnaire, a written explanation for the rating and identify what corrective action was taken to correct the situation resulting in that rating.

4. OSHA Information:

☐ **YES** ☒ **NO** **Contractor has received a willful violation issued by OSHA or a New York City Department of Buildings (NYCDOB) construction-related violation within the last three years.**

☐ **YES** ☒ **NO** **Contractor has had an incident requiring OSHA notification within 8 hours (all work-related fatalities) or an incident requiring OSHA notification within 24 hours (work-related in-patient hospitalization, amputation and all loss of an eye).**

The OSHA Form 300 "Log of Work-Related Injuries and Illnesses" and OSHA Form 300A "Summary of Work-Related Injuries and Illnesses" must be submitted for the last three years for Contractors with more than ten employees.

The Bidder / Contractor must indicate the total number of hours worked by its employees, as reflected in payroll records for the past three (3) years.

The Bidder / Contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three (3) years. The Incident Rate is calculated in accordance with the formula set forth below. For each given year, the total number of incidents is the total number of non-fatal injuries and illnesses reported on the OSHA Form 300 and OSHA Form 300A. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty (50) weeks per year.

$$\text{Incident Rate} = \frac{\text{Total Number of Incidents X 200,000}}{\text{Total Number of Hours Worked by Employees}}$$

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
2020	107,000	0
2019	227,500	2.63
2018	233,600	.85

If the Bidder's / Contractor's Incident Rate for any of the past three years is one point higher than the Incident Rate for the type of construction it performs (listed below), the Bidder / Contractor must attach, to this questionnaire, a written explanation for the relatively high rate.

General Building Construction	8.5
Residential Building Construction	7.0
Nonresidential Building Construction	10.2
Heavy Construction, except building	8.7
Highway and Street Construction	9.7
Heavy Construction, except highways	8.3
Plumbing, Heating, HVAC	11.3
Painting and Paper Hanging	6.9
Electrical Work	9.5
Masonry, Stonework and Plastering	10.5
Carpentry and Floor Work	12.2
Roofing, Siding, and Sheet Metal	10.3
Concrete Work	8.6
Specialty Trade Contracting	8.6

5. Safety Performance on Previous DDC Project(s)

☐ YES ☒ NO Fatality or an incident requiring OSHA notification within 24 hours (work-related in-patient hospitalization, amputation and all loss of an eye) on DDC Project(s) within the last three (3) years.

DDC Project Number(s): _____, _____, _____

The Bidder hereby affirms that all the information provided in this Safety Questionnaire and all additional pages and/or attachments, if applicable, consist of accurate representations.

Date: Oct 12, 2021 By: _____

(Signature of Bidder: Owner, Partner, Corporate Officer)

Title: President

Department of Design and Construction

PROJECT ID: **S136-383N**

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000
WEBSITE www.nyc.gov/buildnyc

VOLUME 2 OF 3

PROJECT LABOR AGREEMENT
INFORMATION FOR BIDDERS
CONTRACT
PERFORMANCE AND PAYMENT BONDS
SCHEDULE OF PREVAILING WAGES
GENERAL CONDITIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR THE PROJECT

DSNY 17/18 Brooklyn Garage Roof and HVAC Upgrade

LOCATION: **10502 Avenue D**
BOROUGH: **Brooklyn, NY 11236**
CITY OF NEW YORK

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

NYC Dept. of Sanitation

Syska Hennessy Group

Date: **June 25, 2020**

Department of Design and Construction

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

30-30 THOMSON AVENUE
LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000
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VOLUME 2 OF 3

PROJECT LABOR AGREEMENT
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GENERAL CONDITIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR THE PROJECT

NOTICE TO BIDDERS

This contract is subject to a new 2020 Project Labor Agreement

This contract is subject to the attached Project Labor Agreement ("PLA") entered into between the City and the Building and Construction Trades Council of Greater New York ("BCTC") affiliated Local Unions. By submitting a bid, the Contractor agrees that if awarded the Contract the PLA is binding on the Contractor and all subcontractors of all tiers.

The bidder to be awarded the contract will be required to execute a Letter of Assent prior to award. The Contractor shall include in any subcontract a requirement that the subcontractor, and sub-subcontractors of all tiers, become signatory to and bound to the PLA with respect to the subcontracted work. The Contractor will also be required to have all subcontractors of all tiers execute a Letter of Assent prior to such subcontractors performing any Program Work.

Bidders are advised that the City of New York and City agencies have entered into multiple PLAs. The terms of each PLA, while similar, are not identical. Please also note that there are revisions between the 2020 Citywide Renovation PLA attached to this bid and the prior 2015 Citywide Renovation PLA.

All bidders are urged to review the entire 2020 Citywide Renovation PLA prior to submitting a bid.

To the extent that the terms of the PLA conflict with any other terms of the invitation for bids, including the Standard Construction Contract, the terms of the PLA shall govern. For example, the PLA section that authorizes the scheduling of a four-day week, ten hours per day on straight time at the commencement of the job, PLA Article 12, Section 1(A), overrides the Standard Construction Contract's provision concerning a five-day work week with a maximum of eight hours in a day, Standard

Construction Contract Article 37.2.1. Where, however, the invitation for bids, including the Standard Construction Contract, requires the approval of the City/Department, the PLA does not supersede or eliminate that requirement.

This Contract is subject to the apprenticeship requirements of Labor Law § 222 and to apprenticeship requirements established by the Department pursuant to Labor Law § 816-b. Please be advised that the involved trades have apprenticeship programs that meet the statutory requirements of Labor Law § 222(e) and the requirements set by the Department pursuant to Labor Law § 816-b, Contractors and subcontractors who agree to perform the Work pursuant to the PLA are participating in such apprenticeship programs within the meaning of Labor Law § 222(e) and the Department's directive.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program implemented pursuant to New York City Administrative Code § 6-129, the specific requirements of M/WBE participation for this Contract are set forth elsewhere in this bid package. If such requirements are included with this Contract, the City strongly advises Contractors to read those provisions, as well as PLA Article 4, Section 4. A list of certified M/WBE firms may be obtained from the Department of Small Business Services (DSBS) website at http://mtprawvwsbswtp1-1.nyc.gov/, emailing MWBE@sbs.nyc.gov, or by calling the DSBS certification hotline at (212) 513-6311, or by visiting or writing the DSBS at One Liberty Plaza, 11th Floor, New York, New York, 10006.

The local collective bargaining agreements (CBAs) that are incorporated into the PLA as PLA Schedule A Agreements are available from the Department's Agency Chief Contract Officer upon the request of any prospective bidder.

Please note that the "PLA Schedule A" is distinct from the Department's Schedule A that is a part of this invitation for bids.

2020 Citywide Renovation Project Labor Agreement
Frequently Asked Questions

1. **Q.** Does a Contractor need to be signatory with the unions in the NYC Building and Construction Trades Council ("BCTC") in order to bid on projects under the PLA?

   A. No, any contractor may bid by signing and agreeing to the terms of the PLA. The contractor need not be signatory with these unions by any other labor agreement or for any other project.

2. **Q.** Does a Contractor agreeing to the PLA and signing the Letter of Assent create a labor agreement with these unions outside of the project covered by the PLA?

   A. No, the PLA applies only to those projects that the Contractor agrees to perform under the PLA and makes no labor agreement beyond those projects. Contractors do not need to sign any additional agreements (*e.g.*, a collective bargaining agreement) with a union aside from the Letter of Assent to work on a PLA project.

3. **Q.** Do the provisions of the PLA apply equally to subcontractors as well as contractors and how does the PLA affect the subcontractors that a bidder may utilize on the project?

   A. Yes, the PLA applies to subcontractors and all subcontractors performing Program Work must agree to become party to the PLA. Subject to the Agency's approval of subcontractors pursuant to Article 17 of the Standard Construction Contract, a Contractor may use any subcontractor, union or non-union, as long as the subcontractor signs the Letter of Assent. See PLA Article 2, Section 8.

4. **Q.** Are bidders required to submit Letters of Assent signed by proposed subcontractors with their bid in order to be found responsive?

   A. No, bidders do not have to submit signed Letters of Assent from their subcontractors with their bid. However, subcontractors performing Program Work will be required to sign the Letter of Assent prior to being approved by the Agency.

5. **Q.** May a Contractor or subcontractor use any of its existing employees to perform this work?

   A. Generally, labor will be referred to the Contractor from the respective signatory local unions. However, Contractors and subcontractors may use up to 12% of their existing, qualifying labor force for this work. Certified M/WBEs for which participation goals are set pursuant to NYC Administrative Code § 6-129 that are not signatory to any Schedule A collective bargaining agreements ("CBAs") may use their existing employees for the 2nd, 4th, 6th and 8th employee (per trade) needed on the job if their contracts are valued at or under $2,000,000. Any additional workers will be referred to the Contractor in accordance with the 12% referral requirements set forth in the PLA. See PLA Article 4, Section 2.

6. **Q.** Must the City set M/WBE participation goals for the particular project or contract in order for a certified M/WBE to utilize the provisions of PLA Article 4, Section 2(C)?

   A. No. PLA Article 4, Section 2(C) specifies what categories of M/WBEs are eligible to take advantage of this provision (i.e., those M/WBEs for which the City is authorized to set participation goals under § 6-129). For purposes of Article 4, Section 2(C), it is not necessary for the project to be subject to § 6-129 or for the City to have actually set participation goals for the particular contract or project. The result is the same where a project receives State funding and therefore is subject to the requirements of Article 15-A of the Executive Law.

7. **Q.** May a Contractor bring in union members from locals that are not signatory unions?

   A. Referrals will be from the respective signatory locals and/or locals listed in Schedule A of the PLA. Contractors may utilize 'traveler provisions' contained in the local CBAs where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.

8. **Q.** Does a non-union employee working under the PLA automatically become a union member?

   A. No, the non-union employee does not automatically become a union member by working on a project covered by the PLA and nothing in the PLA requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work. Non-union employees will be enrolled in the appropriate benefit plans and earn credit toward various union benefit programs except in certain circumstances as set forth in the PLA. See PLA Article 4, Section 6 and Article 11.

9. **Q.** Are all Contractors and subcontractors working under the PLA, including non-union Contractors and Contractors signatory to CBAs with locals other than those that are signatories to the PLA, required to make contributions to designated employee benefit funds?

   A. Except in certain circumstances, as described in the following paragraph, Contractors and subcontractors working under the PLA will be required to contribute on behalf of all employees covered by the PLA to established jointly trusteed employee benefit funds designated in the Schedule A CBAs and required to be paid on public works under any applicable prevailing wage law. The Agency may withhold from amounts due the Contractor any amounts required to be paid, but not actually paid into any such fund by the Contractor or a subcontractor. See PLA Article 11, Section 2.

   Non-union Contractors with bona fide private benefit plans that satisfy the requirements of Labor Law 220 will not be required to pay into union benefit funds for their employees working pursuant to Article 4, Section 2 (B) and (C) ("Core Employees") who are already covered under their bona fide private benefit plans. Supplemental

benefit funds in excess of the annualized value of the private benefit plans will be paid directly to workers as additional wages in compliance with Labor Law § 220. At the time of contract award, the Contractor shall make available to the contracting Agency a complete set of plan documents for each private benefit plan into which contributions will be made and/or coverage provided. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Labor Law § 220. See PLA Article 11, Section 2.

10. **Q.** When do Core Employees become eligible for union benefits?

    A. Union benefit plans have their own plan documents that determine eligibility and workers will become eligible for certain benefits at different points in time. Contractors who will have Core Employees should speak with the respective union(s) as to benefit eligibility thresholds. Employees that may remain unaffiliated with any local union at the completion of their employment may apply for any distributions to which they may be entitled from the funds in accordance with the applicable rules and governing documents of the unions and the employee benefit funds.

11. **Q.** What happens if a Contractor or subcontractor fails to make a required payment to a designated employee benefit fund?

    A. The PLA sets forth a process for unions to address a Contractor or a subcontractor's failure to make required payments. The process includes potentially the direct payment by the City to the benefit fund of monies owed and the corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2.

    Upon notification by a union or fringe benefit fund that a Contractor is delinquent in its payment of benefits and a determination by the Agency that the union or fund has submitted appropriate documentation of such delinquency, the Agency will thereafter require the Contractor to submit cancelled checks or other equivalent proof of payment of benefit contributions with certified payroll reports for work covered by this PLA on which the Contractor is engaged.

    The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

12. **Q.** Does signing on to the PLA satisfy the Apprenticeship Requirements established for this bid?
    A. Yes. By agreeing to perform the Work subject to the PLA, the bidder demonstrates compliance with the apprenticeship requirements imposed by this Invitation for Bids.

13. **Q.** Who decides on the number of workers needed?

    A. Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the determination as to the number of employees to be hired and the qualifications therefore and the promotion, transfer, and layoff of its employees. See PLA Article 6, Section 1.

14. **Q.** What happens if a union does not provide a worker within 48 hours from the request (Saturdays, Sundays, and holidays excepted)?

A. In the event that a Local Union does not fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source.

15. **Q.** May a Contractor discharge a union referral for lack of productivity?

A. Except as expressly limited by a specific provision of the PLA, a Contractor retains full and exclusive authority for the management of their operations, including the right to discipline or discharge for just cause its employees. See PLA Article 6, Section 1.

16. **Q.** May a contractor assign a management person to site?

A. Yes. Managers are not subject to the provisions of the PLA, so there is no restriction on management and/or other non-trade personnel, as long as such personnel do not perform trade functions. See Article 3, Section 1.

17. **Q.** What type of work can Stewards perform?

A. All Stewards must be working Stewards (*i.e.*, they must be performing Program Work). In addition, Stewards may perform other tasks such as receiving complaints or grievances from other employees of the Steward's trade. Stewards may not determine when overtime is worked. Stewards are entitled to the same wages as other employees of that trade. See PLA Article 5, Sections 2 and 3.

18. **Q.** Can a Contractor utilize apprentices?

A. Contractors are permitted to utilize apprentices so long as the ratios between journeyperson and apprentice do not exceed the allowable ratios set by the New York State Department of Labor ("NYSDOL"). Should a Contractor request that apprentices be provided for Program Work, the referring Local Union shall comply with that request so long as it is consistent with the maximum ratios permitted by NYSDOL.

19. **Q.** What is HireNYC Construction Careers?

A. HireNYC Construction Careers is an initiative to advance career opportunities within the construction industry. The initiative has a target goal of 30% of all hours worked on PLA projects are performed by workers who reside in NYCHA housing or zip codes where 15% or more of the residences are below poverty. When a Contractor requests employees, the trades will take into account the target goals when they refer additional workers.

20. **Q.** Does the PLA provide a standard work day across all the signatory trades?

A. Yes, all signatory trades will work an eight (8) hour day, Monday through Friday with a day shift at straight time as the standard work week. The PLA also permits a Contractor to schedule a four-day (within Monday through Friday) work week, ten (10) hours per day at straight time if announced at the commencement of the project. See PLA Article 12, Section 1. This is an example where the terms of the PLA override provisions of the Standard Construction Contract (compare with section 37.2 of the Standard Construction Contract). The standard work week may be reduced to 35 or 37 ½ hours of work in those limited circumstances where the City states in the bid documents that the Contractor will not be given access to the site to accommodate an 8-hour day. The 8 hour, 7 ½ hour or 7-hour work day must be established at the commencement of the project by the Agency and may not be altered by the Contractor.

21. **Q.** Does the PLA create a common holiday schedule for all the signatory trades?

A. Yes, the PLA recognizes nine common holidays. See PLA Article 12, Section 4.

22. **Q.** Are workers entitled to holiday pay if they do not work on the holiday?

A. No. Workers are only entitled to pay if they work on the holiday. See PLA Article 12, Section 4.

23. **Q.** Does the PLA provide for a standard policy for 'shift work' across all signatory trades?

A. Yes, second and third shifts may be worked with a standard 5% premium pay. In addition, a day shift does not have to be scheduled in order to work the second and third shifts at the 1.05 hourly pay rate. See PLA Article 12, Section 3.

24. **Q.** May the Contractor schedule overtime work, including work on a weekend?

A. Yes, the PLA permits the Contractor to schedule overtime work, including work on weekends. See PLA Article 12, Sections 2, 3, and 5. To the extent that the Agency's approval is required before a Contractor may schedule or be paid for overtime, that approval is still required notwithstanding the PLA language.

25. **Q.** Are overtime payments affected by the PLA?

A. Yes, all overtime pay incurred Monday through Saturday will be at time and one half (1 ½). There will be no stacking or pyramiding of overtime pay under any circumstances. See PLA Article 12, Section 2. Sunday and holiday overtime will be paid according to each trade's CBA.

26. **Q.** Are there special provisions for Saturday work when a day is 'lost' during the week due to weather, power failure or other emergency?

A. Yes, when this occurs the Contractor may schedule Saturday work at weekday rates. See PLA Article 12, Section 5.

27. **Q.** Does the PLA contain special provisions for the staffing of temporary services?

A. Yes. Where temporary services are required by specific request of the Agency or construction manager, they shall be provided by the Contractor's existing employees during working hours in which a shift is scheduled for employees of the Contractor. The need for temporary services during non-working hours will be determined by the Agency or construction manager. There will be no stacking of trades on temporary services. See PLA Article 15.

28. **Q.** What do the workers get paid when work is terminated early in a day due to inclement weather or otherwise cut short of 8 hours?

A. The PLA provides that employees who report to work pursuant to regular schedule and not given work will be paid two hours of straight time. Work terminated early for severe weather or emergency conditions will be paid only for time actually worked. In other instances where work is terminated early, the worker will be paid for a full day. See PLA Article 12, Sections 6 and 8. The usual reporting pay requirement of two hours for employees who report to their work location pursuant to their regular schedule does not apply when the National Weather Service issues a Weather Advisory and the Contractor speaks to the employee at least four hours before their shift starting time. See PLA Article 12, Section 6.

29. **Q.** Should a local collective bargaining agreement of a signatory union expire during the project will a work stoppage occur on a project subject to the PLA?

A. No. All the signatory unions are bound by the 'no strike' agreement as to the PLA work. Work will continue under the PLA and the otherwise expired local CBA(s) until the new local CBA(s) are negotiated and in effect. See PLA Articles 7 and 19.

30. **Q.** May a Contractor working under the PLA be subject to a strike or other boycott activity by a signatory union at another site while the Contractor is a signatory to the PLA?

A. Yes. The PLA applies ONLY to work under the PLA and does not regulate labor relations at other sites even if those sites are in close proximity to PLA work.

31. **Q.** If a Contractor has worked under other PLAs in the New York City area, are the provisions in this PLA generally the same as the others?

A. While PLAs often look similar to each other, and particular clauses are often used in multiple agreements, each PLA is a unique document and should be examined accordingly.

32. **Q.** What happens if a dispute occurs between the Contractor and an employee during the project?

A. The PLA contains a grievance and arbitration process to resolve disputes between the Contractor and the employees. See PLA Article 9.

33. **Q.** What happens if there is a dispute between locals as to which local gets to provide employees for a particular project or a particular aspect of a project?

A. The PLA provides for jurisdictional disputes to be resolved in accordance with the NY Plan. A copy of the NY Plan is available upon request from the Agency. The PLA provides that work is not to be disrupted or interrupted pending the resolution of any jurisdictional dispute. The work proceeds as assigned by the Contractor until the dispute is resolved. See PLA Article 10.

34. **Q.** Does the PLA contain special provisions for JOCS or task order-based Contracts?

A. The PLA does not apply to Task Orders or Work Orders that do not exceed $250,000 issued under JOCS or Requirements Contracts. See PLA Article 3, Section 1.

35. **Q.** How do the referral rules work for Operating Engineers Locals 14 and 15?

A. If there is Program Work within the jurisdiction of Operating Engineers Locals 14 or 15, the contractor shall request labor from the appropriate local union. If the locals provide labor consistent with the referral provisions outlined in Article 4, Section 2, the terms of the Local 14 CBA or Local 15 CBA will apply to that work. However, if the locals do not provide labor for that work, the terms of the PLA will apply to such work.

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PROJECT LABOR AGREEMENT
COVERING SPECIFIED
RENOVATION & REHABILITATION
OF CITY OWNED BUILDINGS AND STRUCTURES

2020 – 2024

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PROJECT LABOR AGREEMENT COVERING SPECIFIED RENOVATION & REHABILITATION OF NEW YORK CITY OWNED BUILDINGS & STRUCTURES

ARTICLE 1 - PREAMBLE

WHEREAS, the City of New York desires to provide for the cost efficient, safe, quality, and timely completion of certain rehabilitation and renovation work ("Program Work," as defined in Article 3) in a manner designed to afford the lowest costs to the Agencies covered by this Agreement, and the public it represents, and the advancement of permissible statutory objectives;

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

(1) providing a mechanism for responding to the unique construction needs associated with this Program Work and achieving the most cost-effective means of construction, including direct labor cost savings, by the Building and Construction Trades Council of Greater New York and Vicinity and the signatory Local Unions and their members waiving various shift and other hourly premiums and other work and pay practices which would otherwise apply to Program Work;

(2) expediting the construction process and otherwise minimizing the disruption to the covered Agencies' ongoing operations at the facilities that are the subject of the Agreement;

(3) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, reducing jobsite friction on common situs worksites, and promoting labor harmony and peace for the duration of the Program Work;

(4) standardizing the terms and conditions governing the employment of labor on Program Work;

(5) permitting wide flexibility in work scheduling and shift hours and times to allow maximum work to be done during off hours yet at affordable pay rates;

(6) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;

(7) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;

(8) fostering increased participation by Minority and Women-owned Business Enterprises ("MWBEs");

(9) encouraging the development of pathways to construction careers;

(10) ensuring a reliable source of skilled and experienced labor; and

(11) securing applicable New York State Labor Law exemptions.

WHEREAS, the Building and Construction Trades Council of Greater New York and Vicinity, its participating affiliated Local Unions and their members, desire to assist the City in meeting these operational needs and objectives as well as to provide for stability, security and work opportunities which are afforded by this Project Labor Agreement; and

WHEREAS, the Parties desire to maximize Program Work safety conditions for both workers and the community in the project area.

NOW, THEREFORE, the Parties enter into this Agreement:

SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement ("Agreement") entered into by the City of New York ("City"), on behalf of itself and the Agencies covered herein, including in their capacity as construction manager of covered projects and/or on behalf of any third party construction manager which may be utilized, and the Building and Construction Trades Council of Greater New York and Vicinity ("Council" or "BCTC") (on behalf of itself) and the signatory affiliated Local Unions ("Unions" or "Local Unions"). The Council and each signatory Local Union hereby warrant and represents that it has been duly authorized to enter into this Agreement.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

A. The term "Agency" means the following New York City agencies: the Department for the Aging ("DFTA"), Administration for Children's Services ("ACS"), Department of Citywide Administrative Services ("DCAS"), Department of Correction ("DOC"), Department of Design and Construction ("DDC"), Fire Department ("FDNY"), Department of Homeless Services ("DHS"), Human Resources Administration ("HRA"), Department of Health and Mental Hygiene ("DOHMH"), Department of Parks and Recreation ("DPR"), Police Department ("NYPD"),

Department of Sanitation ("DSNY"); Department of Transportation ("DOT"), Department of Buildings ("DOB"); with respect to Program Work as defined in Article 3, the New York City Agency that awards a particular contract subject to this Agreement may be referred to hereafter as the "Agency";

B. The term "Agreement" means this project labor agreement ("PLA"), the applicable Schedule "A" Collective Bargaining Agreements (each a "CBA") identified in Schedule "A", and each Exhibit hereto;

C. The term "BCTC" refers to the Building and Construction Trades Council of Greater New York and Vicinity. The terms "BCTC" and "Council" are used interchangeably;

D. The term "Contractor(s)" shall include any Construction Manager, General Contractor and all other contractors, and subcontractors of all tiers engaged in Program Work within the scope of this Agreement as defined in Article 3. When an Agency acts as Construction Manager, unless otherwise provided, it has the rights and obligations of a "Construction Manager" in addition to the rights and obligations of an Agency;

E. The term "Core Employee" means an employee that has been on a contractor's payroll consistent with Article 4, Section 2(B) and (C);

F. The term "Minor Repair" means routine repair, service, or maintenance that is recurrent, day to day, periodic scheduled or routine work required to preserve or restore a building, facility or system to working order;

G. The term "HireNYC Construction Careers" refers to the PLA initiative to advance career opportunities for Program Hires;

H. The term "Program Work" is the work covered by this Agreement as defined in Article 3;

I. The term "Program Hire" means an individual that resides in a zip code where at least 15% of the individuals residing in such zip code are below the federal poverty rate and residents of NYCHA housing regardless of zip codes; and

J. The term "Union(s)" or "Local Union(s)" refers to the various participating unions affiliated with the BCTC, singularly and collectively.

SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

This Agreement shall not become effective unless each of the following conditions are met: the Agreement is executed by (1) the Council, on behalf of itself, (2) the participating affiliated Local Unions; and (3) the mayor of the City of New York or their designee.

SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

This Agreement shall be binding on all participating Unions and their affiliates, the Construction Manager (in its capacity as such) and all Contractors of all tiers performing Program Work, as defined in Article 3. The Contractors shall include in any subcontract that they let for performance during the term of this Agreement a requirement that their subcontractors, of all tiers, become signatory and bound by this Agreement with respect to that subcontracted work falling within the scope of Article 3 and all Contractors (including subcontractors) performing Program Work shall be required to sign a "Letter of Assent" in the form annexed hereto as Exhibit "A". This Agreement shall be administered by the applicable Agency or a Construction Manager or such other designee as may be named by the Agency or Construction Manager, on behalf of all Contractors.

SECTION 4. SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements (each a "CBA") appended hereto as Schedule "A", represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other CBA of any type which would otherwise apply to this Program Work, in whole or in part, except for Program Work which falls

within the jurisdiction of the Operating Engineers Locals 14 and 15. If Program Work falling within the jurisdiction of Operating Engineers Locals 14 and 15 is accepted by and performed by said locals, only then will such work be performed under the terms and conditions set out in the Schedule "A" agreements of Operating Engineers Locals 14 and 15. The CBAs of the affiliated local unions that cover the particular type of construction work to be performed by the contractor, and as set forth in the Schedule "A" list of agreements, shall be deemed the Schedule "A" Collective Bargaining Agreements ("Schedule "A" CBA") under this Agreement. Where association and independent CBAs for a particular type of construction work are both set forth in Schedule "A", association members shall treat the applicable association agreement as the Schedule "A" CBA and independent contractors shall treat the applicable independent agreement as the Schedule "A" CBA. Subject to the foregoing, where a subject covered by the provisions of this project labor agreement is also covered by a Schedule "A" CBA, the provisions of this project labor agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing Program Work. No practice, understanding or agreement between a Contractor and a Local Union which is not set forth in this Agreement shall be binding with respect to Program Work unless endorsed in writing by the Construction Manager or such other designee as may be designated by the Agency. Nothing in this Agreement requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work.

SECTION 5. LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The Construction Manager and any Contractor shall not be liable for any

violations of this Agreement by any other Contractor; and the Council and Local Unions shall not be liable for any violations of this Agreement by any other Union.

SECTION 6. THE AGENCY

The Agency (or Construction Manager where applicable) shall require in its bid specifications for all Program Work within the scope of Article 3 that all successful bidders, and their subcontractors of all tiers, become bound by, and signatory to, this Agreement. The Agency (or Construction Manager) shall not be liable for any violation of this Agreement by any Contractor. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the Agency or Construction Manager in determining which Contractors shall be awarded contracts for Program Work. It is further understood that the Agency or Construction Manager has sole discretion at any time to terminate, delay or suspend the Program Work, in whole or part, on any project.

SECTION 7. AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS

The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for (or subcontractor of) Program Work who becomes signatory thereto, without regard to whether that successful bidder (or subcontractor) performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder (or subcontractor) are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor which is performed at any location other than the site of Program Work.

SECTION 8. SUBCONTRACTING

Contractors will subcontract Program Work only to a person, firm or corporation who is or agrees to become party to this Agreement.

ARTICLE 3 - SCOPE OF THE AGREEMENT
SECTION 1. WORK COVERED

A. Program Work shall be limited to designated rehabilitation and renovation construction contracts bid and let by an Agency (or its Construction Manager where applicable) after the effective date of this Agreement with respect to rehabilitation and renovation work performed for an Agency on City-owned property under contracts advertised for public solicitation prior to December 31, 2024. Subject to the foregoing, and the exclusions below, such Program Work shall mean any and all contracts that predominantly involve the renovation, alteration, repair, rehabilitation or expansion of an existing City-owned building or structure within the five boroughs of New York City. Examples of Program Work include, but are not limited to, the renovation, repair, alteration and rehabilitation of an existing temporary or permanent structure, or an expansion of above ground structures located in the City on a City-owned building. Program Work shall also include job order contracts ("JOCS"), demolition work, painting services. Low voltage work, site work, elevator work, mold, asbestos and lead abatement, carpentry services, and carpet removal and installation shall be included as Program Work only when incidental to such building renovation and/or rehabilitation of City-owned buildings or structures and included in a contract that predominantly involves such renovation and/or rehabilitation.

B. It is understood that, except where the City specifically applies this Agreement to such work in its bid documents, Program Work does not include, and this Agreement shall not apply to, any other work, including:

1. Contracts that are let under a different project labor agreement with one of the defined City Agencies, and/or other Agencies and Authorities that have entered separate PLAs, such as DEP, NYCHA, H+H and SCA;

2. Contracts let and work performed in connection with projects carried over,

recycled from, or performed under bids or rebids relating to work that were bid prior to the effective date of this Agreement or after December 31, 2024;

3. Contracts procured on an emergency basis;

4. Prime contracts that do not exceed $3,000,000;

5. Contracts for work on streets and bridges and for the closing or environmental remediation of landfills;

6. Contracts with not-for-profit corporations where the City is not awarding or performing the work performed for that entity;

7. Contracts with governmental entities where the City is not awarding or performing the work performed for that entity;

8. Contracts with electric utilities, gas utilities, telephone companies, and railroads, except that it is understood and agreed that these entities may only install their work to a demarcation point, *e.g.*, a telephone closet or utility vault, the location of which is determined prior to construction and employees of such entities shall not be used to replace employees performing Program Work pursuant to this Agreement;

9. Contracts for installation of information technology that are not otherwise Program Work;

10. Task Orders or Work Orders issued under JOCS or Requirements Contracts that do not exceed $250,000, and JOCS or Requirements Contracts where the monetary value of such contracts predominantly involves such Task Orders or Work Orders;

11. Contracts that predominantly involve Minor Repair work, as defined in Article 2, Section 1(F) above. Such work is to be paid under the applicable prevailing wage law for service or maintenance work;

12. Up to five percent (5%) of work performed by certified MWBE

subcontractors on prime contracts that are valued at $25,000,000 or more and for which participation goals are set forth in the contract and where such MWBE subcontractor is not signatory to any Schedule "A" agreement ("Exempt Work"). Exempt Work shall be no more than $500,000 or 15% (whichever is greater) of the value of the subcontracts for work in any particular union's jurisdiction under any prime contract; and

13. On-site work performed on purchased equipment, which is required by the manufacturer to be performed by its staff or by its selected contractors as a condition of the continued effectiveness of the equipment warranty.

SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement, Program Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to December 31, 2024, the expiration date of this Agreement. It is understood that this Agreement, together with all of its provisions, shall remain in effect for all such Program Work until completion, even if not completed by the expiration date of the Agreement. If Program Work otherwise falling within the scope of Article 3, Section 1 is not let for bid by the expiration date of this Agreement, this Agreement may be extended to that work by mutual agreement of the parties.

SECTION 3. EXCLUDED EMPLOYEES

The following persons are not subject to the provisions of this Agreement, even though performing Program Work:

A. Superintendents, supervisors (except field surveyors on construction contracts, general and forepersons specifically covered by a craft's Schedule "A" agreement are included), engineers, professional engineers and/or licensed architects engaged in inspection and testing, quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers,

guards, technicians, non-manual employees, and all professional, engineering, administrative and management persons;

B. Employees of the Agency, New York City, or any other municipal or State agency, authority or entity, or employees of any other public employer, even though working on the project site while covered Program Work is underway;

C. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of project components, materials, equipment or machinery, or involved in deliveries to and from the Program site, except to the extent they are lawfully included in the bargaining unit of a Schedule "A" agreement;

D. Employees of the Construction Manager (except that in the event the Agency engages a Contractor to serve as Construction Manager, then those employees of the Construction Manager performing manual, on site construction labor will be covered by this Agreement);

E. Employees engaged in on-site equipment warranty work including installation, repair or maintenance unless employees are already working on the site and are certified to perform warranty work;

F. Employees engaged in geophysical testing other than boring for core samples;

G. Employees engaged in laboratory, specialty testing, or inspections, pursuant to a professional services agreement between the Agency, or any of the Agency's other professional consultants, and such laboratory, testing, inspection or surveying firms;

H. Employees engaged in on-site maintenance of installed equipment or systems which maintenance is awarded as part of a contract that includes Program Work, but which maintenance occurs after installation of such equipment or system and is not directly related to construction services; and

I. Employees who perform work classified as Minor Repairs, and routine service and/or maintenance work.

SECTION 4. NON-APPLICATION TO CERTAIN ENTITIES

This Agreement shall not apply to those parents, affiliates, subsidiaries, or other joint or sole ventures of any Contractor which do not perform Program Work. It is agreed that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among the Agency (including in its capacity as Construction Manager) or any Contractor. The Agreement shall further not apply to any New York City or other municipal or State agency, authority, or entity other than a listed Agency and nothing contained herein shall be construed to prohibit or restrict the Agency or its employees, or any State, New York City or other municipal or State authority, agency or entity and its employees, from performing on or off-site work related to Program Work.

As the contracts involving Program Work are completed and accepted, the Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs, modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the Agency (or Construction Manager) for performance under the terms of this Agreement.

ARTICLE 4 - UNION RECOGNITION AND EMPLOYMENT

SECTION 1. PRE-HIRE RECOGNITION

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all employees who are performing on-site Program Work, with respect to that work.

SECTION 2. UNION REFERRAL

A. The Contractors agree to request, employ and hire craft employees, including

Program Hires as defined in Article 2, Section 1(I), for Program Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions' area CBAs set forth in Schedule "A". Notwithstanding this, Contractors shall have sole right to determine the competency of all referrals; to determine the number of employees required; to select employees for layoff (subject to Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union, subject to the show-up payments. In the event that a Local Union does not fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of craft employees hired for Program Work within its jurisdiction from any source other than referral by the Union. Any employee hired by a Contractor because a Local Union does not fill a request for qualified employees within a 48 hour period (Saturdays, Sundays and holidays excepted) are not covered by this Agreement for purposes of Article 11, Section 2, unless they are or become a member or agency shop fee payor of an affiliated Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Program Work ("Core Employees") and who meet the following qualifications:

(1) possess any license required by New York State law for the Program Work to be performed;

(2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and

(3) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award.

No more than twelve per centum (12%) of the employees covered by this Agreement, per Contractor by craft, shall be hired through the special provisions above. Under this provision, name referrals begin with the eighth employee needed and continue on that same basis.

C. Notwithstanding Section 2(B), above, certified MWBE contractors for which participation goals are set forth in New York City Administrative Code §6-129, that are not signatory to any Schedule "A" CBAs, with subcontracts valued at or under two-million dollars ($2,000,000), may request by name, and the Local will honor, referral of the second (2nd), fourth (4th), sixth (6th), and eighth (8th) Core Employee, who have applied to the Local for Program Work and who meet the following qualifications:

(1) possess any license required by New York State law for the Program Work to be performed;

(2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and

(3) were on the Contractor's active payroll for at least 60 out of the 365 calendar days prior to the contract award.

D. Where a certified MWBE Contractor voluntarily enters into a CBA with a BCTC Union, the employees of such Contractor at the time the CBA is executed shall be allowed to join the Union for the applicable trade subject to satisfying the Union's basic standards of proficiency for admission.

SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Council represents that each Local Union hiring hall and referral system will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated

against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

SECTION 4. MINORITY, FEMALE, LOCAL AND SECTION 3 REFERRALS

In the event a Local Union either fails, or is unable to refer qualified minority or female applicants in percentages equaling the workforce participation goals adopted by the City and set forth in the Agency's (or, if applicable, Construction Manager's) bid specifications, within 48 hours of the request for same, the Contractor may employ qualified minority or female applicants from any other available source.

The Local Unions agree to prioritize the referral of Program Hires in accordance with Article 13 and to the extent consistent with the law, rules applicable to the union referral systems and joint apprentice programs. Those unions that do not currently provide for zip code preferences in their referral systems will undertake to implement such preferences consistent with this Agreement and their governing documents. Please see Exhibit "C" for a non-exhaustive list of eligible zip codes. Employees from these zip codes that are already on a contractor's workforce, including Core Employees, and referral of apprentices, in accordance with Article 13, Section 1(A) below, shall count towards the referral goals of this Section.

For any Program Work that may become subject to requirements under Section 3 of the Housing and Urban Development Act of 1968, as amended by the Housing and Community Development Act of 1992, and any rules, including new or revised rules, that may be published thereunder, the Local Unions acknowledge the Section 3 obligations of the Construction Manager or Contractor, as applicable, and agree to the zip code and NYCHA preferences described above to help implement this Article in a manner that would allow the Construction Manager or Contractor to meet its Section 3 obligations to the greatest extent feasible, and to post any required notices in the manner required by Section 3. The parties also acknowledge that the Construction Manager

and Contractor may also fulfill its Section 3 requirements on Program Work by promoting opportunities for excluded employees, as defined by Article 3, Section 3 of this Agreement, on Program Work and, to the extent permitted by Section 3, by promoting opportunities for craft and other employees on non-Program Work.

SECTION 5. CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

SECTION 6. CRAFT FOREPERSONS AND GENERAL FOREPERSONS

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor except where otherwise provided by specific provisions of an applicable Schedule "A" CBA, and provided that all craft forepersons shall be experienced and qualified journeypersons in their trade as determined by the appropriate Local Union. All forepersons shall take orders exclusively from the designated Contractor representatives. Craft forepersons shall be designated as working forepersons at the request of the Contractor, except when an existing local CBA prohibits a foreperson from working when the craft persons, they are leading exceed a specified number.

SECTION 7. ON CALL REPAIR REFERRALS

A. When an Agency awards a contract under this Agreement that requires the Contractor to have employees available on short notice to make time-sensitive repairs with such contract requiring the Contractor to respond within as little as two hours from the time the Contractor is contacted by the Agency ("On Call, Repair Contract"), the Contractor will, within ten (10) days of being awarded an On Call, Repair Contract subject to this Agreement, notify the

appropriate affiliated Union that would perform the work for a contractor that the Contractor has been awarded such a contract and immediately enter into good faith negotiations with such relevant affiliated Union to establish a procedure to receive time sensitive referrals from such affiliated Union(s).

B. In the event the Contractor and the relevant affiliated Union(s) are unable to negotiate a specific, mutually agreeable procedure for on call repair referral procedure within twenty (20) days of commencement of negotiations or prior to commencement of performance of the contract, whichever is earlier, the Contractor and the relevant affiliated Unions will follow the following procedure:

1. Upon notification by a Contractor that it has been awarded an On Call, Repair Contract pursuant to paragraph A above, each relevant affiliate Union shall provide the Contractor with the name and twenty-four (24) hour contact information of an On Call, Repair Contract contact person for urgent on call repair referrals.

2. The relevant affiliated Unions shall prepare a list of individuals eligible and prepared for referral on an immediate basis to respond to the on call repair contractor, which may include the affiliated Unions' service, repair and maintenance division workers where appropriate for repairs that can be made within 24 to 48 hours and paid at the appropriate prevailing wage rates for service and repair or maintenance work. Such list shall be provided to and in the possession of the designated-on call repair contact person for the affiliated Union and available for immediate reference.

3. Individuals on such list must be able to comply with the Contractor's response time pursuant to contract requirements.

4. The Union's On Call, Repair Contract contact person shall respond to a contractor's request for referrals within a reasonable time of the request so that compliance with

the contract shall be possible.

C. In the event that the Contractor makes a request for an on call referral that is compliant with this procedure and a Union is not able to respond to the request, that Union will be deemed to have waived the forty-eight (48) hour referral rule contained in Section 2 above and the Contractor may employ qualified applicants from any other available source that can meet contract requirements for that time-sensitive on call repair work only; provided, however, that any work related to the repair work that is not of a time sensitive nature under the contract shall comply with Section 2. If a Union fails to timely refer a worker and the Contractor employs other workers, the Contractor will e-mail the Agency within 72 hours and the Agency will forward that e-mail to the designated Labor Management Committee contacts.

ARTICLE 5 - UNION REPRESENTATION

SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site employees shall be entitled to designate in writing (copy to Contractor involved and Construction Manager) one representative, and/or the Business Manager, who shall be afforded access to the Program Worksite during such time as bargaining unit work is occurring and subject to otherwise applicable policies pertaining to visitors to the site.

SECTION 2. STEWARDS

A. Each affiliated Union shall have the sole discretion to designate any journey person as a Steward and an alternate Steward. The Union shall notify the Owner and/or Construction Manager as well as the Contractor of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions and will receive the regular rate of pay for their craft classifications. All Stewards shall be working Stewards.

B. In addition to their work as an employee, the Steward shall have the right to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's trade and, if applicable, subcontractors of their Contractor, but not with the employees of any other trade Contractor. No Contractor shall discriminate against the Steward in the proper performance of Union duties.

C. The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime except pursuant to a Schedule "A" CBA provision providing procedures for the equitable distribution of overtime.

SECTION 3. LAYOFF OF A STEWARD

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by a Schedule "A" provision, such provision shall be recognized to the extent the Steward possesses the necessary qualifications to perform the work required, except in cases of discipline or discharge for just cause. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

ARTICLE 6 - MANAGEMENT'S RIGHTS

SECTION 1. RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their operations including, but not limited to, the right to: direct the work force, including determination as to the number of employees to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; require compliance with the directives of the Agency including standard restrictions related to security and access to the site that are equally applicable to Agency employees, guests, or vendors; or the discipline or discharge for just cause of its employees; assign and schedule work; promulgate

reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work; and, the requirement, timing and number of employees to be utilized for overtime work. No rules, customs, or practices which limit or restrict productivity or efficiency of the individual, as determined by the Contractor, Agency and/or Construction Manager and/or joint working efforts with other employees shall be permitted or observed.

SECTION 2. MATERIALS, METHODS & EQUIPMENT

There shall be no limitation or restriction upon the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source; provided, however, that where there is a Schedule "A" that includes a lawful union standards and practices clauses, then such clause as set forth in Schedule "A" agreements will be complied with, unless there is a lawful Agency specification (or specification issued by a Construction Manager which would be lawful if issued by the Agency directly) that would specifically limit or restrict the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices, and which would prevent compliance with such Schedule "A" clause. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in the installation, check-off or testing of specialized or

unusual equipment or facilities as designated by the Contractor. There shall be no restrictions as to work which is performed off-site for Program Work.

ARTICLE 7 - WORK STOPPAGES AND LOCKOUTS

SECTION 1. NO STRIKES-NO LOCK OUT

There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, hand billing, demonstrations or other similar disruptive activity at the Program Work site for any reason by any Union or employee against any Contractor or employer. There shall be no other Union or concerted or employee activity which disrupts or interferes with the operation of the Program Work or the objectives of the Agency at any Program Work site. In addition, failure of any Union or employee to cross any picket line established by any Union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at or in proximity to a Program Work site where the failure to cross disrupts or interferes with the operation of Program Work is a violation of this Article. Should any employees breach this provision, the Unions will use their best efforts to try to immediately end that breach and return all employees to work. There shall be no lockout at a Program Work site by any signatory Contractor, Agency or Construction Manager.

SECTION 2. DISCHARGE FOR VIOLATION

A Contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 days.

SECTION 3. NOTIFICATION

If a Contractor contends that any Union has violated this Article, it will notify the Local Union involved advising of such fact, with copies of the notification to the Council. The Local Union shall instruct and order, the Council shall request, and each shall otherwise use their best efforts to cause, the employees (and where necessary the Council shall use its best efforts to cause the Local Union), to immediately cease and desist from any violation of this Article. If the Council

complies with these obligations, it shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members will not be liable for any unauthorized acts of the Council. Failure of a Contractor or the Construction Manager to give any notification set forth in this Article shall not excuse any violation of Section 1 of this Article.

SECTION 4. EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 1 of this Article may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity that may be brought).

A. A party invoking this procedure shall notify J.J. Pierson or Richard Adelman; who shall alternate (beginning with Arbitrator J.J. Pierson) as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to the alleged violator and Council.

B. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the Local Union involved, the Council and the Construction Manager, hold a hearing within 48 hours of receipt of the notice invoking the procedure if it is contended that the violation still exists. The hearing will not, however, be scheduled for less than 24 hours after the notice required by Section 3, above.

C. All notices pursuant to this Article may be provided by telephone, telegraph, hand delivery, or fax, confirmed by overnight delivery, to the Arbitrator, Contractor, Construction Manager and Local Union involved. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session, which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case and conduct their cross examination) unless otherwise agreed. A failure of any Union or Contractor to attend the hearing

shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.

D. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease and Desist Award restraining such violation and serve copies on the Contractor and Union involved. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages (any damages issue is reserved solely for court proceedings, if any). The Award shall be issued in writing within 3 hours after the close of the hearing and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

E. The Agency and Construction Manager (or such other designee of the Agency) may participate in full in all proceedings under this Article.

F. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of this Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to the Union or Contractor involved, and the Construction Manager.

G. Any rights created by statute or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.

H. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

SECTION 5. ARBITRATION OF DISCHARGES FOR VIOLATION

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 1, above,

may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

ARTICLE 8 - LABOR MANAGEMENT COMMITTEE

SECTION 1. SUBJECTS

The Program Labor Management Committee (the "LMC") will meet on a regular basis to: 1) promote harmonious relations among the Contractors and Unions; 2) enhance safety awareness, cost effectiveness and productivity of construction operations; 3) protect the public interests; 4) discuss matters relating to staffing and scheduling with safety and productivity as considerations; and 5) review efforts to meet applicable participation goals for MWBEs and workforce participation goals for Program Hires, minority and female employees.

SECTION 2. COMPOSITION

The LMC shall be jointly chaired by a designee of the Agency and the President of the Council. It may include representatives of the Local Unions and Contractors involved in the issues being discussed. The parties shall mutually designate an MWBE representative to participate in appropriate Committee discussions. The Committee may conduct business through mutually agreed upon sub-committees.

ARTICLE 9 - GRIEVANCE & ARBITRATION PROCEDURE

SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES

Any question, dispute or claim arising out of, or involving the interpretation or application of this Agreement (other than jurisdictional disputes or alleged violations of Article 7, Section 1) shall be considered a grievance and shall be resolved pursuant to the exclusive procedure of the steps described below, provided, in all cases, that the question, dispute or claim arose during the term of this Agreement. Grievances shall include the City contract number and the Program Work

address; such information is posted at the work site if already commenced and is available in the City Record and Notice to Proceed for projects not already commenced.

Local Union grievances as to whether a scope of work is included or excluded from this Agreement shall be submitted to the LMC in the first instance rather than Step 1 below. To be timely, such notice must be given no later than five days prior to the bid opening date advertised in the City Record and bid documents for that contract, or any adjourned date publicly noticed if the grievance is challenging a determination by an Agency that the contract is not subject to this Agreement. Compliance with this limit shall operate as a statute of limitations and shall be a condition precedent to arbitration. For other grievances as to contractor and/or subcontractor scope of work issues, notice of such challenges shall be submitted to the LMC within 7 calendar days after the act, occurrence or event giving rise to the grievance. If the scope of work grievance is not resolved within 21 days of its submission to the LMC, then the grievance may proceed directly to Step 3 below.

Step 1:

(a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall, through the Local Union business representative or job steward give notice of the claimed violation to the work site representative of the involved Contractor and the Construction Manager. To be timely, such notice of the grievance must be given within 7 calendar days after the act, occurrence or event giving rise to the grievance. The business representative of the Local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within 7 calendar days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of the grievance procedure by serving the involved Contractor with written copies of the grievance setting forth a description of the claimed

violation, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved unless the settlement is accepted in writing by the Construction Manager (or designee) as creating a precedent.

(b) Should any signatory to this Agreement have a dispute (excepting jurisdictional disputes or alleged violations of Article 7, Section 1) with any other signatory to this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute shall be reduced to writing and proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

Step 2:

A Step 2 grievance shall be filed with the Agency, the BCTC, the Contractor, and, if the grievance is against a subcontractor, the subcontractor. The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor and/or a contractor association representative where appropriate, Council, the Construction Manager (or designee), and, if the grievance is against a subcontractor, the subcontractor, shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement. The BCTC shall schedule the Step 2 meeting.

Step 3:

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the Construction Manager or designee) to the BCTC. In the event the matter is not resolved at Step 2, either J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure, shall be designated at the Step 2 hearing and the BCTC will notify

the arbitrator of his designation. After such notification by the BCTC, the local demanding arbitration shall within a reasonable time request the arbitrator to schedule the matter for an arbitration hearing date. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

(b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the Construction Manager (or designee), involved Contractor and involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

SECTION 2. LIMITATION AS TO RETROACTIVITY

No arbitration decision or award, with the exception of those related to compliance with requirements to pay prevailing wages and supplements in accordance with federal or State law, may provide retroactivity of any kind exceeding 60 calendar days prior to the date of service of the written grievance on the Construction Manager and the involved Contractor or Local Union.

SECTION 3. PARTICIPATION BY AGENCY AND/OR CONSTRUCTION MANAGER

The Agency and Construction Manager (or such other designee of the Agency) shall be notified by the involved Contractor of all actions at Steps 2 and 3 and, at its election, may participate in full in all proceedings at these Steps, including Step 3 arbitration.

ARTICLE 10 - JURISDICTIONAL DISPUTES

SECTION 1. NO DISRUPTIONS

There will be no strikes, sympathy strikes, work stoppages, slowdowns, picketing or other disruptive activity of any kind arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

SECTION 2. ASSIGNMENT

All Program Work assignments shall be made by the Contractor to unions affiliated with the BCTC consistent with the New York Plan for the Settlement of Jurisdictional Disputes ("New York Plan") and its Greenbook decisions, if any. Where there are no applicable Greenbook decisions, assignments shall be made in accordance with the provisions of the New York Plan and local industry practice.

SECTION 3. NO INTERFERENCE WITH WORK

There shall be no interference or interruption of any kind with the Program Work while any jurisdictional dispute is being resolved. The work shall proceed as assigned by the Contractor until finally resolved under the applicable procedure of this Article. The award shall be confirmed in writing to the involved parties. There shall be no strike, work stoppage or interruption in protest of any such award.

ARTICLE 11 - WAGES AND BENEFITS

SECTION 1. CLASSIFICATION AND BASE HOURLY RATE

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the hourly wage rates applicable for those classifications as required by the applicable prevailing wage laws.

SECTION 2. EMPLOYEE BENEFITS

A. The Contractors agree to pay on a timely basis contributions on behalf of all employees covered by this Agreement to those established jointly trusteed employee benefit funds designated in the applicable CBA in Schedule "A" (in the appropriate Schedule "A" amounts), provided that such benefits are required to be paid on public works under any applicable prevailing wage law. Bona fide jointly trusteed fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added if similarly required under applicable prevailing wage law. Contractors, not otherwise contractually bound to do so, shall not be required to contribute to benefits, trusts or plans of any kind which are not required by the prevailing wage law provided, however, that this provision does not relieve Contractors signatory to local collective bargaining agreement with any affiliated union from complying with the fringe benefit requirements for all funds contained in the CBA. Furthermore, employees that may remain unaffiliated with any local union at the completion of their employment under the terms of this Agreement may apply for any distributions to which they may be entitled from the funds in accordance with the applicable rules and governing documents of the unions and the employee benefit funds that they have participated in under the terms of this Agreement.

B. 1. Notwithstanding Section 2 (A) above, and subject to 2 (B)(2) below, Contractors who designate Core Employees pursuant to Article 4, Section 2 (B) and (C) that are not signatory to a Schedule "A" agreement and who maintain bona fide private benefit plans that satisfy the requirements of Section 220 of the New York State Labor Law, may satisfy the above benefit obligation with respect to those employees by providing those employees with coverage under their private benefit plans (to the extent consistent with Section 220). The total benefit payments to be made on behalf of each such employee must be equal to the total Section 220 supplement amount and any shortfall must be paid by cash supplement to the employee.

2. A contractor that will satisfy its Section 220 obligations in accordance with subsection 2(B)(1) above shall make available to the Agency at the time of contract award a complete set of plan documents for each non-Schedule "A" benefit plan into which contributions will be made and/or coverage provided pursuant to the provisions of Section 2(B)(l) above. The Contractor shall also provide certification from a certified public accountant as to the annualized hourly value of such benefits consistent with the requirements of Section 220.

3. The City shall verify that the alternate benefit plan(s), together with any cash supplement to the employee, is compliant with Section 220 prior to awarding the Contractor a contract covered by this Agreement. In the event the Contractor's alternate benefit plan(s), together with any cash supplement to the employee, is determined to be compliant with Section 220 and will be utilized by the Contractor on behalf of Article 4, Section 2(B) and (C) Core Employees, the Local Unions have no duty to enforce the Contractor's obligations on the alternate benefit plan(s) as they are not party to the alternate plan(s) or privy to the terms and conditions of the plan obligations. In the event the City determines the alternate benefit plan(s), together with any cash supplement to the employee, is not compliant with Section 220, the Contractor may, upon executing a Letter of Assent, satisfy its obligations for all employees, including Core Employees, by contributing to the Schedule "A" benefit plans in accordance with the terms of the Schedule "A" agreements.

C. The Contractors agree to be bound by the written terms of the legally established jointly trusteed Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to Program Work done under this Agreement and only for those employees to whom this Agreement requires such benefit payments.

D. 1. To the extent consistent with New York City's Procurement Policy Board Rules with respect to prompt payment, as published at www.nyc.gov/ppb, §4-06(e), and in consideration of the unions' waiver of their rights to withhold labor from a contractor or subcontractor delinquent in the payment of fringe benefits contributions ("Delinquent Contractor"); the Agency agrees that where any such union and/or fringe benefit fund shall notify the Agency, the General Contractor, and the Delinquent Contractor in writing with back-up documentation that the Delinquent Contractor has failed to make fringe benefit contributions to it as provided herein and the Delinquent Contractor shall fail, within ten (10) calendar days after receipt of such notice, to furnish either proof of such payment or notice that the amount claimed by the union and/or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union or fringe benefit fund claims to be due it, and shall remit the amount when and so withheld to the fringe benefit fund and deduct such payment from the amounts then otherwise due and payable to the General Contractor, which payment shall, as between the General Contractor and the Agency, be deemed a payment by the Agency to the General Contractor; provided however, that in any month, such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. The union or its employee benefit funds shall include in its notification of delinquent payment of fringe benefits only such amount it asserts the Delinquent Contractor failed to pay on the specific project against which the claim is made and the union or its employee benefit funds may not include in such notification any amount such Delinquent Contractor may have failed to pay on any other City or non-City project.

2. In addition, where a union or employee benefit fund gives notice to the City that a Contractor is Delinquent as defined in subsection 2(D)(1) above and the City determines that the

notice includes appropriate back-up documentation that the Contractor is delinquent, the City will promptly, but not later than twenty (20) days after receipt of the notice, provide a copy of said notice to City Agencies. In the event the City determines there is insufficient back-up documentation, it will notify the appropriate union and/or fringe benefit fund promptly, but not later than twenty (20) days after receipt of the Delinquency Notice, and shall include notice of what additional documentation is requested. Any determination by the City that there is insufficient back-up must be reasonable. This provision is intended to enhance compliance with the prevailing wage law and this Agreement with respect to the payment of fringe benefits and is not intended as a substitute for the resolution of a disputed claim pursuant to any applicable law or agreement.

The City and the relevant Agency(s) will thereafter require the Delinquent Contractor to provide cancelled checks or other equivalent proof of payment of benefit contributions that have come due, to be submitted with certified payroll reports for all Program Work covered by this Agreement on which the Delinquent Contractor is engaged, for at least a one-year period or such earlier period if the Contractor is ultimately determined not to be a Delinquent Contractor. Such proof of payment when required is a condition of payment of the Delinquent Contractor's invoices by any entity, including, but not limited to, the City, the relevant Agency(s), Construction Manager, General Contractor, the prime or higher level subcontractor, as is appropriate under the Delinquent Contractor's engagement. The union and the funds shall upon request receive copies of the certified payrolls, cancelled checks, or other proof of payment from the City and/or the relevant Agency(s).

E. In the event the General Contractor or Delinquent Contractor shall notify the Agency as above provided that the claim of the union or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor that the union and/or fringe benefit fund claims

to be due it, pending resolution of the dispute pursuant to the union's Schedule "A" agreement, and the amount shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the Delinquent Contractor and union or employee benefit fund shall otherwise agree as to the disposition thereof; provided however, that such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. In the event the Agency shall be required to withhold amounts from a General Contractor for the benefit of more than one fringe benefit fund, the amounts so withheld in the manner and amount prescribed above shall be applied to or for such fund in the order in which the written notices of nonpayment have been received by the Agency, and if more than one such notice was received on the same day, proportionately based upon the amount of the union and/or fringe benefit fund claims received on such day. Nothing herein contained shall prevent the Agency from commencing an interpleader action to determine entitlement to a disputed payment in accordance with section one thousand six of the civil practice law and rules or any successor provision thereto.

F. Payment to a fringe benefit fund under this provision shall not relieve the General Contractor or Delinquent Contractor from responsibility for the work covered by the payment. Except as otherwise provided, nothing contained herein shall create any obligation on the part of the Agency to pay any union or fringe benefit fund, nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the union/fund and/or fringe benefit and the Agency.

ARTICLE 12 - HOURS OF WORK, PREMIUM PAYMENTS, SHIFTS AND HOLIDAYS

SECTION 1. WORK WEEK AND WORKDAY

A. The standard work week shall consist of 40 hours of work at straight time rates, Monday through Friday, 8 hours per day, plus ½ hour unpaid lunch period. The standard work week may be reduced to 35 or 37 ½ hours of work at straight time rates, Monday to Friday, 7 or 7

½ hours per day, plus ½ hour unpaid lunch period in those limited circumstances where the City states in the bid documents that the Contractor will not be given access to the site to accommodate an 8 hour day. The 8 hour, 7 ½ hour or 7-hour workday must be established at the commencement of the project and may not be altered by the Contractor.

B. In accordance with project needs, there shall be flexible start times with advance notice from Contractor to the Union. The Day Shift shall commence between the hours of 6:00 a.m. and 9:00 a.m. and shall end between the hours of 2:30 p.m. and 5:30 p.m., for an 8-hour day, and up to 7:30 p.m. for a 10-hour day. The Evening Shift shall commence between the hours of 3:00 p.m. and 6:00 p.m., unless different times are necessitated by the Agency's phasing plans on specific projects. The Night Shift shall commence between the hours of 11:00 p.m. and 2:00 a.m., unless different times are necessitated by the Agency's phasing plans on specific projects. Subject to the foregoing, starting and quitting times shall occur at the Program Work site designated by the Contractor.

C. Scheduling - Except as provided above, Monday through Friday is the standard work week; 8 hours of work plus ½ hour unpaid lunch. Notwithstanding any other provision of this Agreement, a Contractor may schedule a four-day work week, 10 hours per day ("4/10") at straight time rates, plus a ½ hour unpaid lunch, at the commencement of the job.

D. Notice - Contractors shall provide not less than 5 days prior notice to the Local Union involved as to the work week and work hour schedules to be worked or such lesser notice as may be mutually agreed upon.

SECTION 2. OVERTIME

Overtime shall be paid for any work (i) over an employee's regularly scheduled work day, i.e., work over eight (8) hours in a day where 5/8s is scheduled, work over ten (10) hours in a day where 4/10s is scheduled, or work over seven (7) or seven and one half (7½) hours where such

hours are scheduled pursuant to Article 12, section 1(A) and (ii) over forty (40) hours in a week, or over thirty five (35) or thirty seven and one-half (37 ½) where such hours are scheduled pursuant to Article 12, section 1(A). Overtime shall be paid at time and one half (1½) Monday through Saturday. All overtime work performed on Sunday and Holidays will be paid pursuant to the applicable Schedule "A". There shall be no stacking or pyramiding of overtime pay under any circumstances. There will be no restriction upon the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who shall be worked, including the use of employees, other than those who have worked the regular or scheduled work week, at straight time rates. The Contractor shall have the right to schedule work so as to minimize overtime or schedule overtime as to some, but not all, of the crafts and whether or not of a continuous nature.

SECTION 3. SHIFTS

A. Flexible Schedules - Scheduling of shift work, including Saturday and Sunday work, shall be within the discretion of the Contractor in order to meet Program Work schedules and existing Program Work conditions including the minimization of interference with the mission of the Agency. It is not necessary to work a day shift in order to schedule a second or third shift, or a second shift in order to schedule a third shift, or to schedule all of the crafts when only certain crafts or employees are needed. Shifts must have prior approval of the Agency or Construction Manager and must be scheduled with not less than five workdays' notice to the Local Union or such lesser notice as may be mutually agreed upon.

B. Second and/or Third Shifts - The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 10 p.m. and 2 a.m., subject to different times necessitated by the Agency phasing plans on specific projects. There shall be no reduction in shift hour work. With respect to second and third shift work there shall be a 5% shift premium, or the rate required by the applicable prevailing wage laws, whichever is less. No other premium or other payments for such

work shall be required unless such work is in excess of the employee's regularly scheduled work week, i.e., forty (40) hours in the week or thirty five (35) or thirty seven and one half (37 ½) pursuant to Article 12, Section 1(A). All employees within the same classification performing Program Work will be paid at the same wage rate regardless of the shift or work, subject only to the foregoing provisions.

C. Flexible Starting Times - Shift starting times will be adjusted by the Contractor as necessary to fulfill Program Work requirements subject to the notice requirements of paragraph A.

SECTION 4. HOLIDAYS

A. Schedule - There shall be nine (9) recognized holidays on the project:

New Year's Day	
Martin Luther King Day	President's Day
Memorial Day	Veteran's Day
Labor Day	Thanksgiving Day
Independence Day	Christmas Day

All said holidays shall be observed on the calendar date except those holidays which occur on Saturday shall be observed on the previous Friday and those that occur on Sunday shall be observed on the following Monday.

B. Payment - Regular holiday pay, if any, for work performed on such a PLA recognized holiday shall be in accordance with the applicable Schedule "A" for work performed on a holiday, even where the PLA holiday differs from the CBA holidays.

C. Exclusivity - No holidays other than those listed in Section 4(A) above shall be recognized or observed.

SECTION 5. MAKE-UP DAYS

When severe weather, power failure, fire or natural disaster or other similar circumstances beyond the control of the Contractor prevent work from being performed on a regularly scheduled weekday, the Contractor may schedule a Saturday make-up day (or Friday make-up day in the case of a 4/10 schedule) and such time shall be scheduled and paid as if performed on a weekday. Any other Saturday work shall be paid at time and one-half (1½). The Contractor shall notify the Local Union on the missed day or as soon thereafter as practicable if such a make-up day is to be worked.

SECTION 6. REPORTING PAY

A. Employees who report to the work location pursuant to their regular schedule and who are not provided with work shall be paid two hours reporting pay at straight time rates. An employee whose work is terminated early by a Contractor due to severe weather, power failure, fire or natural disaster of for similar circumstances beyond the Contractor's control, shall receive pay only for such time as is actually worked. In other instances, in which an employee's work is terminated early (unless provided otherwise elsewhere in this Agreement), the employee shall be paid for their full shift. Contractors shall not be permitted to call, text or email or voicemail employees in advance of their regularly scheduled shift starting time to avoid reporting pay. Notwithstanding the above, in the event that the National Weather Service issues a weather advisory for the area in which the work location is situated, and the entire project is shut down as a result of the Weather Advisory, the Contractor shall be permitted to speak to employees no less than four (4) hours in advance of their shift starting time, unless the Local Union consents to a shorter notice in writing, to advise them not to report to work due to the National Weather Service advisory, and employees who are so notified shall not receive two (2) hours reporting pay if they report to the work location. The Contractor shall make every effort to notify each employee directly and confirm that notification has been received. Voice, text, and email messages left for employees without

confirmation of delivery and receipt by employee do not constitute sufficient notice under this provision.

B. When an employee, who has completed their scheduled shift and left the Program Work site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive overtime pay at the rate of time and one-half of the employee's straight time rate for hours actually worked.

C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.

D. Except as specifically set forth in this Article there shall be no premiums, bonuses, hazardous duty, high time or other special premium payments or reduction in shift hours of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Article and except where an applicable Schedule "A" requires a full weeks' pay for forepersons.

SECTION 7. PAYMENT OF WAGES

A. Termination - Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor shall also provide the employee with a written statement setting forth the date of lay off or discharge.

SECTION 8. EMERGENCY WORK SUSPENSION

A Contractor may, if considered necessary for the protection of life and/or safety of employees or others, suspend all or a portion of Program Work. In such instances, employees will be paid for actual time worked, except that when a Contractor requests that employees remain at the job site available for work, employees will be paid for that time at their hourly rate of pay.

SECTION 9. INJURY/DISABILITY

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than a full day's pay in accordance with the employee's regularly scheduled workday under Article 12, Section (1)(A). Further, the employee shall be rehired at such time as able to return to duties provided there is still Program Work available for which the employee is qualified and able to perform.

SECTION 10. TIME KEEPING

A Contractor may utilize systems to check employees in and out. Each employee must check in and out and sign a daily sign-in sheet, or other attendance methodology approved in writing by the Agency(s). The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

SECTION 11. MEAL PERIOD

A Contractor shall schedule an unpaid period of not more than 1/2-hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts, or which provides for staggered lunch periods within a craft or trade. If an employee is required to work through the meal period, the employee shall be compensated in a manner established in the applicable Schedule "A".

SECTION 12. BREAK PERIODS

There will be no rest periods, organized coffee breaks or other non-working time established during working hours. Individual coffee containers will be permitted at the employee's work location. Where 4/10s are being worked there shall be a morning and an afternoon coffee break.

ARTICLE 13 - APPRENTICES AND WORKFORCE DEVELOPMENT

SECTION 1. APPRENTICE RATIOS AND REFERRALS

A. Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications in the maximum ratio permitted by the New York State Department of Labor ("NYSDOL") or the maximum allowed per trade. Apprentices and such other classifications as are appropriate shall be employed in a manner consistent with the provisions of the appropriate Schedule "A" agreement. The parties encourage, as an appropriate source of apprentice recruitment consistent with the rules and operations of the affiliated unions' apprentice-programs, the use of the Edward J. Malloy Initiative for Construction Skills, Non-Traditional Employment for Women, New York Helmets to Hardhats, and Pathways to Apprenticeship (P2A). Should a Contractor request that apprentices be provided for Program Work, the referring Local Union shall comply with that request so long as it is consistent with the maximum ratios permitted by NYSDOL.

SECTION 2. WORKFORCE DEVELOPMENT

A. The parties to this Agreement recognize the mutual interest in increasing training and career opportunities for Program Hires. The parties are committed to (i) increasing opportunities for Program Hires in these zip codes in pre-apprenticeship and apprenticeship programs, and (ii) using the work opportunities provided by this Agreement to increase the career opportunities for qualified Program Hires, and (iii) to assure the continued availability of a skilled and qualified, readily available construction workforce for this program and future work. The parties agree to the Workforce Development Program set forth in Exhibit "D".

B. Specifically, the parties have established an initiative entitled HireNYC Construction Careers, which is an initiative to advance career opportunities for Program Hires.

C. The HireNYC Construction Careers initiative will work with the Mayor's Office of Workforce Development ("WKDEV") and its Workforce1 Centers to recruit Program Hires interested in employment in the construction industry.

D. HireNYC Construction Careers intends to capitalize on the work opportunities presented by this Agreement to create a pathway to career opportunities in the construction workforce. To this end the HireNYC Construction Careers initiative includes a workforce goal of at least 30% of all hours worked under this Agreement, including by subcontractors pursuant to Article 3, Section 1(B)(12), to be worked by workers residing within the specified zip codes or NYCHA housing. In order to encourage recruitment of new workers, HireNYC Construction Careers has established a goal that at least 30% of all of those hours are to be worked by apprentices from those zip codes or NYCHA housing.

E. The Contractors and Unions agree to cooperate and participate in the implementation of HireNYC Construction Careers to assist Program Hires with educational and training opportunities related to access to pre-apprenticeship, apprenticeship, and project work as set forth in this Agreement.

F. Reporting Requirements:

i. The Contractors shall report the residence zip code information on all certified payroll reports.

ii. The Local Unions, their referral systems, the affiliated pre-apprentice programs, and Contractors shall cooperate with any protocol developed for monitoring the HireNYC Construction Careers initiative.

iii. The Local Unions shall provide the WKDEV copies of the following

reports when such reports are submitted to NYSDOL: *Apprentice Training Recruitment Notification and Minimum Qualifications (AT 505)*, *Apprentice Training Program Affirmative Action Plan (AT 603), Apprenticeship Agreement (AT 401), or such alternate reporting system as the parties may negotiate during the term of this Agreement*.

G. The City and BCTC agree that no less than annually, the LMC shall review the implementation of HireNYC Construction Careers, as well as Program Hire opportunities afforded as a result of the initiative. The City and BCTC will collaborate to develop monitoring protocol for the purpose of measuring the success of HireNYC Construction Careers. The City and BCTC may, on mutual consent, modify the goals, procedures and protocols, as necessary to afford continued opportunity to Program Hires.

H. To facilitate the commitments set forth in this Agreement, each Local Union shall designate a HireNYC Construction Careers lead representative to work in partnership with WKDEV to implement these workforce and apprenticeship provisions within the union and across City construction contracts.

ARTICLE 14 - SAFETY PROTECTION OF PERSON AND PROPERTY
SECTION 1. SAFETY REQUIREMENTS

Each Contractor will ensure that applicable OSHA and safety requirements are at all times maintained on the Program Work site and the employees and Unions agree to cooperate fully with these efforts to the extent consistent with their rights and obligations under the law. Employees will cooperate with employer safety policies and will perform their work at all times in a safe manner and protect themselves and the property of the Contractor and Agency from injury or harm, to the extent consistent with their rights and obligations under the law. Failure to do so will be grounds for discipline, including discharge. The Construction Manager and/or Contractor may

adopt, and the Unions shall agree to, the Drug and Alcohol Testing Policy attached as Schedule "B".

SECTION 2. CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Contractors and the Construction Manager for Program Work. Such rules will be published and posted in conspicuous places throughout the Program Work sites. Any site security and access policies established by the Construction Manager or General Contractor intended for specific application to the construction workforce for Program Work and that are not established pursuant to an Agency directive shall be implemented only after notice to the BCTC and its affiliates and an opportunity for negotiation and resolution by the Labor Management Committee.

SECTION 3. INSPECTIONS

The Contractors and Construction Manager retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

ARTICLE 15 - TEMPORARY SERVICES

SECTION 1.

Temporary services, i.e. all temporary heat, climate control, water, power and light, shall only be required upon the determination of the Agency or Construction Manager, and when used shall be staffed and assigned to the appropriate trade(s) with jurisdiction. Temporary services shall be provided by the appropriate Contractors' existing employees during working hours in which a shift is scheduled for employees of the Contractor. The Agency or Construction Manager may determine the need for temporary services requirements during non-working hours, and when used shall be staffed and assigned to the appropriate trades(s), and which may be limited to one person per applicable trade where practicable. There shall be no stacking of trades on temporary services,

provided this does not constitute a waiver of primary trade jurisdiction. In the event a temporary system component is claimed by multiple trades, the matter shall be resolved through the New York Plan for Jurisdictional Disputes.

ARTICLE 16 - NO DISCRIMINATION
SECTION 1. COOPERATIVE EFFORTS

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of creed, race, color, religion, sex, sexual orientation, national origin, marital status, citizenship status, disability, gender identity, age or any other status provided by law, in any manner prohibited by law or regulation.

SECTION 2. LANGUAGE OF AGREEMENT

Any words signifying any gender shall be interpreted to mean any or all gender identities.

ARTICLE 17 - GENERAL TERMS
SECTION 1. PROJECT RULES

A. The Construction Manager and the Contractors shall establish such reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work. These rules will be explained at the pre-job conference and posted at the Program Work sites and may be amended thereafter as necessary. Notice of amendments will be provided to the appropriate Local Union. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is for cause.

B. The parties adopt and incorporate the BCTC's Standards of Excellence as annexed hereto as Exhibit "B".

SECTION 2. TOOLS OF THE TRADE

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

SECTION 3. SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson.

SECTION 4. TRAVEL ALLOWANCES

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement.

SECTION 5. FULL WORKDAY

Employees shall be at their work area at the starting time established by the Contractor, provided they are provided access to the work area. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 6. COOPERATION AND WAIVER

The Construction Manager, Contractors and the Unions will cooperate in seeking any NYSDOL, or any other government, approvals that may be needed for implementation of any terms of this Agreement. In addition, the Council, on their own behalf and on behalf of its participating affiliated Local Unions and their individual members, intend the provisions of this Agreement to control to the greatest extent permitted by law, notwithstanding contrary provisions of any applicable prevailing wage, or other, law and intend this Agreement to constitute a waiver of any such prevailing wage, or other, law to the greatest extent permissible only for work within the scope of this Agreement, including specifically, but not limited to those provisions relating to shift, night,

and similar differentials and premiums. This Agreement does not, however, constitute a waiver or modification of the prevailing wage schedules applicable to work not covered by this Agreement.

ARTICLE 18 - SAVINGS AND SEPARABILITY

SECTION 1. THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or if such application may cause the loss of project funding or any New York State Labor Law exemption for all or any part of the Program Work, the provision or provisions involved (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the remainder of the Agreement shall remain in full force and effect to the extent allowed by law (and to the extent no funding or exemption is lost), unless the part or parts so found to be in violation of law or to cause such loss are wholly inseparable from the remaining portions of the Agreement and/or are material to the purposes of the Agreement. In the event a court of competent jurisdiction finds any portion of the Agreement to trigger the foregoing, the parties will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

SECTION 2. THE BID SPECIFICATIONS

In the event that the Agency's (or Construction Manager's) bid specifications, or other action, requiring that a successful bidder (and subcontractor) become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or may cause the loss of project funding or any New York State Labor Law exemption for all or any part of the Program Work, such requirement (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the Agreement shall remain in full force and effect to the extent allowed

by law and to the extent no funding or exemption is lost In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction only where the Agency and Contractor voluntarily accepts the Agreement. The parties will enter into negotiations as to modifications to the Agreement to reflect the court or other action taken and the intent of the parties for contracts to be let in the future.

SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the Agency, the Construction Manager, any Contractor, nor any Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order or injunction, other determination, or in order to maintain funding or a New York State Labor Law exemption for Program Work. Bid specifications will be issued in conformance with court orders then in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors and signatory Unions.

ARTICLE 19 - FUTURE CHANGES IN SCHEDULE "A" AREA CONTRACTS

SECTION 1. CHANGES TO AREA CONTRACTS

A. Schedule "A" to this Agreement shall continue in full force and effect until the Contractor and/or Union parties to the Area CBAs that are the basis for the Schedule "A" notify the Mayor's Office of Contract Services ("MOCS"), Agency and Construction Manager in writing by providing a copy of the updated CBA(s) incorporating the changes agreed to in that Area CBA which are applicable to work covered by this Agreement and their effective dates.

B. It is agreed that any provisions negotiated into Schedule "A" CBAs will not apply to work under this Agreement if such provisions are less favorable to those uniformly required of

contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied on Program Work if it may be construed to apply exclusively, or predominantly, to work covered by this Agreement.

C. Any disagreement between signatories to this Agreement over the incorporation into Schedule "A" of provisions agreed upon in the renegotiation of Area CBAs shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Program Work by any Local Union involved in the renegotiation of Area Local CBAs nor shall there be any lock-out on such Program Work affecting a Local Union during the course of such renegotiations.

ARTICLE 20 - WORKERS' COMPENSATION ADR

SECTION 1.

An Alternative Dispute Resolution ("ADR") program may be negotiated and participation in the ADR program will be optional by trade.

ARTICLE 21 - HELMETS TO HARDHATS

SECTION 1.

The Contractors and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractors and Unions agree to utilize the services of the New York City Helmets to Hardhats Program ("H2H") to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

SECTION 2.

The Unions and Contractors agree to coordinate with H2H to create and maintain an integrated database of veterans interested in working on this project and of apprenticeship and employment opportunities for this project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

2020 NYC AGENCY RENOVATION PROJECT LABOR AGREEMENT

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective as of the ___ day of_____, _____.

FOR BUILDING AND CONSTRUCTION TRADES COUNCIL
OF GREATER NEW YORK AND VICINITY

BY: _____
Gary LaBarbera
President

FOR NEW YORK CITY

BY: _____
Dean Fuleihan
First Deputy Mayor

APPROVED AS TO FORM:

_____
ACTING CORPORATION COUNSEL
NEW YORK CITY

LIST OF SIGNATORY UNIONS
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-CIO, Local Lodge No.5
Bricklayers and Allied Craftworkers, Local Union No. 1
Building Concrete & Excavating Laborers, Local Union No. 731
N.Y.C. and Vicinity District Council of Carpenters
Cement Masons, Local Union No. 780
Concrete Workers District Council No. 16
Asbestos, Lead & Hazardous Waste, Laborers Local Union No. 78
Construction & General Building Laborers Local Union No. 79
Derrickmen and Riggers Local Union No. 197
International Brotherhood of Electrical Workers, Local Union No. 3
International Union of Elevator Constructors, Local Union No. 1
Heat & Frost Insulators & Allied Workers, Local Union No. 12
Heat & Frost Insulators & Allied Workers, Local Union No. 12A
Pavers & Road Builders, Laborers Local Union No. 1010
New York State Iron Workers District Council
Structural Iron Workers, Local Union No. 40
Structural Iron Workers, Local Union No. 361
Mason Tenders District Council
Metallic Lathers & Reinforcing Ironworkers, Local No. 46
Ornamental Iron Workers, Local Union No. 580
Glaziers No. 1087, District Council 9
Painters, District Council No. 9
Metal Polishers, Local Union No. 8A-28A; District Council No. 9
Drywall Tapers Local Union No 1974, District Council 9
Bridge & Structural Steel Painters, Local Union No. 806, District Council 9
Operative Plasterers Local Union No. 262
UA Plumbers Local Union No. 1
Private Sanitation, Teamsters Local Union No. 813
Roofers & Waterproofers, Local Union No. 8
Sheet Metal Workers, Local Union No. 28
Sheet Metal Workers, Local Union No. 137
UA Steamfitters, Local Union No. 638
Teamsters, Local Union No. 282
Tile, Marble & Terrazzo, B.A.C. Local Union No. 7

SCHEDULE "A" - CBAs

Union	Current Agreement w/
Architectural and Ornamental Iron Workers Local Union 580, AFL-CIO	Allied Building Metal Industries, Inc.
Building, Concrete, Excavating & Common Laborers Local 731	Independent
Building, Concrete, Excavating & Common Laborers Local 731	Members of the General Contractors Association of New York, Inc.
Bricklayers Local 1 of the International Union of Bricklayers and Allied Craftworkers	Independent
District Council No. 9, I.U.P.A.T Glaziers Local 1087	Window and Plate Glass Dealers Association
Drywall Tapers and Painters Local 1974, affiliated with International Union of Painters & Allied Trades and Drywall Taping Contractor's Association & Association of Wall-Ceiling & Carpentry Industries NY, Inc.	Independent
Enterprise Association of Steamfitters and Apprentices Local 638	Mechanical Contractors Association of NY, Inc.
Enterprise Association of Steamfitters and Apprentices Local 638	Independent
Elevator Constructors Local 1 of NY and NJ	ThyssenKrupp Elevator Corporation
Elevator Constructors Local 1 of NY and NJ	Independent
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers' International Union of North America AFL-CIO	Independent
Highway Road and Street Laborers Local Union 1010 of the District Council of Pavers and Road Builders of the Laborers' International Union of North America AFL-CIO	Member of the General Contractors Association of New York, Inc.
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	Independent
International Association of Heat and Frost Insulators and Allied Workers Local No. 12 of New York City	The Insulation Contractors Association of New York City, Inc.
International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Independent

International Association of Heat and Frost Insulators and Allied Workers Local No. 12A of New York City	Environmental Contractors Association, Inc.
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, AFL-CIO, Local Lodge No. 5	Boilermakers Association of Greater New York
Local Union No. 3 International Brotherhood of Electrical Workers, AFL-CIO	New York Electrical Contractors Association
International Brotherhood of Teamsters, Local 282, High Rise Contract	Building Contractors Association & Independents
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Cement League
Local 46 Metallic Lathers Union and Reinforcing Iron Workers of NY and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers	Independent
Local 8 Roofers, Waterproofers & Allied Workers	Roofing and Waterproofing Contractors Association of New York and Vicinity
Local Union 1 of the United Association of Journeymen and Apprentices of the Pipe Fitting Industry of the United States and Canada	Association of Contracting Plumbers of the City of New York
Local Union Number 40 & 361 of Bridge, Structural Ornamental and Reinforcing Iron Workers AFL-CIO	Independent
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Building Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Interior Demolition Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Independent
Mason Tenders DC & Laborers' International Union – Local 78 & 79	NYCDCA
Mason Tenders DC & Laborers' International Union – Local 78 & 79	Environmental Contractors Association
Mason Tenders DC & Laborers' International Union – Local 78 & 79	ABMC

Operative Plasterers' and Cement Masons' International Association Local No. 262	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	Independent
Painters and Allied Trades AFL-CIO, District Council No. 9 (Painting and Protective Coatings CBA)	The Association of Master Painters & Decorators of NY, Inc. and The Association of Wall, Ceiling & Carpentry Industries of NY, Inc. and The Window and Plate Glass Dealers Association
Sheet Metal Workers' International Association, Local 28	Sheet Metal & Air Conditioning Contractors Association of New York City, Inc.
Sheet Metal Workers' International Association, Local 137	The Greater New York Sign Association
Structural Steel and Bridge Painters Local 806, DC 9 International Union of Painters and Allied Trades, AFL-CIO	New York Structural Steel Painting Contractors Association
Teamsters Local 813	Independent
Teamsters Local 813	IESI NY Corporation
The Cement Masons' Union, Local 780	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Cement League
The District Council of Cement and Concrete Workers (comprised of Local 6A; Local 18A and Local 20)	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local No. 1556	Concrete Contractors of NY
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Dockbuilders Local 1556	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Millwright Local 740	Independent

The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Timbermen Local 1556	GCA
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Heavy Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Manufacturing Woodworkers Association of Greater New York Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Hoisting Trade Association of New York, Inc.
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Test Boring Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	Building Contractors Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America	The Association of Wall-Ceiling & Carpentry Industries of New York, Incorporated
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	The Cement League
The District Council of NYC and Vicinity of the United Brotherhood of Carpenters and Joiners of America	New York City Millwright Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners	Greater New York Floor Covering Association
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Association of Architectural Metal & Glass

The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Carpenters	Concrete Contractors of NY
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Building Construction Carpenters	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Local 2287	Independent
The District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America for Shop Carpenters	Independent
The Tile Setters and Tile Finishers Union of New York and New Jersey, Local 7 of the International Bricklayers and Allied Craftworkers	The Greater New York and New Jersey Contractors Association
United Derrickmen & Riggers Association, Local 197 of NY, LI, Westchester & Vicinity	Contracting Stonesetters Association Inc.
United Derrickmen & Riggers Association Local 197 of NY, LI, Westchester and Vicinity	Building Stone and Pre-cast Contractors Association

Exhibit A

Project Labor Agreement - Letter of Assent

Dear: _____

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as the NYC Agency Renovation and located at 10502 Ave D, Brooklyn, NY 11236 (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

(1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto:

(2) Agrees to be bound by the legally established collective bargaining agreements; local trust agreements for employee benefit funds; and trust documents for joint apprentice programs as well as apprentice program rules and procedures but only to the extent of Program Work and as required by the PLA.

(3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.

(4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.

(5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Provide description of the Work, identify craft jurisdiction(s) and all contract numbers below:

Local Union: _____

Description of Work: DSNY 17/18 Brooklyn Garage Roof Replacement And HVAC Upgrade + Solar

Contract Number(s): S136-383N

Dated: October 12, 2021

La Sardo General Contractors, Inc.
(Name of Contractor or subcontractor)

La Sardo General Contractors, Inc
(Name of CM; GC; Contractor or Higher Level Subcontractor)

Silvio C. La Sardo, President
(Authorized Officer & Title)

35 Crescent Street, Brooklyn, NY 11208
(Address)

(Signature)

718-647-4924, 718-647-7528
(Phone) (Fax)

Contractor's State License
11-2250503

Sworn to before me this
12 day of October, 2021

Lucy Romano
Notary Public

LUCY ROMANO
Notary Public, State of New York
No. 01RO5016372
Qualified in Queens County
Commission Expires Aug 9, 2025

Exhibit B

NEW YORK CITY BUILDING AND CONSTRUCTION TRADES COUNCIL STANDARDS OF EXCELLENCE

The purpose of this Standard of Excellence is to reinforce the pride of every construction worker and the commitment to be the most skilled, most productive and safest workforce available to construction employers and users in the City of New York. It is the commitment of every affiliated local union to use our training and skills to produce the highest quality work and to exercise safe and productive work practices.

The rank and file members represented by the affiliated local unions acknowledge and adopt the following standards:

- ***Provide a full day's work for a full days pay;***
- ***Safely work towards the timely completion of the job;***
- ***Arrive to work on time and work until the contractual quitting time;***
- ***Adhere to contractual lunch and break times;***
- ***Promote a drug and alcohol free work site;***
- ***Work in accordance with all applicable safety rules and procedures;***
- ***Allow union representatives to handle job site disputes and grievances without resort to slowdowns, or unlawful job disruptions;***
- ***Respect management directives that are safe, reasonable and legitimate;***
- ***Respect the rights of co-workers;***
- ***Respect the property rights of the owner, management and contractors.***

The Unions affiliated with the New York City Building and Construction Trades Council will expect the signatory contractors to safely and efficiently manage their jobs and the unions see this as a corresponding obligation of the contractors under this Standard of Excellence. The affiliated unions will expect the following from its signatory contractors:

- ***Management adherence to the collective bargaining agreements;***
- ***Communication and cooperation with the trade foremen and stewards;***
- ***Efficient, safe and sanitary management of the job site;***
- ***Efficient job scheduling to mitigate and minimize unproductive time;***
- ***Efficient and adequate staffing by properly trained employees by trade;***
- ***Efficient delivery schedules and availability of equipment and tools to ensure efficient job progress;***
- ***Ensure proper blueprints, specifications and layout instructions and material are available in a timely manner***
- ***Promote job site dispute resolution and leadership skills to mitigate such disputes;***
- ***Treatment of all employees in a respectful and dignified manner acknowledging their contributions to a successful project.***

The affiliated unions and their signatory contractors shall ensure that both the rank and file members and the management staff shall be properly trained in the obligations undertaken in the Standard of Excellence.

Exhibit "C" - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate
(Zip codes within ~100 mile radius of NYC)

Zip Code	Borough	Neighborhood
10001	Manhattan	Midtown South
10002	Manhattan	Chinatown
10009	Manhattan	East Village
10025	Manhattan	Manhattan Valley
10026	Manhattan	Central Harlem
10027	Manhattan	Manhattanville
10029	Manhattan	East Harlem
10030	Manhattan	Central Harlem
10031	Manhattan	Hamilton Heights
10032	Manhattan	Inwood and Washington Heights
10033	Manhattan	Washington Heights
10034	Manhattan	Inwood
10035	Manhattan	East Harlem
10037	Manhattan	Central Harlem
10038	Manhattan	Lower Manhattan
10039	Manhattan	Central Harlem
10040	Manhattan	Inwood and Washington Heights
10301	Staten Island	St. George
10302	Staten Island	Port Richmond
10303	Staten Island	Mariner's Harbor
10304	Staten Island	Stapleton
10310	Staten Island	West Brighton
10451	Bronx	Concourse Village
10452	Bronx	High Bridge
10453	Bronx	University Heights
10454	Bronx	Mott Haven
10455	Bronx	Longwood
10456	Bronx	Melrose
10457	Bronx	Central Bronx
10458	Bronx	Bedford Park
10459	Bronx	Morrisania
10460	Bronx	East Tremont
10462	Bronx	Parkchester
10463	Bronx	Kingsbridge
10466	Bronx	Wakefield
10467	Bronx	Norwood
10468	Bronx	Bronx Park and Fordham
10472	Bronx	Unionport
10473	Bronx	Soundview
10474	Bronx	Hunts Point

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	Borough	Neighborhood
11101	Queens	Long Island City
11102	Queens	Northwest Queens
11106	Queens	Ravenswood
11203	Brooklyn	East Flatbush
11204	Brooklyn	Borough Park
11205	Brooklyn	Fort Greene
11206	Brooklyn	East Williamsburg
11207	Brooklyn	East New York
11208	Brooklyn	East New York / Cypress Hills
11211	Brooklyn	Williamsburg
11212	Brooklyn	Brownsville
11213	Brooklyn	Crown Heights
11214	Brooklyn	Bensonhurst
11216	Brooklyn	Central Brooklyn
11218	Brooklyn	Kensington
11219	Brooklyn	Borough Park
11220	Brooklyn	Sunset Park
11221	Brooklyn	Bushwick
11223	Brooklyn	Gravesend
11224	Brooklyn	Coney Island
11225	Brooklyn	Prospect Lefferts Gardens
11226	Brooklyn	Prospect Park South
11230	Brooklyn	Midwood
11232	Brooklyn	Sunset Park
11233	Brooklyn	Ocean Hill
11235	Brooklyn	Brighton Beach
11237	Brooklyn	Bushwick and Williamsburg
11239	Brooklyn	Starrett City
11354	Queens	Downtown Flushing
11355	Queens	Queensboro Hill
11368	Queens	South Corona
11369	Queens	East Elmhurst
11373	Queens	Elmhurst
11416	Queens	Southwest Queens
11417	Queens	Ozone Park
11418	Queens	Richmond Hill
11430	Queens	Ozone Park
11432	Queens	Jamaica Center
11433	Queens	South Jamaica
11435	Queens	Briarwood
11691	Queens	Far Rockaway
11692	Queens	Arverne

Data Source: 2013-2017 American Community Survey 5-year estimates

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
06401	CT	Ansonia
06510	CT	New Haven
06511	CT	New Haven
06513	CT	New Haven
06515	CT	New Haven
06519	CT	New Haven
06604	CT	Bridgeport
06605	CT	Bridgeport
06607	CT	Bridgeport
06608	CT	Bridgeport
06610	CT	Bridgeport
06702	CT	Waterbury
06704	CT	Waterbury
06705	CT	Waterbury
06706	CT	Waterbury
06708	CT	Waterbury
06710	CT	Waterbury
06810	CT	Danbury
07002	NJ	Bayonne
07017	NJ	East Orange
07018	NJ	East Orange
07022	NJ	Fairview
07026	NJ	Garfield
07029	NJ	Harrison
07047	NJ	North Bergen
07050	NJ	Orange
07055	NJ	Passaic
07060	NJ	Plainfield
07062	NJ	Plainfield
07087	NJ	Union City
07093	NJ	West New York
07102	NJ	Newark
07103	NJ	Newark
07104	NJ	Newark
07105	NJ	Newark
07106	NJ	Newark
07107	NJ	Newark
07108	NJ	Newark
07111	NJ	Irvington
07112	NJ	Newark
07114	NJ	Newark
07201	NJ	Elizabeth
07202	NJ	Elizabeth
07206	NJ	Elizabethport
07208	NJ	Elizabeth
07304	NJ	Jersey City
07305	NJ	Jersey City
07306	NJ	Jersey City
07307	NJ	Jersey City
07310	NJ	Jersey City

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
07501	NJ	Paterson
07502	NJ	Paterson
07503	NJ	Paterson
07504	NJ	Paterson
07505	NJ	Paterson
07513	NJ	Paterson
07514	NJ	Paterson
07522	NJ	Paterson
07524	NJ	Paterson
07608	NJ	Teterboro
07703	NJ	Fort Monmouth
07712	NJ	Asbury Park
07727	NJ	Farmingdale
07734	NJ	Keansburg
07740	NJ	Long Branch
07820	NJ	Allamuchy
07939	NJ	Lyons
08031	NJ	Bellmawr
08045	NJ	Lawnside
08095	NJ	Winslow
08102	NJ	Camden
08103	NJ	Camden
08104	NJ	Camden
08105	NJ	Camden
08110	NJ	Pennsauken
08217	NJ	Elwood
08224	NJ	New Gretna
08608	NJ	Trenton
08609	NJ	Trenton
08611	NJ	Trenton
08618	NJ	Trenton
08638	NJ	Trenton
08701	NJ	Lakewood
08751	NJ	Seaside Heights
08808	NJ	Broadway
08861	NJ	Perth Amboy
08901	NJ	New Brunswick
10545	NY	Maryknoll
10550	NY	Mount Vernon
10601	NY	White Plains
10701	NY	Yonkers
10703	NY	Yonkers
10705	NY	Yonkers
10801	NY	New Rochelle
10927	NY	Haverstraw
10932	NY	Howells
10940	NY	Middletown
10950	NY	Monroe
10952	NY	Monsey
10963	NY	Otisville
10977	NY	Spring Valley

PLA Exhibit C - HireNYC Construction Careers

(August 2020 version)

Non-exhaustive list of zip codes where at least 15% of the individuals are below the federal poverty rate

(Zip codes within ~100 mile radius of NYC)

Zip Code	State	City or Town
11096	NY	Inwood
11550	NY	Hempstead
11556	NY	Uniondale
11713	NY	Bellport
11798	NY	Wyandanch
11951	NY	Mastic Beach
11970	NY	South Jamesport
12401	NY	Kingston
12416	NY	Chichester
12419	NY	Cottekill
12427	NY	Elka Park
12428	NY	Ellenville
12432	NY	Glasco
12457	NY	Mount Tremper
12475	NY	Ruby
12489	NY	Wawarsing
12490	NY	West Camp
12491	NY	West Hurley
12516	NY	Copake
12550	NY	Newburgh
12561	NY	New Paltz
12583	NY	Tivoli
12589	NY	Wallkill
12594	NY	Wingdale
12601	NY	Poughkeepsie
12701	NY	Monticello
12725	NY	Claryville
12729	NY	Cuddebackville
12732	NY	Eldred
12733	NY	Fallsburg
12743	NY	Highland Lake
12747	NY	Hurleyville
12749	NY	Kauneonga Lake
12751	NY	Kiamesha Lake
12754	NY	Liberty
12758	NY	Livingston Manor
12759	NY	Loch Sheldrake
12762	NY	Mongaup Valley
12763	NY	Mountain Dale
12779	NY	South Fallsburg
12780	NY	Sparrow Bush
19007	PA	Bristol
19123	PA	Philadelphia
19125	PA	Philadelphia
19134	PA	Philadelphia
19135	PA	Philadelphia
19136	PA	Philadelphia
19137	PA	Philadelphia

Data Source: 2013-2017 American Community Survey 5-year estimates

EXHIBIT "D"
MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING, entered into as of _____, between the City of New York ("City") with an office located at City Hall, New York, NY 10007, the Building and Construction Trades Council of Greater New York and Vicinity ("BCTC"), on its behalf and on behalf of its affiliated unions, with its principal place of business located at 350 West 31s[t] Street, New York, NY 10001, and the Building Trade Employers' Association of New York City ("BTEA"), on its behalf and on behalf of its affiliated contractors, with its principal place of business located at 1325 Avenue of the Americas, New York, NY 10019.

WHEREAS, since 2009, the City, the BCTC, and the BTEA have entered into Memoranda of Understanding (each an "MOU"), contemporaneous to the City entering to Project Labor Agreements with the BCTC (each a "PLA"), setting goals on new apprenticeship opportunities for graduates of direct entry pre-apprenticeship programs for low-income New Yorkers, minorities, high school students, women, veterans, NYCHA residents, and qualified employees of Minority- and Women-Owned Business Enterprises ("M/WBEs") that become signatory to the union, and have provided increased opportunities for New Yorkers to have access to good union construction careers;

WHEREAS, in 2014, the City and the BCTC entered into an MOU related to the New York City Build It Back Program and committed to encourage contractors and subcontractors to employ Sandy-impacted residents and for the City and the BCTC to work together with community-based organizations to recruit and train New York City residents, with an emphasis on Sandy-impacted low income residents;

WHEREAS, the BCTC and the BTEA committed to: (i) promote the representation of veterans, women, high school graduates of the City's public schools, and New Yorkers in need of economic opportunity in apprenticeship programs jointly sponsored by BCTC unions and BTEA contractors, and (ii) improve workforce training and development for entrance into the construction industry;

WHEREAS, in 2014, the City of New York issued *Career Pathways: One City Working Together,* with a commitment to maximize local job opportunities through the City's contracts, and as such the City is committed to ensuring that low-income New Yorkers have access to the good jobs and careers that are created through the City's capital investments and through this MOU and contemporaneous PLA, the City the BCTC, and with the cooperation of the BTEA contractors can connect low-income New Yorkers to good prevailing wage construction careers;

WHEREAS, through this MOU and contemporaneous PLAs, the City, the BCTC, and the BTEA commit to recruiting in low-income communities, providing opportunities through pre-apprenticeship and apprenticeship programs for access to construction careers, and ensuring residents of low-income communities, including apprentices, are provided opportunities to work on publicly-funded and -assisted construction projects;

WHEREAS, pursuant to Local Law 1 of 2013, the City is also committed to its M/WBE program, and in partnership with the M/WBE Leadership Association seeks to encourage eligible companies to certify as M/WBEs, and provides a wide range of training and technical assistance to build the capacity of its certified companies to bid successfully for the City's contracts and subcontracts;

WHEREAS, an important element in the success of pre-apprenticeship and apprenticeship programs, as well as in creating work opportunities for contractors and sub-contractors in New York City, is the availability of work on publicly funded and assisted projects; and

WHEREAS, the parties to this MOU desire to publicly state their intentions with respect to apprenticeship programs and the creation of contracting and other economic opportunities in the construction industry.

NOW, THEREFORE, the City, the BCTC, and the BTEA state as follows:

1. Scope. This MOU:

a. States the intentions of the City, the BCTC, and the BTEA regarding:

a. the provision of opportunities in apprenticeship programs jointly sponsored by BCTC unions and BTEA contractors;
b. the City's application of apprenticeship requirements in City construction contracts from the time of execution through December 31, 2024;
c. the joint goal of the City, the BCTC, and the BTEA to create employment opportunities, including apprenticeships, in the construction industry; and

b. Shall terminate on December 31, 2024

2. To facilitate the commitments set forth in this MOU, each Local Union shall designate a HireNYC Construction Careers lead representative to work in partnership with the Mayor's Office of Workforce Development ("WKDEV") to implement these workforce and apprenticeship provisions within the union and across City construction contracts.

3. The BCTC and the BTEA shall work collaboratively with the City to reserve at least 500 new apprenticeship positions each calendar year through both the general recruitment and direct entry programs for New York City residents living in zip codes where at least 15% of the individuals in such zip code are below the federal poverty rate and NYCHA residents regardless of zip code.

4. The BCTC and BTEA shall work collaboratively with the City to reserve new apprenticeship positions each year for direct entry.

a. New York State Department of Labor ("NYSDOL") approved Direct Entry programs may be used by sponsors of Registered Apprenticeship programs as another way to bring apprentices into their programs. It is a tool to help sponsors reach underrepresented populations. Direct Entry provides individuals who successfully complete an apprenticeship preparation program, and who meet the minimum requirements for a NYS Registered Apprenticeship program, with the direct opportunity for an interview with the

sponsor of a program bypassing the general recruitment scheduled for the Apprentice Programs.

5. Apprenticeship programs jointly sponsored by Local Unions and employers affiliated with the BTEA shall, subject to approval by the NYSDOL and to the extent consistent with applicable consent decrees, court orders or similar mandates, reserve up to the following percentages of their new apprenticeships (some apprentices may be counted in more than one category) for direct entry each year:

a. 20% for graduates of New York City public high school who have completed pre-apprenticeship training provided by The Edward J. Malloy Initiative for Construction Skills ("C-SKILLS");

b. 10% for veterans of the U.S. Armed Forces who are referred by New York City Helmets to Hardhats ("NYC H2H"), provided, however, that any veterans whose qualifications allow them to enter unions as journeypersons shall be counted toward the fulfillment of this percentage;

c. 15% for women who have completed pre-apprenticeship training provided by Nontraditional Employment for Women ("NEW");

d. 10% for NYCHA and Section 8 residents who have completed pre-apprenticeship training provided by C-SKILLS, NEW, the NYCHA Resident Training Academy ("NRTA"), or Pathways to Apprenticeships ("P2A");

e. 10% for justice-involved individuals who have completed pre-apprenticeship training provided by C-SKILLS, NEW, NRTA, or P2A; and

f. 5% for qualified employees of certified minority- and women-owned business enterprises and other employers not signatory to collective bargaining agreements of unions affiliated with the BCTC which become signatory to such collective bargaining agreements, provided, however, that any such employees whose qualifications allow them to enter unions as journeypersons shall be counted toward the fulfillment of this percentage.

6. To help reach the goals set forth in paragraph 3, 4, and 5, the City, the BCTC and the BTEA will work cooperatively to identify and pursue appropriate sources of public and private funds and resources, as needed, to provide pre-apprenticeship training scaled to support the goals targeting at least seven hundred (700) pre-apprenticeship positions cumulatively for all above named direct entry programs each year. The City will help coordinate recruitment within the zip codes and target populations identified in paragraphs 3, 4 and 5.

7. The goals in Paragraphs 3, 4, and 5 are aggregate goals for apprenticeship programs jointly sponsored by the Local Unions and BTEA contractors to achieve on an annual basis through their general recruitments and direct entry programs. The City recognizes that different apprenticeship programs face different circumstances and

have varying capacities to meet the percentages set forth in each category; notwithstanding that, the BCTC and the BTEA agree to encourage and support meeting the goals in Paragraphs 3, 4, and 5, and to work with apprenticeship programs jointly sponsored by their affiliated unions and contractors to take affirmative steps to achieve that goal.

8. The City, BCTC, and BTEA acknowledge that on federally funded projects NYCHA, and the City on certain federally funded projects, must comply with Executive Order 11246 and federal regulations contained at 24 CFR Part 135 ("Section 3") regarding efforts to employ residents of NYCHA developments and other Section 3 populations.

9. The City, the BCTC, and the BTEA will jointly seek any necessary waivers from NYSDOL with respect to direct entry goals for the joint apprentice programs, as well as jointly support and encourage 100% participation of all affiliated joint apprentice programs.

10. Reporting.

    a. Each Local Union shall provide, or cause to be provided by their Apprentice Directors, copies of the following reports to WKDEV within thirty (30) days of the submission to NYSDOL:

        i. *Apprentice Training Recruitment Notification and Minimum Qualifications (AT 505)* submissions to NYSDOL;
        ii. *Apprentice Training Program Affirmative Action Plan (AT 603)* submissions to NYSDOL; and
        iii. *Apprenticeship Agreement (AT 401)* submissions to NYSDOL.

    b. Pre-apprenticeship programs funded in part by the City will provide quarterly reports, beginning at the end of the first quarter after the first class is held, to the WKDEV with detailed information as required by NYC's Workforce Common Metrics reporting for all individuals trained in all classes.

    c. On an annual basis, beginning on January 1, 2021, the City shall provide an electronic report to the BCTC that contains a list of contracts registered in the previous full fiscal year that were subject to either a City Project Labor Agreement or the Apprenticeship Directive. Such list shall contain the following for each contract:

        i. contracting agency
        ii. contract name;
        iii. prime contractor name;
        iv. registered dollar amount; and
        v. date of registration.

    d. Upon mutual agreement, the parties may modify these reporting requirements, as needed.

11. City of New York Apprenticeship Directive. As a means of expanding the pool of work available to apprentices and graduates of state-approved apprenticeship programs providing opportunities to the groups of individuals designated in Paragraphs 3 and 5 above, the City states its intention to implement, as may be amended from time to time, the Directive, attached as Exhibit A. The Directive directs City agencies, for construction contracts where either (i) the cost estimate of the contract exceeds $3 million, or (ii) the cost estimate of the contract exceeds $2 million on a project with a cost estimate of at least $5 million, and for such other contracts as the bidding agency determines to be appropriate, to require the contractor and any of its subcontractors with subcontracts worth at least $2 million to have apprenticeship agreements appropriate for the type and scope of work to be performed that have been registered with, and approved by, the New York State Commissioner of Labor, and shall have passed any required probationary period and recertification established by the New York State DOL.

12. The City shall include a statement concerning the applicability of the Directive in every City Record notice of the solicitation or award of a contract for a public works project. Within five (5) days of the issuance of any waiver from the apprenticeship requirement, the City shall notify the BCTC and the BTEA, in writing or electronically, of the granting of such waiver and the reasons therefore.

13. The City, the BCTC, and the BTEA look forward to working together and with the contractor community in a spirit of cooperation and good will toward the goal that all New Yorkers from diverse backgrounds, particularly minorities, women, returning veterans, recent public high school graduates, NYCHA residents, individuals in need of economic opportunity, and justice-involved individuals, are well-prepared for participation in the workforce and can gain access to good careers in the construction industry, in both the private and public sectors.

For the City of New York

By: _____

First Deputy Mayor, Dean Fuleihan

For Building and Construction Trades Council of Greater New York and Vicinity

By: _____

Gary LaBarbera, President

For Building Trades Employers' Association of New York City

By: _____

Louis J. Coletti, President & CEO

SCHEDULE "B" - DRUG AND ALCOHOL POLICY

PREAMBLE

WHEREAS, [CONSTRUCTION MANAGER] ("Construction Manager"), for the construction project located at [PROJECT ADDRESS] ("Project") desires to provide for a safe, drug and alcohol-free work site for the Project;

WHEREAS, the parties have entered into a separate Project Labor Agreement for the Project and have agreed to negotiate in good faith a Project Drug & Alcohol Testing Policy;

WHEREAS, this Testing Policy is collectively negotiated between the Construction Manager and the New York City Building and Construction Trades Council ("Council") (the Construction Manager and BCTC are collectively referred to hereafter as the "Parties");

WHEREAS, the Parties each currently have respective drug and alcohol policies, including the Projects' Zero-Tolerance policy;

WHEREAS, the Parties desire to maximize project safety conditions for the Project personnel and public, as well as deter violations of the Parties' respective drug and alcohol policies;

NOW, THEREFORE, the Parties agree to this Policy as of the date hereof,

ARTICLE 1 - PARTIES

This Drug & Alcohol Testing Policy ("Policy") is hereby established by the Construction Manager and the Council, on behalf of itself and its affiliated local union members, and the signatory local unions on behalf of themselves and their members.

ARTICLE 2-GENERAL CONDITIONS

SECTION 2.1 - SUMMARY

In order to reinforce the Parties' respective drug and alcohol policies, including the Projects' zero tolerance policy regarding the prohibition of the use of drugs and alcohol, and to deter Project personnel from violating those policies, the Parties agree that all Project Personnel (defined later) will be required to submit to drug and/or alcohol testing randomly, post-accident, and for reasonable suspicion.

Any individual on site that violates this Policy is subject to disciplinary action, including, without limitation, loss of site access privileges.

SECTION 2.2 - REVOCATION OF PROJECT ACCESS PRIVILEGES

Any one of the following occurrences will result in the immediate revocation of a Project Personnel's project access privileges:

1. An individual is found selling or using drugs or alcohol, or otherwise is under the influence of drugs or alcohol, subject to the other terms of this Policy, on a Project Site;
2. An individual has been convicted under any criminal drug or alcohol

statute for a violation occurring in the workplace within the past two years;

3. An individual who refuses to abide by the Projects' drug and alcohol policy, or refuses to submit to a test in accordance with this Policy;

4. An individual who switches, adulterates, or in any way tampers with a specimen required to be submitted in accordance with this Policy.

SECTION 2.3 - DEFINITIONS

Confirmed Positive Test: The presence of drugs, drug metabolites, or alcohol in a person's body that equals or exceeds the established cut off levels as defined in Exhibit 1. For drugs, the sample will have undergone Laboratory screening and confirmation testing and must have been verified as positive by a Medical Review Officer. A positive test result for alcohol obtained through Evidential Breath Testing is considered a Confirmed Positive Test.

Employee Assistance Program (EAP): An EAP is generally considered a workplace-based, confidential program designed to help employees deal effectively with a variety of personal problems, and, of relevance to this policy, substance abuse problems. The EAP promotes assessments and short-term counseling. An EAP shall also include any similar education or rehabilitation program provided by the Councilor its respective members. The Project Personnel that are required to participate in the EAP shall be responsible for the cost of their consultation with an EAP and/or participation in any education or rehabilitation program.

Evidential Breath Testing Device (EBT): A device that is used to measure alcohol in the breath and which meets National Highway Traffic Safety Administration's specifications for precision and accuracy.

Laboratory: A laboratory that is SAMHSA (Substance Abuse and Mental Health Services Administration) certified for the testing of drugs.

Medical Review Officer (MRO): A licensed physician responsible for receiving laboratory results generated by an employer's drug testing plan who has knowledge of substance abuse disorders and medical training to interpret and evaluate a donor's confirmed positive test result together with his/her medical history and all other relevant information.

Previous Worker: All individuals whose employment relationship with the contractor, company or organization no longer exists.

Project Site: The construction area for respective Project.

Reasonable Suspicion: When a qualified trade contractor, the Developer or Construction Manager as set forth in Section 3.7, reasonably believes that an individual has violated this Policy. Reasonable suspicion is based upon (1) specific, current, behavioral or performance indicators, (2) the possible manufacture, distribution, consumption or possession of unauthorized drugs, drug paraphernalia, or alcohol, or (3) documented investigation by an agency retained by, or otherwise independent from, the Developer or Construction Manager.

SECTION 2.4 - INCLUDED SUBJECTS

This Policy shall cover all employees of the Owner, Construction Manager and Project

trade contractors, their subcontractors and any other of their respective personnel at any level that are performing any activity at a Project Site, inclusive of managers, superintendents and supervisors, except as specifically excluded by Section 2.5 of this Policy (collectively and singularly, "Project Personnel").

SECTION 2.5 - EXCLUDED SUBJECTS

The following persons are not subject to the provisions of this Policy:

- **A.** Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of components, materials, equipment or machinery;
- **B.** Vendors and employees of vendors engaged on a Project Site in equipment testing, inspection, training, warranty work, or engaged in corrections of defective or nonconforming work, unless such employees are expressly included in the bargaining unit of a local signatory to this Agreement;
- **C.** Employees engaged in ancillary work on a Project which is performed by third parties, such as electric utilities, gas utilities, telephone companies, and railroads, or any other work not constituting Project work;
- **D.** Employees of any governmental authority (state, local or otherwise);
- **E.** Employees and contractors engaged in work on the Project Site as part of due diligence or monitoring, which work is ancillary to Project work; and
- **F.** Emergency responders.

SECTION 2.6 - PRESCRIPTION AND NON-PRESCRIPTION DRUGS

The use of prescription drugs not prescribed directly to Project Personnel is prohibited, including the use of drugs prescribed to a spouse or domestic partner. The use of non-prescription drugs that are sold outside the United States and that contain substances that are illegal or require a prescription in the United States are prohibited, unless prescribed by a licensed physician.

SECTION 2.7 - SEARCHES

In order for the Construction Manager to ensure the safety of Project Personnel and for the Construction Manager to protect its assets, the Construction Manager shall have the right upon good cause (such as reasonable suspicion of a violation of this Policy) to conduct reasonable searches for alcohol, drugs and related paraphernalia anywhere within the boundaries of a Project Site. A search may include any assets owned or leased by any Project Personnel that is on a Project Site, including without limitation, vehicles, lockers, gang boxes, desks and personal property brought onto a Project Site, but excluding personal body searches or physical contact with employees.

ARTICLE 3 - DRUG & ALCOHOL TESTING

SECTION 3.1 - COLLECTION PROCESS

As of the execution date of this PLA, Project Personnel may be required to submit urine samples ("Preliminary Drug Screening") for the purpose of detecting the presence of drugs as part of the random, post-accident or reasonable suspicion testing, in accordance with

chain of custody protocols as established by Substance Abuse and Mental Health Services Administration (SAMHSA), utilizing an instant result test cup for Preliminary Drug Screenings, such testing is to be performed on-site by an independent service provider. The results from the instant result test cup will be considered preliminary. The sample will be sent to a SAMHSA certified testing laboratory for confirmation.

As of the date hereof, all Project Personnel will be required to submit to an Evidential Breath Test (EBT) for the purpose of detecting the presence of alcohol when submitting to random, post-accident or reasonable suspicion testing. Alcohol testing will not be conducted for pre-access testing.

SECTION 3.2 - NEGATIVE PRELIMINARY DRUG SCREENING

Project Personnel with a negative Preliminary Drug Screening will be considered conditionally accepted for Project site access, pending confirming laboratory results. Site access privileges will be revoked if the subsequent laboratory results determine that the sample has tested positive for drugs or that the sample has been adulterated.

SECTION 3.3 POSITIVE PRELIMINARY DRUG SCREENING

If the Preliminary Drug Screening indicates a positive result, the individual will not be allowed access to the Project Site. The sample will be sent to the certified laboratory for analysis and, if applicable, reviewed by the Medical Review Officer (MRO). If the laboratory confirmation results are also positive, the individual will be considered in violation of this Policy and their site access will be revoked for at least 30 days. If the laboratory confirmation results are negative, the Project Personnel's site access will not be revoked.

SECTION 3.4 CONFIRMED POSITIVE TEST RESULTS

A. POSITIVE DRUG TEST

A drug test is considered positive if the test results exceed the limits shown in Exhibit 1, which is attached hereto and incorporated herein by reference. The test will be confirmed through a second analysis process and reviewed by an MRO before results are reported. Project Personnel with confirmed positive drug test results will have their site access revoked. In case of a "false positive" result, any such Personnel shall be entitled to the reimbursement of any wages lost during the suspension caused by any such false positive result.

B. POSITIVE EBT

An EBT is considered positive if the test results exceed .04 BrAC, or as otherwise set forth in Exhibit 1. Project Personnel with a positive alcohol test result will be subject to the remedies set forth in Exhibit 1.

C. REINSTATEMENT OF SITE ACCESS PRIVILEGES

(a) Subject to section 3.4(C)(a) immediately below, if the site access of a Project Personnel has been revoked pursuant to this Policy, then any such person may request that their site access be reinstated after 30 days, provided that all of the following conditions are met to the reasonable satisfaction of the Construction Manager. :

1. The individual has provided proof of wellness from an accredited rehabilitation

facility or has provided proof that treatment isn't needed as attested to by a licensed health care provider specializing in the diagnosis and treatment of alcohol and drug abuse.

2. A current drug and alcohol test is obtained within three (3) days of the request for re-access to the site and proof of a negative test result has been received; and
3. The individual agrees to submit to multiple testing for two (2) full years from the date of gaining re-access to the project, the scheduling of which will be determined at the sole discretion of the Construction Manager. If all of these conditions have been met, the Construction Manager agrees that it will not unreasonably withhold their consent to any such request.

(b) Unlawful possession, concealment, use, purchase, sale, manufacture, dispensation or distribution of illegal drugs or un-prescribed controlled substances on the Project site will subject the Project Personnel Employee to immediate removal from the Project site and shall bar such Project Personnel Employee from returning for a minimum of three (3) months, which return shall, in any event, be subject to the reasonable approval by Construction Manager.

(c) All of the Parties agree that any such Project Personnel will only be entitled to any such reinstatement of site access privileges one time and that any subsequent violation of this Policy will result in the permanent termination of access to the Project Site.

SECTION 3.5 - RANDOM TESTING

A third-party provider designated by the Construction Manager will randomly select by an objective criteria a testing pool for random drug and/or alcohol testing from all Project Personnel with site access cards. Any individual selected for a random drug and/or alcohol test will be required to submit to an Evidential Breath Test (EBT) and/or drug test. Individuals may be tested more than once during any given time period. The Parties acknowledge and agree that an EBT may be required without a drug test and that a drug test may be required without an EBT, as solely determined by the Construction Manager.

If an individual is unable to attend the first scheduled random drug test as a result of being involved in a work-related task, such drug test will be rescheduled and will be completed at or before the conclusion of such employee's then current work shift. If the second drug test is missed for any reason, the incident will be reviewed by the Construction Manager, who shall have the right to terminate the site access privileges of any such Project Personnel until such time as that Project Personnel has complied with this Policy. If the individual refuses to take the test, their access privileges will be immediately terminated for cause.

SECTION 3.6 - POST ACCIDENT TESTING

After each work-related incident or injury requiring the services of a licensed health care provider, all Project Personnel involved with the incident will be required to submit to a drug and/or alcohol test immediately following the incident. In instances where emergency care is necessary, the drug and/or alcohol test shall be obtained by the care facility, if possible, within 24 hours after treatment is rendered. If more than 48 hours have passed before an injury is reported and treated by a licensed health care provider, an alcohol test will not be required.

In addition, any Project Personnel involved in a non-injury related incident at a Project Site

with damages at or in excess of $200 will be required to submit to a drug and/or alcohol test unless:

A. It is determined, after conducting an investigation and interviewing all employees involved and any witnesses, that the employee's performance can be completely discounted as a contributing factor to the incident; or
B. It is determined, after conducting an incident investigation and interviewing all employees and any witnesses that the incident was caused by inadequate equipment or system design, and/or premature failure of equipment or system components.

SECTION 3.7 - REASONABLE SUSPICION TESTING

All Project Personnel will be required to submit to a drug and/or alcohol test when there is reasonable suspicion the individual has violated this policy.

Reasonable suspicion includes, without limitation, the following:

A. Violent or irrational behavior;
B. Emotional or physical unsteadiness;
C. Sensory or motor-skill malfunctions;
D. Slurred speech;
E. The odor of alcohol or drugs on clothing or breath in conjunction with other indicators;
F. Possession of alcohol, unauthorized drugs or drug paraphernalia; or
G. Documented evidence of an independent investigation regarding Project Personnel's consumption of what is reasonably believed to be an alcoholic beverage or drugs in violation of the Project's policies and/or this Policy.

Reasonable suspicion testing may only be ordered by supervisory personnel that: (a) have been trained to recognize the above referenced factors; or (b) have received credible documentary evidence from an independent investigator that a Project Personnel has violated a drug and/or alcohol policy. It is agreed that any certified training program shall satisfy the training requirement.

SECTION 3.8 - PRIVACY CONSIDERATIONS

The Parties agree to use reasonable efforts to conduct any testing pursuant to this Policy in accordance with the privacy concerns of Project Personnel. To address these concerns, the Parties agree that:

1. The testing station(s) shall be screened off, or otherwise closed off from public view.
2. All documents and information regarding the testing, including test results, shall be maintained by the respective custodian(s) of record in accordance with their respective privacy policies, which any Project Personnel shall be entitled to review upon timely request.

3. The Parties agree to make a good faith effort to resolve any other privacy concern of Project Personnel regarding this Policy, provided that any such concerns do not interfere with the purpose of this Policy.

ARTICLE 4 – GRIEVANCE

SECTION 4.1 - REPRESENTED WORKERS

Nothing in this Policy shall restrict a member of a signatory local union from filing a grievance in accordance with the member's collective bargaining agreement or a Project Labor Agreement, provided that the grievance shall be limited to whether the removal of a member for violation of this Policy was conducted in compliance with the terms and conditions set forth herein.

SECTION 4.2 - HOLD HARMLESS

The Construction Manager agrees to hold harmless and indemnify the Union/Council and its representatives from any liability that may be incurred as a result of the Company's Drug and Alcohol Policy to the extent caused by the negligence or intentional misconduct of the Construction Manager.

IN WITNESS WHEREOF the parties have agreed to this Policy as of _____, 20___.

FOR [CONSTRUCTION MANAGER]

By: _____

Name: [INSERT NAME]_____

Title: [INSERT TITLE]_____

FOR GREATER NEW YORK CITY BUILDING TRADES COUNCIL

By: _____

Name: Gary LaBarbera _____

Title: President

EXHIBIT 1

CLASS OF DRUGS TESTED AND THEIR RESPECTIVE CUT-OFF LIMITS

The cut-off limits established are those recommended by the U.S. Department of Health and Human Services in their mandatory Guidelines for Federal Workplace Drug Testing Programs.

Drug Class	Screening Cut-Off Limit (ng/ml)	Confirmation Cut-off Limit (ng/ml)
Amphetamines	1000	500
Benzoylecgonine (Cocaine Metabolite)	300	150
Cannabinoids (THC)	50	15
*Opiates	2000	10
Phencyclidine (PCP)	25	25

Confirmation screening is done by means of GC/MS analysis.

*The GC/MS confirmation for opiates will be for both codeine and morphine separately. If morphine is equal to or greater than 2,000ng/ml then the GC/MS confirmation analysis for 6- acetylmorphine (6-MAM) is at a cut-off level of 10ng/ml.

Alcohol Screening

All Project Personnel will be required to submit to an EBT under the random, post-accident, and reasonable suspicion test arenas, for the purpose of detecting presence of alcohol. If this test supports a positive result for presence of alcohol, the Project Personnel will be considered in violation of this Policy.

If the results of the EBT are:

1. Above 0.001 BrAC, but at or below 0.020 BrAC, a second test will be conducted within approximately 15 minutes.
    - If the second BrAC test is less than the first BrAC, the results will be deemed negative and the Project Personnel may return to work, if there are no other outstanding issues.
- If the second BrAC is increasing, but below 0.04 BrAC, the results will be deemed negative, but the Project Personnel will be sent home for the day and the Construction Manager shall be notified. If a Project Personnel is sent home two times within a six-month period pursuant to this Section I, then any such Project Personnel shall be deemed to have tested positive and will be subject to the applicable remedies set forth in Section 2 below.

2. Above 0.02 BrAC, but below 0.06 BrAC, a second test will be conducted after approximately 15 minutes.

- Notwithstanding anything set forth above to the contrary, a Project Personnel may elect to voluntarily go home for the day instead of taking a second test and the results will be deemed negative, provided that any such Project Personnel may not voluntarily go home more than once within a twelve month period.
- If the second BrAC test is at or below 0.02 BrAC, the results will be deemed negative and the Project Personnel may return to work if there are no other outstanding issues.
- If the second BrAC test is above 0.020, but below 0.06, the results will be deemed positive, the Project Personnel will be sent home for the day and their site access will be revoked for at least five [5] calendar days and until such time as the Project Personnel has been evaluated by an EAP professional skilled in substance abuse and confirmed fit for duty.
- Any Project Personnel who is deemed positive two times within two years pursuant to this Section 2 will have their site access privileges terminated and will be entitled to the limited relief set forth in Section 3 .4(c) of the Policy.

3. At or above .06 BrAC, the Project Personnel will have their site access privileges terminated, after which they will be entitled to the limited relief set forth in Section 3.4(C) of the Policy.

CITY OF NEW YORK

DEPARTMENT OF
DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

INFORMATION FOR BIDDERS

JULY 2019

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CITY OF NEW YORK CITY
DEPARTMENT OF DESIGN AND CONSTRUCTION
INFORMATION FOR BIDDERS

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INFORMATION FOR BIDDERS

1. Description and Location of Work

The description and location of the work for which bids are requested are specified in Attachment 1, "Bid Information". Attachment 1 is included in the BID BOOKLET, VOLUME 1 OF 3.

2. Time and Place for Receipt of Bids

Sealed bids shall be received on or before the date and hour specified in Attachment 1, at which time they will be publicly opened and read aloud in the presence of the Commissioner or his or her representative, and any bidders who may desire to be present.

3. Definitions

The definitions set forth in the Procurement Policy Board Rules shall apply to this Invitation For Bids.

4. Invitation For Bids and Contract Documents

(A) Except for titles, sub-titles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience) the following, except for such portions thereof as may be specifically excluded, shall be deemed to be part of the Contract and the Invitation for Bids.

(1) All provisions required by law to be inserted in this Contract, whether actually inserted or not
(2) The Contract Drawings and Specifications
(3) The General Conditions, the General Requirements and the Special Conditions, if any
(4) The Contract
(5) The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet
(6) The Budget Director's Certificate; all Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed with the Work.

(B) For particulars as to this procurement, including quantity and quality of the purchase, extent of the work or labor to be performed, delivery and performance schedule, and any other special instructions, prospective bidders are referred to the Invitation For Bids Documents. A copy of such documents can be obtained at the location set forth in Attachment 1.

(C) Deposit for Copy of Invitation For Bids Documents: Prospective bidders may obtain a copy of the Invitation For Bids Documents by complying with the conditions set forth in the Notice of Solicitation. The deposit must be in the form of a check or money order made payable to the City of New York, and drawn upon a state or national bank or trust company, or a check of such bank or trust company signed by a duly authorized officer thereof.

(D) Return of Invitation For Bids Documents: All Invitation For Bids Documents must be returned to the Department upon request. If the bidder elects not to submit a bid thereunder, the Invitation For Bids Documents shall be returned to the Department, along with a statement that no bid will be submitted.

(E) Return of Deposit: Such deposit will be returned within 30 days after the award of the contract or the rejection of all bids as set forth in the advertisement, provided the Invitation For Bids Documents are returned to the location specified in Attachment 1, in physical condition satisfactory to the Commissioner.

(F) Additional Copies: Additional copies of the Invitation For Bids Documents may be obtained, subject to the conditions set forth in the advertisement for bids.

5. Pre-Bid Conference

A pre-bid conference shall be held as set forth in Attachment 1. Nothing stated at the pre-bid conference shall change the terms or conditions of the Invitation For Bids Documents, unless a change is made by written amendment as provided in Section 9 below. Failure to attend a mandatory pre-bid conference shall constitute grounds for the rejection of the bid.

6. Agency Contact

Any questions or correspondence relating to this bid solicitation shall be addressed to the Agency Contact person specified in Attachment 1.

7. Bidder's Oath

(A) The bid shall be properly signed by an authorized representative of the bidder and the bid shall be verified by the written oath of the authorized representative who signed the bid, that the several matters stated and information furnished therein are in all aspects true.

(B) A materially false statement willfully or fraudulently made in connection with the bid or any of the forms completed and submitted with the bid may result in the termination of any Contract between the City and the Bidder. As a result, the Bidder may be barred from participating in future City contracts as well as be subject to possible criminal prosecution.

8. Examination and Viewing of Site, Consideration of Other Sources of Information and Changed Conditions

(A) Pre-Bidding (Investigation) Viewing of Site - Bidders must carefully view and examine the site of the proposed work, as well as its adjacent area, and seek other usual sources of information, for they will be conclusively presumed to have full knowledge of any and all conditions on, about or above the site relating to or affecting in any way the performance of the work to be done under the Contract which were or should have been indicated to a reasonably prudent bidder. To arrange a date for visiting the work site, bidders are to contact the Agency Contact person specified in Attachment 1.

(B) Should the contractor encounter during the progress of the work subsurface conditions at the site materially differing from any shown on the Contract Drawings or indicated in the Specifications or such subsurface conditions as could not reasonably have been anticipated by the contractor and were not anticipated by the City, which conditions will materially affect the cost of the work to be done under the Contract, the attention of the Commissioner must be called immediately to such conditions before they are disturbed. The Commissioner shall thereupon promptly investigate the conditions. If he finds that they do so materially differ, or that they could not reasonably have been anticipated by the contractor and were not anticipated by the City, the Contract may be modified with his written approval.

9. Examination of Proposed Contract

(A) Request for Interpretation or Correction: Prospective bidders must examine the Contract Documents carefully and before bidding must request the Commissioner in writing for an interpretation or correction of every patent ambiguity, inconsistency or error therein which should have been discovered by a reasonably prudent bidder. Such interpretation or correction, as well as any additional contract provisions the Commissioner may decide to include, will be issued in writing by the Commissioner as an addendum to the Contract, which will be transmitted to each person recorded as having received a copy of the Contract Documents from the Department. Transmission of such addendum will be by mail, e-mail, facsimile or hand delivery. Such addendum will also be posted at the place where the Contract Documents are available for the inspection of prospective bidders. Upon transmission as provided for herein, such addendum shall become a part of the Contract Documents, and binding on all bidders, whether or not actual notice of such addendum is shown.

(B) Only Commissioner's Interpretation or Correction Binding: Only the written interpretation or correction so given by the Commissioner shall be binding, and prospective bidders are warned that no other officer, agent or employee of the City is authorized to give information concerning, or to explain or interpret, the Contract.

(C) Documents given to a subcontractor for the purpose of soliciting the subcontractor's bid shall include either a copy of the bid cover sheet or a separate information sheet setting forth the project name, the Contract number (if available), the contracting agency and the Project's location.

10. Form of Bid

Each bid must be submitted upon the prescribed form and must contain: a) the name, residence and place of business of the person or persons making the same; b) the names of all persons interested therein, and if no other person is so interested, such fact must be distinctly stated; c) a statement to the effect that it is made without any connection with any other person making a bid for the same purpose and that it is in all respects fair and without collusion or fraud; d) a statement that no Council member or other officer or employee or person whose salary is payable in whole or part from the City Treasury is directly or indirectly interested therein or in the supplies, materials or equipment and work or labor to which it relates, or in any portion of the profits thereof; e) a statement that the bidder is not in arrears to the City or to any agency upon a debt or contract or taxes, and is not a defaulter as surety or otherwise upon any obligation to the City to any agency thereof, except as set forth in the bid.

THE BID SHALL BE TYPEWRITTEN OR WRITTEN LEGIBLY IN INK. THE BID SHALL BE SIGNED IN INK. ERASURES OR ALTERATIONS SHALL BE INITIALED BY THE SIGNER IN INK. FAILURE TO CONFORM TO THE REQUIREMENTS OF THIS SECTION 10 SHALL RESULT IN THE REJECTION OF THE BID.

11. Irrevocability of Bid

The prices set forth in the bid cannot be revoked and shall be effective until the award of the Contract, unless the bid is withdrawn as provided for in Sections 15 and 18 below.

12. Acknowledgment of Amendments

The receipt of any amendment to the Contract Documents shall be acknowledged by the bidder in its bid submission.

13. Bid Samples and Descriptive Literature

Bid samples and descriptive literature shall not be submitted by the bidder, unless expressly requested elsewhere in the Contract or Contract Documents. Any unsolicited bid samples or descriptive literature which are submitted shall not be examined or tested and shall not be deemed to vary any of the provisions of this Contract.

14. Proprietary Information/Trade Secrets

(A) The bidder shall identify those portions of the bid which it deems to be confidential, proprietary information or trade secrets, and provide justification why such materials shall not be disclosed by the City. All such materials shall be clearly indicated by stamping the pages on which such information appears, at the top and bottom thereof with the word "Confidential". Such materials stamped "Confidential" must be easily separable from the non-confidential sections of the bid.

(B) All such materials so indicated shall be reviewed by the Agency and any decision not to honor a request for confidentiality shall be communicated in writing to the bidder. For those bids which are unsuccessful, all such confidential materials shall be returned to the bidder. Prices, makes and model or catalog numbers of the items offered, deliveries, and terms of payment shall be publicly available after bid opening, regardless of any designation of confidentiality made by the bidder.

15. Pre-Opening Modification or Withdrawal of Bids

Bids may be modified or withdrawn by written notice received in the office designated in Attachment 1, before the time and date set for the bid opening. If a bid is withdrawn in accordance with this Section, the bid security, if any, shall be returned to the bidder.

16. Bid Evaluation and Award

In accordance with the New York City Charter, the Procurement Policy Board Rules and the terms and conditions of this Invitation For Bids, this Contract shall be awarded, if at all, to the responsible bidder whose bid meets the requirements and evaluation criteria set forth in the Invitation For Bids, and whose bid price is either the most favorable bid price or, if the Invitation For Bids so states, the most favorable evaluated bid price. A bid may not be evaluated for any requirement or criterion that is not disclosed in the Invitation For Bids.

Restriction: No negotiations with any bidder shall be allowed to take place except under the circumstances and in the manner set forth in Section 21. Nothing in this Section shall be deemed to permit a contract award to a bidder submitting a higher quality item than that designated in the Invitation For Bids, if that bid is not also the most favorable bid.

17. Late Bids, Late Withdrawals and Late Modifications

Any bid received at the place designated in the solicitation after the time and date set for receipt of bids is late and shall not be considered. Any request for withdrawal or modification received at the place designated in the solicitation after the time and date set for receipt of bids is late and shall not be considered. The exception to this provision is that a late modification of a successful bid that makes the bid terms more favorable to the City shall be considered at any time it is received.

18. Withdrawal of Bids.

Except as provided for in Section 15, above, a bidder may not withdraw its bid before the expiration of forty-five (45) days after the date of the opening of bids; thereafter, a bidder may withdraw its bid only in writing and in advance of an actual award. If within sixty (60) days after the execution of the Contract, the Commissioner fails to fix the date for commencement of work by written notice to the bidder, the bidder, at his option, may ask to be relieved of his obligation to perform the work called for by written notice to the Commissioner. If such notice is given to the Commissioner, and the request to withdraw is granted, the bidder waives all claims in connection with this Contract.

19. Mistake in Bids

(A) Mistake Discovered Before Bid Opening: A bidder may correct mistakes discovered before the time and date set for bid opening by withdrawing or correcting the bid as provided in Section 15 above.

(B) Mistakes Discovered Before Award

(1) In accordance with General Municipal Law (Section 103, subdivision 11), where a unilateral error or mistake is discovered in a bid, such bid may be withdrawn upon written approval of the Agency Chief Contracting Officer if the following conditions are met:

(a) The mistake is known or made known to the agency prior to the awarding of the Contract or within 3 days after the opening of the bid, whichever period is shorter; and
(b) The price bid was based upon an error of such magnitude that enforcement would be unconscionable; and

(c) The bid was submitted in good faith and the bidder submits credible evidence that the mistake was a clerical error as opposed to a judgment error; and
(d) The error in the bid is actually due to an unintentional and substantial arithmetic error or an unintentional omission of a substantial quantity of work, labor, material or services made directly

in the compilation of the bid, which unintentional arithmetic error pr unintentional omission can be clearly shown by objective evidence drawn from inspection of the original work paper, documents, or materials used in the preparation of the bid sought to be withdrawn; and

(e) It is possible to place the agency in the same position as existed prior to the bid.

(2) Unless otherwise required by law, the sole remedy for a bid mistake in accordance with this Article shall be withdrawal of the bid, and the return of the bid bond or other security, if any, to the bidder. Thereafter, the agency may, in its discretion, award the Contract to the next lowest bidder or rebid the Contract. Any amendment to or reformation of a bid or a Contract to rectify such an error or mistake therein is strictly prohibited.

(3) If the mistake and the intended correct bid are clearly evident on the face of the bid document, the bid shall be corrected to the intended correct bid and may not be withdrawn. Examples of mistakes that may be corrected are typographical errors, errors in extending unit prices, transposition errors and arithmetical errors.

20. Low Tie Bids

(A) When two or more low responsive bids from responsible bidders are identical in price, meeting all the requirements and criteria set forth in the Invitation For Bids, the Agency Chief Contracting Officer will break the tie in the following manner and order of priority:

(1) Award to a certified New York City small, minority or woman-owned business entity bidder;
(2) Award to a New York City bidder;
(3) Award to a certified New York State small, minority or woman-owned business bidder;
(4) Award to a New York State bidder.

(B) If two or more bidders still remain equally eligible after application of paragraph (A) above, award shall be made by a drawing by lot limited to those bidders. The bidders involved shall be invited to attend the drawing. A witness shall be present to verify the drawing and shall certify the results on the bid tabulation sheet.

21. Rejection of Bids

(A) Rejection of Individual Bids: The Agency may reject a bid if:

(1) The bidder fails to furnish any of the information required pursuant to Section 24 or 28 hereof; or if
(2) The bidder is determined to be not responsible pursuant to the Procurement Policy Board Rules; or if
(3) The bid is determined to be non-responsive pursuant to the Procurement Policy Board Rules; or if
(4) The bid, in the opinion of the Agency Chief Contracting Officer, contains unbalanced bid prices and is thus non-responsive, unless the bidder can show that the prices are not unbalanced for the probable required quantity of items, or if the imbalance is corrected pursuant to Section 15.

(B) Rejection of All Bids: The Agency, upon written approval by the Agency Chief Contracting Officer, may reject all bids and may elect to resolicit bids if in its sole opinion it shall deem it in the best interest of the City so to do.

(C) Rejection of All Bids and Negotiation With All Responsible Bidders: The Agency Head may determine that it is appropriate to cancel the Invitation For Bids after bid opening and before award and to complete the acquisition by negotiation. This determination shall be based on one of the following reasons:

(1) All otherwise acceptable bids received are at unreasonable prices, or only one bid is received and the Agency Chief Contracting Officer cannot determine the reasonableness of the bid price, or no responsive bid has been received from a responsible bidder; or
(2) In the judgment of the Agency Chief Contracting Officer, the bids were not independently arrived at in open competition, were collusive, or were submitted in bad faith.

(D) When the Agency has determined that the Invitation for Bids is to be canceled and that use of negotiation is appropriate to complete the acquisition, the contracting officer may negotiate and award the Contract

without issuing a new solicitation, subject to the following conditions:

(1) prior notice of the intention to negotiate and a reasonable opportunity to negotiate have been given by the contracting officer to each responsible bidder that submitted a bid in response to the Invitation for Bids;
(2) the negotiated price is the lowest negotiated price offered by a responsible bidder; and
(3) the negotiated price is lower than the lowest rejected bid price of a responsible bidder that submitted a bid in response to the Invitation for Bids.

22. Right to Appeal Determinations of Non-Responsiveness or Non-Responsibility and Right to Protest Solicitations and Award

The bidder has the right to appeal a determination of non-responsiveness or non-responsibility and has the right to protest a solicitation and award. For further information concerning these rights, the bidder is directed to the Procurement Policy Board Rules.

23. Affirmative Action and Equal Employment Opportunity

This Invitation For Bids is subject to applicable provisions of Federal, State and Local Laws and executive orders requiring affirmative action and equal employment opportunity.

24. PASSPort COMPLIANCE

All vendors that intend to do business with the City of New York must complete a disclosure process in order to be considered for a contract. This disclosure process was formerly completed using Vendor Information Exchange System (VENDEX) paper-based forms. The City of New York has moved collection of vendor disclosure information online. In early August 2017, the New York City Mayor's Office of Contract Services (MOCS) launched the Procurement and Sourcing Solutions Portal (PASSPort), a new online procurement system that replaced the paper-VENDEX process. In anticipation of awards, all bidders must create online accounts in the new PASSPort system, and file all disclosure information using PASSPort. Paper submissions, including certifications of no changes to existing VENDEX packages, will not be accepted in lieu of complete online filings using PASSPort.

All vendors that intend to do business with the City, but specifically those that fall into any of the following categories, are required to enroll:

- Have a pending award with a City Agency; or
- Hold a current contract with a City Agency and have either an expiring VENDEX or expiring Certificate of No Change.

The Department of Design and Construction (DDC) and MOCS hereby notifies all proposers that the PASSPort system is available, and that disclosure filing completion is required prior to any award through this competitive bid.

To enroll in PASSPort and to access the PASSPort website (including online training), please visit www.nyc.gov/passport. Contact MOCS at passport@mocs.nyc.gov for additional information and technical support.

25. Complaints About the Bid Process

The New York City Comptroller is charged with the audit of contracts in New York City. Any vendor who believes that there has been unfairness, favoritism or impropriety in the bid process should inform the Comptroller, Office of Contract Administration, One Centre Street, Room 835, New York, New York; telephone number (212)669-2323.

26. Bid, Performance and Payment Security

(A) Bid Security: Each bid must be accompanied by bid security in an amount and type specified in Attachment 1 (BID BOOKLET, VOLUME 1 OF 3). The bid security shall assure the City of New York of the

adherence of the bidder to its proposal, the execution of the Contract, and the furnishing of Performance and Payment Bonds by the bidder, if required in Attachment 1. Bid security shall be returned to the bidder as follows:

(1) Within ten (10) days after the bid opening, the Comptroller will be notified to return the deposits of all but the three (3) lowest bidders. Within five (5) days after the award, the Comptroller will be notified to return the deposits of the remaining two unsuccessful bidders.
(2) Within five (5) days after the execution of the Contract and acceptance of the Contractor's bonds, the Comptroller will be notified to return the bid security of the successful bidder or, if performance and payment bonds are not required, only after the sum retained under Article 21 of the Contract equals the amount of the bid security.
(3) Where all bids are rejected, the Comptroller will be notified to return the deposit of the three (3) lowest bidders at the time of rejection.

(B) Performance and Payment Security: Performance and Payment Security must be provided in an amount and type specified in Attachment 1. The performance and payment security shall be delivered by the contractor prior to or at the time of execution of the Contract. If a contractor fails to deliver the required performance and payment security, its bid security shall be enforced, and an award of Contract may be made to the next lowest responsible and responsive bidder, or the contract may be rebid.

(C) Acceptable Types of Security: Acceptable types of security for bids, performance, and payment shall be limited to the following:

(1) a one-time bond in a form satisfactory to the City;
(2) a bank certified check or money order;
(3) obligations of the City of New York; or
(4) other financial instruments as determined by the Office of Construction in consultation with the Comptroller.

Whenever the successful bidder deposits obligations of the City of New York as performance and payment security, the Comptroller may sell and use the proceeds thereof for any purpose for which the principal or surety on such bond would be liable under the terms of the Contract. If the money is deposited with the Comptroller, the successful bidder shall not be entitled to receive interest on such money from the City.

(D) Form of Bonds: Security provided in the form of bonds must be prepared on the form of bonds authorized by the City of New York. Forms for bid, performance, and payment bonds are included in the Invitation for Bids Documents. Such bonds must have as surety thereunder such surety company or companies as are: (1) approved by the City of New York; (2) authorized to do business in the State of New York, and (3) approved by the Department of the Treasury of the United States. Premiums for any required bonds must be included in the base bid.

The bidder is advised that submission of a bid bond where the surety on such bond fails to meet the criteria set forth herein, shall result in the rejection of the bid as non-responsive.

The Department of the Treasury of the United States advises that information concerning approved surety companies may be obtained as follows: (1) from the Government Printing Office at 215-364-6465; (2) through the Internet at https://www.fiscal.treasury.gov/surety-bonds/.

(E) Power of Attorney: Attorneys in fact who sign bid, performance, or payment bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

27. Failure to Execute Contract

In the event of failure of the successful bidder to execute the Contract and furnish the required security within ten (10) days after notice of the award of the Contract, the deposit of the successful bidder or so much thereof as shall be applicable to the amount of the award made shall be retained by the City, and the successful bidder shall be liable for and hereby agrees to pay on demand the difference between the price bid and the price for which such Contract shall be subsequently awarded, including the cost of any required reletting and less the amount of such deposit. No plea of mistake in such accepted bid shall be available to the bidder for the recovery of the deposit or as a defense to any action based upon such accepted bid. Further, should the bidder's failure to comply with this Section cause any funding agency, body or group (Federal, State, City, Public, Private, etc.) to terminate, cancel or reduce the funding on this project, the bidder in such event shall be liable also to the City for the amount of actual funding withdrawn by such agency on this project, less the amount of the forfeited deposit.

28. Bidder Responsibilities and Qualifications

(A) Bidders must include with their bids all information necessary for a determination of bidder responsibility, as set forth in the Specifications.

(B) The Agency may require any bidder or prospective bidder to furnish all books of account, records, vouchers, statements or other information concerning the bidder's financial status for examination as may be required by the Agency to ascertain the bidder's responsibility and capability to perform the Contract. If required, a bidder must also submit a sworn statement setting forth such information as the Agency may require concerning present and proposed plant and equipment, the personnel and qualifications of his working organizations, prior experience and performance record.

(C) Oral Examination on Qualifications: In addition thereto, and when directed by the Agency, the bidder, or a responsible officer, agent or employee of the bidder, must submit to an oral examination to be conducted by the Agency in relation to his proposed tentative plan and schedule of operations, and such other matters as the Agency may deem necessary in order to determine the bidder's ability and responsibility to perform the work in accordance with the Contract. Each person so examined must sign and verify a stenographic transcript of such examination noting thereon such corrections as such person may desire to make.

(D) If the bidder fails or refuses to supply any of the documents or information set forth in paragraph (B) hereof or fails to comply with any of the requirements thereof, the Agency may reject the bid.

29. Employment Report

In accordance with Executive Order No. 50 (1980) as modified by Executive Order 108 (1986), the filing of a completed Employment Report (ER) is a requirement of doing business with the City of New York for construction contractors with contracts of $1,000,000 or more and subcontractors with construction subcontracts of $750,000 or more. The required forms and information are included in the Bid Booklet.

30. Labor Law Requirements

(A) General: The successful bidder will be required to comply strictly with all Federal, State and local labor laws and regulations.

(B) New York State Labor Law: This Contract is subject to New York State Labor Law Section 220, which requires that construction workers on the site be paid prevailing wages and supplements. The Contractor is reminded that all wage provisions of this Contract will be enforced strictly and failure to comply will be considered when evaluating performance. Noncompliance may result in the contractor being debarred by the City from future contracts. Complaints filed with the Comptroller may result in decisions which may debar a contractor from bidding contracts with any state governmental entity and other political subdivisions.

(C) Records: The Contractor is expected to submit accurate payroll reports and other required documents and verify attendance and job classifications being utilized in compliance with the law, Contract provisions and agency procedures.

31. Insurance

(A) Bidders are advised that the insurance requirements contained herein are regarded as material terms of the Contract. As required by Article 22 of the Contract, the contractor must effect and maintain with companies licensed and authorized to do business in the State of New York, the types of insurance set forth therein, when required by and in the amounts set forth in Schedule A of the General Conditions. Such required insurance must be provided from the date the contractor is ordered to commence work and up to the date of final acceptance of all required work.

(B) The contractor must, within ten days of receipt of the notice of award, submit the following insurance documentation: (a) original certificate of insurance for general liability in the amount required by Schedule A of the General Conditions, and (b) original certificates of insurance or other proof of coverage for workers' compensation and disability benefits, as required by Section 57 of the New York State Workers' Compensation Law and Section 220 of the Disability Benefits Law.

32. Lump Sum Contracts

(A) Comparison of Bids: Bids on Lump Sum Contracts will be compared on the basis of the lump sum price bid, adjusted for alternate prices bid, if any.

(B) Lump Sum Bids for "General Construction Work" which include excavation shall include all necessary excavation work defined in the Specifications as being included in the lump sum bid. The bidder shall also bid a unit price for the additional cost of excavating material which is defined in the Specifications as excavation for which additional payment will be made. The total estimated additional cost of removing such material will be taken as the quantity set forth in the Engineer's Estimate multiplied by the unit price bid. This total estimated cost of additional excavation shall be added to the lump sum bid for the General Construction Work for the purpose of comparing bids to determine the low bidder.

(C) Variations from Engineer's Estimate: The Engineer's Estimate of the quantity of excavation for which additional payment will be made is approximate only and is given solely to be used as a uniform basis for the comparison of bids and such estimate is not to be considered as part of this contract. The quantities actually required to complete the contract work may be more or less than the quantities in the Engineer's Estimate and, if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

33. Unit Price Contracts

(A) Comparison of Bids: Bids on Unit Price Contracts will be compared on the basis of a total estimated price, arrived at by taking the sum of the estimated quantities of such items, in accordance with the Engineer's Estimate of Quantities set forth in the Bid Form, multiplied by the corresponding unit prices, and including any lump sum bids on individual items.

(B) Variations from Engineer's Estimate: Bidders are warned that the Engineer's Estimate of Quantities on the various items of work and materials is approximate only, given solely to be used as a uniform basis for the comparison of bids, and is not be considered part of this contract. The quantities actually required to complete the contract work may be less or more than so estimated, and if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

(C) Overruns: The terms and conditions applicable to overruns of unit price items are set forth in Article 26 of the Contract.

34. Excise Tax

Bidders are referred to the Specifications for information on Federal Excise Tax exemptions.

35. Licenses and Permits

The successful bidder will be required to obtain all necessary licenses and permits necessary to perform the work.

36. Multiple Prime Contractors

If more than one prime contractor will be involved on this project, all contractors are required to examine the Invitation for Bid packages for all other parts of the project.

37. Locally Based Enterprise Requirements (LBE)

This Contract is subject to the requirements of Administrative Code, Section 6-108.1, and the regulations promulgated thereunder. No construction contract will be awarded unless and until these requirements have been complied with in their entirety. The bidder is advised of the provisions set forth below, as well as the provisions with respect to the Locally Based Enterprise Program contained in Article 67 of the Contract. The contractor is advised that:

(A) If any portion of the Contract is subcontracted, not less than ten percent of the total dollar amount of the contract shall be awarded to locally based enterprises ("LBEs"); except, where less than ten percent of the total dollar amount of the Contract is subcontracted, such lesser percentage shall be so awarded.

(B) No contractor shall require performance and payment bonds from LBE subcontractors.

(C) No Contract shall be awarded unless the contractor first identifies in its bid:

(1) the percentage, dollar amount and type of work to be subcontracted; and
(2) the percentage, dollar amount and type of work to be subcontracted to LBEs.

(D) Within ten calendar days after notification of low bid, the apparent low bidder shall submit an "LBE Participation Schedule" to the contracting agency. If such schedule does not identify sufficient LBE subcontractors to meet the requirements of Administrative Code Section 6-108.1, the apparent low bidder shall submit documentation of its good faith efforts to meet such requirements.

(1) The "LBE Participation Schedule" shall include:

(a) the name and address of each LBE that will be given a subcontract,
(b) the percentage, dollar amount and type of work to be subcontracted to the LBE, and
(c) the dates when the LBE subcontract work will commence and end.

(2) The following documents shall be attached to the "LBE Participation Schedule":

(a) verification letters from each subcontractor listed in the "LBE Participation Schedule" stating that the LBE will enter into a formal agreement for work,
(b) certification documents of any proposed LBE subcontractor which is not on the LBE certified list, and
(c) copies of the certification letter of any proposed subcontractor which is an LBE.

(3) Documentation of good faith efforts to achieve the required LBE percentage shall include as appropriate but not limited to the following:

(a) attendance at prebid meetings, when scheduled by the agency, to advise bidders of contract requirements;

(b) advertisement where appropriate in general circulation media, trade association publications and small business media of the specific subcontracts that would be at least equal to the percentage goal for LBE utilization specified by the contractor;

(c) written notification to association of small, minority and women contractors soliciting specific subcontractors;

(d) written notification by certified mail to LBE firms that their interest in the contract is solicited for specific work items and their estimated values;

(e) demonstration of efforts made to select portions of the work for performance by LBE firms in order to increase the likelihood of achieving the stated goal;

(f) documented efforts to negotiate with LBE firms for specific subcontracts, including at a minimum:

(i) The names, address and telephone numbers of LBE firms that are contacted;

(ii) A description of the information provided to LBE firms regarding the plans and specifications for portions of the work to be performed;

(iii) Documentation showing that no reasonable price can be obtained from LBE firms;

(iv) A statement of why agreements with LBE firms were not reached;

(g) a statement of the reason for rejecting any LBE firm which the contractor deemed to be unqualified; and

(h) documentation of efforts made to assist the LBE firms contacted that needed assistance in obtaining required insurance.

(E) Unless otherwise waived by the Commissioner with the approval of the Office of Economic and Financial Opportunity, failure of a proposed contractor to provide the information required by paragraphs (C) and (D) above may render the bid non-responsive and the Contract may not be awarded to the bidder. If the contractor states that it will subcontract a specific portion of the work, but can demonstrate despite good faith efforts it cannot achieve its required LBE percentage for subcontracted work until after award of Contract, the Contract may be awarded, subject to a letter of compliance from the contractor stating that it will comply with Administrative Code Section 6-108.1 and subject to approval by the Commissioner. If the contractor has not met its required LBE percentage prior to award, the contractor shall demonstrate that a good faith effort has been made subsequent to award to obtain LBEs on each subcontract until its meets the required percentage.

(F) When a bidder indicates prior to award that no work will be subcontracted, no work may be subcontracted without the prior written approval of the Commissioner, which shall be granted only if the contractor in good faith seeks LBE subcontractors at least six weeks prior to the start of work.

(G) The contractor may not substitute or change any LBE which was identified prior to award of the contract without the written permission of the Commissioner. The contractor shall make a written application to the Commissioner for permission to make such substitution or change, explaining why the contractor needs to change its LBE subcontractor and how the contractor will meet its LBE subcontracting requirement. Copies of such application must be served on the originally identified LBE by certified mail return receipt requested, as well as the proposed substitute LBE. The Commissioner shall determine whether or not to grant the contractor's request for substitution.

38. Bid Submission Requirements

The Bid Submission Requirements are set forth in the BID BOOKLET, VOLUME 1 OF 3.

39. Comptroller's Certificate

This Contract shall not be binding or of any force unless it is registered by the Comptroller in accordance with Section 328 of the City Charter and the Procurement Policy Board Rules. This Contract shall continue in force only after annual appropriation of funds by the City of New York and certification as hereinabove set forth.

40. Procurement Policy Board Rules

This Invitation For Bids is subject to the Rules of the Procurement Policy Board of the City of New York. In the event of a conflict between said Rules and a provision of this Invitation For Bids, the Rules shall take precedence.

41. Viewing of Submitted Bid Documents

In accordance with NYC Procurement and Policy Board Rules, Section 3-02, the submitted bid documents will be available to view immediately after completion of the bid opening and by appointment for up to 72 hours after the bid opening.

42. DDC Safety Requirements

The DDC Safety Requirements apply to the work to be performed pursuant to the Contract. The DDC Safety Requirements are set forth on the following pages.

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
SAFETY REQUIREMENTS FOR CONSTRUCTION CONTRACTS

January 2020

THE DDC SAFETY REQUIREMENTS FOR CONSTRUCTION CONTRACTS INCLUDE THE FOLLOWING SECTIONS:

I. POLICY ON SITE SAFETY

II. PURPOSE

III. DEFINITIONS

IV. RESPONSIBILITIES

V. SAFETY QUESTIONNAIRE

VI. SITE SAFETY PLAN

VII. KICK-OFF/PRE-CONSTRUCTION MEETINGS AND SAFETY REVIEW

VIII. EVALUATION DURING WORK IN PROGRESS

IX. SAFETY PERFORMANCE EVALUATION

I. POLICY ON SITE SAFETY

The City of New York Department of Design and Construction (DDC) is committed to a policy of injury and illness prevention and risk management for construction work that will ensure the safety and health of the workers engaged in the projects and the protection of the general public. Therefore, it is DDC's policy that work carried out by Contractors on DDC contracts must, at a minimum, comply with the most current versions of all applicable federal, state and city laws, rules, and regulations, including without limitation:

- Code of Federal Regulations, Title 29, Part 1926 (29 CFR 1926) and applicable Sub-parts of Part 1910 – U.S. Occupational Safety and Health Administration (OSHA);
- Federal Highway Administration – Manual on Uniform Traffic Control Devices (MUTCD);
- New York Codes, Rules and Regulations (NYCRR), Title 12, Part 23 – Protection in Construction, Demolition and Excavation Operations;
- New York Codes, Rules and Regulations (NYCRR), Title 16, Part 753 – Protection of Underground Facilities;
- New York City Administrative Code, Title 28 – New York City Construction Codes;
- Rules of the City of New York, Title 15, Chapter 13 – Rules Pertaining To the Prevention of the Emission of Dust from Construction Related Activities;
- Rules of the City of New York, Title 15, Chapter 28 – Citywide Construction Noise Mitigation;
- Rules of the City of New York, Title 34 Chapter 2 – NYCDOT Highway Rules.

The Contractor will be required to comply with all new and/or revised federal, state and city laws, rules, and regulations, issued during the course of the project, at the expense of the Contractor without any additional costs to the DDC.

II. PURPOSE

The purpose of this policy is to ensure that Contractors perform their work and supervise their employees in accordance with all applicable federal, state and city rules and regulations. Further, Contractors will be expected to minimize or eliminate jobsite and public hazards, through a planning, inspection, auditing and corrective action process. The goal is to control risks so that injuries, illnesses, and accidents to contractors' employees, DDC employees and the general public, as well as damage to city-owned and private property, are reduced to the lowest level feasible.

III. DEFINITIONS

Agency Chief Contracting Officer (ACCO): The ACCO will mean the person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the City Chief Procurement Officer (CCPO).

Competent Person: As defined by OSHA, an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees or the general public, and who has authorization to take prompt corrective measures to eliminate them. This individual will have completed, at a minimum an authorized 30-hour OSHA Construction Safety Course. The Contractor may be required to provide more than one competent person due to construction operations and based on the number of active work sites.

Construction Safety Auditor: A representative of the Office of Construction Safety who provides inspection and assessment services to enhance health and safety on all DDC construction projects. The activities of the Construction Safety Auditor include performing site audits, reviewing safety plans, reviewing construction permits, drawings, verifying Contractor's compliance with applicable federal, state and city laws, rules, regulations, and DDC Contract Safety Requirements, etc. and rendering technical advice and assistance to DDC Resident Engineers and Project Managers.

Office of Construction Safety: A unit of DDC Safety and Site Support that assesses contractor's safety on DDC jobsites and advises responsible parties of needed corrective actions.

Registered Construction Superintendent: For certain projects, as defined in New York City Construction Codes – Title 28, the contractor will provide a Construction Superintendent registered with the NYC Department of Buildings and responsible for all duties as defined in Chapter 33 of Title 1 of the Rules of the City of New York.

Contractor: For purposes of these Safety Requirements, the term "Contractor" will mean any person or entity that enters into a contract for the performance of construction work on a DDC project. The term "Contractor" will include any person or entity which enters into any of the following types of contracts: (1) a prime construction contract for a specific project, (2) a prime construction contract using the Job Order Contracting System ("JOCS Contract"), and (3) a subcontract with a CM/Builder ("First Tier Subcontract").

Daily Safety Job Briefing: Daily jobsite safety briefings, given to all jobsite personnel at project site by the Contractor before work begins and/or if hazards or potential hazards are discovered while working, with the purpose of discussing the scheduled activities for the day, the hazards related to these activities, activity specific safety procedures, and Job Hazard Analysis associated with the scheduled construction work. Daily jobsite briefings will be documented, available at the jobsite, and will include at a minimum, topics, name and signature of the person conducting the briefing session, names and signatures of attendants, name of the designated competent person, contactor's name, DDC Project ID, date, time, and location.

Director – Office of Construction Safety: Responsible for the operations of the Office of Construction Safety and the DDC Site Safety management programs.

Job Hazard Analysis (JHA): A process of identifying the major job tasks and any potential site-specific hazards that may be present during construction and establishing the means and methods to eliminate or control those hazards. A JHA will be documented, available at the jobsite and will include at a minimum work tasks, being performed, identified hazards, control methods for the identified hazards, contractor's name, DDC Project ID, location, date, name and signature of certifying person. A JHA is a living document that will be re-evaluated and revised to address new hazards and tasks that may develop and will be present at the worksite and produced upon request.

Qualified Person: As defined by OSHA, an individual who, by possession of a recognized degree, certificate, license, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve problems relating to the subject matter, the work, or the project. Qualified Persons are required under regulation to address issues pertaining, but without limit, to fall protection, scaffold design, maintenance and protection of traffic, and excavation protective system, among others.

Project Site: Those areas indicated in the Contract Documents where the Work is to be performed.

Project Safety Representative: The designated Project Safety Representative will have at a minimum an OSHA 30-hour Construction Safety Course and other safety training applicable to Contractor's/subcontractor's project work. This individual will be responsible to oversee safety performance of the required construction work, conduct documented daily safety inspections, and implement corrective actions to maintain a safe work site. The Project Safety Representative must have sufficient experience and skills necessary to thoroughly understand the health and safety hazards and controls and must have authority to undertake corrective actions. A dedicated full-time Project Safety Representative may be required on large projects and projects deemed by DDC to be particularly high risk. DDC reserves the right to request a dedicated full-time Project Safety Representative for any reason at any time during the course of the project at the expense of the Contractor without any additional costs to the DDC. The full-time Project Safety Representative will be present at the site during all work activities.

Resident Engineer ("RE"): Representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the work. The RE may be a consultant retained by DDC, including a Construction Management (CM) or Resident Engineer Inspection (REI) firm. If DDC has retained a CM, REI or other consultant firm to perform management and oversite for the Project (e.g., CM-Builder, CM-Design-Builder, Project Manager, Program Manager), that CM, REI or other consultant is the Resident Engineer for purposes of these Safety Requirements.

Safety Questionnaire: Used by DDC to evaluate Contractor's current and past safety performance. It is required to be completed by all Contractors initially when submitting bids for Construction work, or when being pre-qualified

and updated annually or as requested by the DDC.

Site Safety Manager: For certain projects, as defined in New York City Construction Codes – Title 28, the Contractor will provide a Site Safety Manager with a Site Safety Manager License issued by the New York City Department of Building.

Site Safety Plan: A site-specific safety plan developed by the Contractor for a DDC project. The Site Safety Plan will identify the project work scope, identify hazards associated with the project work and include project specific safety procedures and training appropriate and necessary to complete the work. The Site Safety Plan will be submitted within 30 days from the Award Date or as otherwise directed and is subject to review and acceptance by the Office of Construction Safety prior to the commencement of work at the site.

Unsafe or Unhealthy Condition: A condition that could be potentially hazardous to the health and safety of personnel or the public, and/or damaging to equipment, machinery, property, or the environment.

Weekly Safety Meetings: Weekly jobsite safety meetings, given to all jobsite personnel by Contractor, with the purpose of discussing general safety topics and job specific requirements encountered at the DDC work site. Weekly safety meetings will be documented and will include at a minimum, topics, name and signature of the person conducting the meeting, names and signatures of attendees, contractor's name, DDC Project ID, date, and location.

Work: The construction required by the Contractor's Contract Documents whether completed or partially completed, performed by the Contractor/ subcontractors. Work refers to the furnishing of labor, furnishing and incorporating materials and equipment into the construction and providing any service required by the Contract Documents to fulfill the Contractor's obligation to complete the Project. For the purposes of these Safety Requirements, the term "Work" includes all Utility Interference work (commonly referred to as "Section U", "EP-7", and "Joint Bid" work) performed in association with this Contract.

IV. RESPONSIBILITIES

All persons who manage, perform, and provide support for construction projects will conduct operations in compliance with the requirements identified in this Policy and all applicable governing regulatory agency requirements and guidelines pertaining to safety in construction.

A. Resident Engineer

1. Review and facilitate Contractor(s) Site Safety Plan submittals to DDC for acceptability.
2. Notify the Office of Construction Safety of the commencement of construction work.
3. Develop and implement a training verification process to ensure that all CM/REI, consultant, Contractor, and subcontractor employees are properly trained. Maintain all applicable initial and refresher training records and assures documentation availability on site.
4. Maintain documentation of and attend weekly safety meetings and daily safety job briefings.
5. Assure that Contractor(s) JHA's are current to reflect the work tasks being performed, hazards, and control methods to mitigate the identified hazards. Verify that all employees at the job site are trained on the JHAs and maintain supporting documentation on site.
6. Assure adequate planning for all critical construction activities (crane operation, excavation, confined space entry, etc.) including coordination between Contractor(s) /DDC/ other Agencies as required.
7. Maintain custody of all construction related permits, plans, approvals, drawings, etc., related to the project and assure their availability on site.
8. Recognize, minimize, or eliminate jobsite and public hazards, through required planning, inspection, verification, and corrective action process.
9. Monitor the conditions at the site for conformance with the Contractor's Site Safety Plan, DDC policies, permits, and all applicable regulations and documentation that pertain to construction safety.
10. Notify the Contractor and DDC immediately upon determination of any condition or activity existing which is not in compliance with the Contractor's Site Safety Plan, applicable federal, state or local codes or any

condition that presents a potential risk of injury to the public or workers or possible damage to property. Direct the Contractor to provide such labor, materials, equipment, and supervision to remedy such conditions.

11. Notify the Office of Construction Safety and the ACCO's Insurance and Risk Management Unit of project-related accidents, incidents, and near misses as per DDC's Construction Safety Emergency and Accident Notification and Response Procedure within two (2) hours.
12. In case of an accident, incident, or near miss, RE is responsible to protect the integrity of the accident site including but not limited to: the safeguarding of all evidence, documentation of all personnel on site at the time of the accident, gather facts related to all accidents, incidents, or near miss, and prepare required DDC Construction Accident Report as per DDC's Construction Safety Emergency and Accident Notification and Response Procedure. Maintain all records pertaining to accidents, incidents, and near miss and have them available upon request.
13. Notify the Office of Construction Safety within two (2) hours of the start of an inspection by any outside/ regulatory agency personnel, including NYS, OSHA, NYC DOB or any other City/State/Federal oversight entity and forward a copy of the inspection report within one business day of its receipt.
14. Escort and assist Construction Safety Auditors during all field and record audits.
15. Report any emergency conditions to the Office of Construction Safety immediately.

Note: In addition to the responsibilities listed above, if the Resident Engineer is a CM/REI or other non-City party hired by the City to manage the Project, the Resident Engineer is also required to do the following:

16. Provide personnel who are certified and or trained appropriately for the requirements of the project.
17. Perform an investigation for any project-related accidents, incidents, and near misses. Within 24-hours of the time of the accident, incident, or near miss, the CM/REI will submit an investigation report to the Office of Construction Safety. Such report will include proposed remedial measures and implementation of corrective actions to prevent recurrence.

DDC reserves the right to request that the CM/REI replace any CM/REI personnel for any reason at any time during the project.

B. Construction Contractors

Note: For CM-Build and CM-Design-Build Projects, the CM will meet all requirements listed in this section, as well as the Resident Engineer section above.

1. Submit a completed Safety Questionnaire and other safety performance related documentation with its bid or as part of a pre-qualification package.
2. Submit a Site Safety Plan within 30 days from the Award Date or as otherwise directed. The Site Safety Plan is subject to review and acceptance by the Office of Construction Safety prior to the commencement of work at the site. The Site Safety Plan will be revised and updated as necessary during the course of the project. If requested by the Office of Construction Safety, the Site Safety Plan must be developed and submitted for approval using a web-based system, the Site Safety Plan Application (SSP App).
3. Designate and identify a Project Safety Representative in the Site Safety Plan. The Contractor will immediately notify the Office of Construction Safety, in a form and manner acceptable to the Office of Construction Safety, of any permanent change to the designated Project Safety Representative. In the event the primary designated Project Safety Representative is temporary unable to perform his or her duties, an alternate Project Safety Representative will be provided. Resumes, outlining the qualification and experience for the Project Safety Representative (s) will be included in the Site Safety Plan and available upon request. DDC reserves the right to request the Contractor to replace a Project Safety Representative for any reason at any time during the course of the project.
4. Designate and identify a Competent Person(s) in the Site Safety Plan. Contractor/subcontractor may be required to provide more than one competent person due to construction operations and based on a number of work tasks/areas. DDC reserves the right to request the Contractor to replace a Competent Person or provide additional Competent Person(s) for any reason at any time during the course of the project. The Competent Person will be present at the site during all work activities.
5. For certain projects, as defined in New York City Construction Codes – Title 28, designate and identify the Licensed Site Safety Manager or Registered Construction Superintendent. Resumes, outlining the qualification and experience for the Licensed Site Safety Manager or Registered Construction Superintendent will be included in the Site Safety Plan and available upon request. The Contractor will immediately notify the Office

of Construction Safety, in a form and manner acceptable to the Office of Construction Safety, of any permanent change to the designated Site Safety Manager and/or Construction Superintendent. In the event the primary designated Site Safety Manager or Construction Superintendent is temporarily unable to perform his or her duties, an alternate Licensed Site Safety Manager and/or Registered Construction Superintendent will be provided. The Office of Construction Safety must be informed of such change. DDC reserves the right to request the Contractor to replace Site Safety Manager or Construction Superintendent for any reason at any time during the course of the project.

6. Develop a written Job Hazard Analysis (JHA) that identifies safety hazards and control methods for project specific work tasks. A preliminary JHA will be included in the Site Safety Plan submitted by the Contractor. A JHA is a living document that will be re-evaluated and revised to address new hazards and tasks that may develop during the course of the project and will be present at the worksite and produced upon request.
7. Develop project specific safety procedures to protect employees, general public, and property during all construction activities for the duration of the project.
8. Ensure that all employees are aware of the hazards associated with the project through documented formal and informal training and/or other communications. Conduct and document new employee and site-specific safety orientation for all Contractor and subcontractor personnel to review the hazards associated with the project as identified in the Site Safety Plan and the specific safety procedures and controls that will be used to protect workers, the general public and property. The Project Safety Representative will conduct this training prior to mobilization and if necessary during the course of the project. Documentation will be provided to the RE.
9. Prior to performing any work on DDC projects all Contractor's and subcontractor's employees will, at a minimum, have successfully completed, within the previous five calendar years, an OSHA 10-hour construction safety course.

   All training records (OSHA 10-hour, flagger, scaffold, fall protection, confined space, etc.) will be provided to the RE prior to mobilization, included in the Site Safety Plan, kept current during the course of the project, and available for review.
10. Conduct and document weekly safety meetings and daily job briefing sessions for the duration of the project. Attendance at weekly safety meetings and daily job briefing sessions is mandatory. A written record of weekly safety meetings will be available upon request and job briefing sessions will be available at the worksite.
11. As part of the Site Safety Plan, prepare site specific procedures, such as maintenance and protection of traffic plan, steel erection plan, confined space program, fall protection plan, demolition plan, site specific emergency evacuation plan, etc. (if not otherwise provided in the contract documents) and comply with all of its provisions.
12. Have immediately available for review at the project site where actual construction activities are being performed all applicable documentation, including but not limited to: JHAs for work tasks being performed, all required training records, MPT plan (where applicable), Noise and Dust Mitigation Plans, excavation protective system drawings (where applicable), Emergency Evacuation plan, fall protection program (where applicable), confined space program (where applicable), all required permits, daily job briefing records, all required documentation for crane operation (where applicable), daily inspection checklist, scaffold and sidewalk drawings (when applicable), safety data sheets for chemicals in use.
13. Comply with all federal, state and local safety and health rules, laws, and regulations.
14. Comply with all provisions of the Site Safety Plan.
15. Provide, replace, and adequately maintain at or around the project site, suitable and sufficient signage, lights, barricades and enclosures (fences, sidewalk sheds, netting, bracing, etc.). The project specific MPT plan will be developed, implemented, and reviewed during the course of the project.
16. The Project Safety Representative will conduct daily safety inspections, document the inspection results, implement corrective actions for the identified hazards. Maintain the inspection records and have them available upon request.
17. **Report unsafe or unhealthy conditions to the RE as soon as practical, but no more than 24 hours after discovery, and take prompt actions to remove or abate such conditions. Should an imminent dangerous condition be discovered, Contractor will stop all work in the area of danger until corrections are made.**
18. Report all accidents, incidents and near misses involving injuries to workers or the general public, as well as property damage, to the RE within one (1) hour.
19. Following an accident or incident, unless otherwise directed, the Contractor will not remove or alter any equipment, structure, material, or evidence related to the accident or incident. Exception: Immediate emergency procedures taken to secure structures, temporary construction, operations, or equipment that pose a continued imminent danger or facilitate assistance for persons who are trapped or who have sustained bodily injury. Take

additional measures as necessary to secure the accident or incident site and to protect against any further injury or property damage.

20. The Contractor will perform an investigation into the root cause of the accident, incident, or near miss. Within 24 hours of an accident, incident, or near miss, the Contractor will prepare and submit to the RE a written investigation report detailing findings, corrective actions, and hazard mitigation implementation to prevent recurrence.
21. Notify the RE within two (2) hours of the start of an inspection by any outside regulatory agency personnel, including OSHA, NYC DOB, or others.
22. Maintain all records pertaining to all required safety compliance documents, accidents and incidents reports. DDC reserves the right to request copy of any records pertaining to the safety of the project and required by DDC and other federal, state, and city agencies, including but not limited to permits, training records, safety inspection records, drawings, equipment records, etc.
23. Cooperate with DDC Office of Construction Safety/ RE and address DDC recommendations on safety, which will in no way relieve the Contractor of its responsibilities for safety on the project. The Contractor has sole responsibility for safety.

V. SAFETY QUESTIONNAIRE

DDC requires that all Contractors provide information regarding their current and past safety performance and programs. This will be accomplished by the use of the DDC Safety Questionnaire. As a part of the bid submittal package, the contractor will submit a completed DDC Safety Questionnaire listing company workers' compensation experience modification rating and OSHA Incident Rates for the three (3) years prior to the date of the bid opening. DDC may request a Contractor to update its Questionnaire at any time or to provide more detailed information. The Contractor will provide the requested information within 15 days.

The following criteria will be used by DDC in reviewing the Contractor's responsibility, which will be based on the information provided on the questionnaire:

Criteria 1: OSHA Injury and Illness Rates (I&IR) are no greater than the average for the industry (based on the most current Bureau of Labor Statistics data for the Contractors SIC code); and

Criteria 2: Insurance workers compensation Experience Modification Rate (EMR) equal to or less than 1.0; and

Criteria 3: Any willful violations issued by OSHA or NYC DOB within the last three (3) years; and

Criteria 4: A fatality (worker or member of public) and injuries, requiring OSHA notification, experienced on or near Contractor's worksite within the last three (3) years; and

Criteria 5: Past safety performance on DDC projects (accidents; status of site safety plan submittals; etc.)

Criteria 6: OSHA violation history for the last three (3) years;

Criteria 7: Contractor will provide OSHA Injury and Illness Records (currently OSHA 300 and 300A Logs) for the last three (3) years.

If the Contractor fails to meet the basic criteria listed above, the Office of Construction Safety may request, through the ACCO, more details concerning the Contractor's safety experience. DDC may request the Contractor to provide copies of, among other things, accident investigation reports, OSHA records, OSHA and NYC DOB citations, EPA citations and written corrective action plan.

VI. SITE SAFETY PLAN

Within thirty (30) days from the Award Date or as otherwise directed, the Contractor will submit the Site Safety Plan. The Site Safety Plan will identify project work scope, safety hazards associated with the project tasks, and include specific safety procedures and training appropriate and necessary to complete the work. The Site Safety Plan is subject to review and acceptance by the Office of Construction Safety prior to the commencement of work at the site. Due to the project work scope and project duration, the Office of Construction Safety may grant a conditional acceptance for a Site Safety Plan without all sections being complete. In a case of a "Conditional Acceptance" of a Site Safety Plan,

the Contractor will provide the remaining sections previously incomplete and/or not submitted for review and acceptance by the Office of Construction Safety prior to the commencement of the construction activities. The Office of Construction Safety reserves the right to withdraw the initial "Conditional Acceptance" if the Contractor fails to provide the remaining sections of a Site Safety Plan. Failure by the Contractor to submit an acceptable Site Safety Plan will be grounds for default.

Site Safety Plan requirements: The Site Safety Plan will be a written document and will apply to all project specific Contractor and subcontractor operations, and will have at a minimum, the following elements with each described in a separate section (It may be necessary to modify the basic format for certain unique or high-risk projects, such as tunnels or high-rise construction). All Site Safety Plan sections will be numbered in the order listed below. For sections, which are not applicable for the type of the work being performed by the Contractor on DDC project, the Contractor will in writing indicate "Not applicable based on the project work scope." The Site Safety Plan will include Contractor's name, DDC project ID, project location (s), and development and revision dates. The Site Safety Plan will include the sections, attachments, and appendixes provided in the Site Safety Plan. All pages of the Site Safety Plan will be numbered. If requested by the Office of Construction Safety, the Site Safety Plan must be developed and submitted for approval using a web-based system, the Site Safety Plan Application (SSP App).

1. Project Work Scope – Detailed information regarding work tasks that will be performed by Contractor and subcontractors under the project.
2. Responsibility and Organization – Contractor's organization chart with responsible personnel for the project, including titles, names, contact information, roles, and responsibilities. All Contractor's personnel required by the DDC Safety Requirements will be identified.
3. Safety Training and Education – OSHA 10 Hours training, requirements for daily safety briefings and weekly safety meetings, any work task specific training, responsible staff for implementation of training program for the project.
4. Job Hazard Analysis (JHA) – Project specific Job Hazard Analysis including work tasks, identified hazards, hazard control methods (administrative, engineering, PPE) to protect workers, property and general public, Contractor's name, project id, location, name and signature of a certifying person, hazard assessment date.
5. Protection of Public – Project specific procedures covering safety of the general public during all project construction activities.
6. Hazard Corrective Actions - Procedures for hazard identification, including responsible person(s), frequency of safety inspections, implementation of corrective actions, safety inspection checklist.
7. Accident/Exposure Investigation – Project specific procedures for accident/incident/near miss investigation and implementation of corrective actions. Accident/incident/near miss notification procedure of DDC project staff (timer frame and responsible personnel).
8. Recording and Reporting Injuries – Procedures to meet 29 CFR 1904 requirements.
9. First Aid and Medical Attention – Responsible staff, location and inspection of First Aid kit, directions to local hospitals; emergency telephone numbers.
10. Project Specific Fire Protection and Prevention Program – Project specific procedures, including responsible staff, fire alarm system/methods, hot work procedures, etc.
11. Housekeeping Procedure.
12. Project Specific Illumination Procedure.
13. Project Specific Sanitation Procedure.
14. Personal Protective Equipment (PPE), including Respiratory Protection Program and Hearing Conservation Program, if required.
15. Hazard Communication Program – Contractor's Hazard Communication Program, responsible staff; training; SDS records, project specific list of chemicals; location of the program and SDS records.
16. Means of Egress – Information regarding free and unobstructed egress from all parts of the building or structure; exit marking; maintenance of means of egress, etc.
17. Employee Emergency Action Plan – Project specific: responsible staff, emergency alarm system/devices, evacuation procedure, procedure to account for employees after evacuation, etc.
18. Evacuation Plan – Project specific evacuation plan (drawing/scheme) with exists and evacuation routes.
19. Ionizing/Nonionizing Radiation – Competent person, license and qualification requirements, type of radiation, employee's exposure and protection, safety procedures, etc.

20. Material Handling, Storage, Use and Disposal – Project specific information regarding material storage, disposal, and handling: procedures, plan/drawings, etc.
21. Signs, Signals, and Barricades – Use of danger/warning signs, safety instruction signs, sidewalk closure and pedestrian fencing and barricades (if not included in the MPT plan), etc.
22. Tools – Hand and Power – Safety procedures for the type of tools to be used.
23. Scaffold – Project specific scaffold types, procedures, training requirements, scaffold drawings, designed, sealed, and signed by NYS Licensed Professional Engineer, or as otherwise directed; competent person, criteria for project specific scaffold, falling object protection, procedures for aerial lifts/scissor lifts.
24. Welding and Cutting – Project specific procedure for welding and cutting, including all necessary safety requirements such as fire prevention, personal protective equipment, hot work permits (if not covered by Contractor's Fire Prevention and Protection program, FDNY certificate requirements).
25. Electrical Safety – Project specific procedures, including lock out-tag out.
26. Fall Protection – Project specific information regarding selected fall protection systems, fall protection plan, responsible staff.
27. Cranes, Derrick, Hoists, Elevators, Conveyors – project specific equipment information including type, rated load capacity, manufacture specification requirements, competent person, exposure to falling load, inspection, recordkeeping, clearance requirements, communication procedure, ground lines, permits.
28. Excavation Safety – Competent person; excavation procedures; project specific protective system, including drawings, designed, sealed, and signed by NYS Licensed Professional Engineer, or as otherwise directed.
29. Protection of Underground Facilities and Utilities Procedure, including responsible staff and responsibilities.
30. Concrete and Masonry Construction Procedures
31. Maintenance and Protection of Traffic Plan – Project specific MPT plan, designed, sealed, and signed by NYS Licensed Professional Engineer, or as otherwise directed; flagmen training, public safety, etc.
32. Steel Erection – Site specific erection plan, requirements for applicable written notifications, competent person, fall protection plan, training requirements, etc.
33. Demolition – Engineering survey, including written evidence, disconnection of all effected utilities, identification of all hazardous chemicals, materials, gases, etc., floor openings, chutes, inspection and maintenance of all stairs/passageways, removal of materials/debris/structural elements, lock out/tag out, competent person.
34. Blasting and the Use of Explosives – Project specific safety procedures, warning signs, training/qualification, transportation, storage and use of explosives, inspection.
35. Stairways and Ladders – Types of stairs and ladders, safety procedures, training requirements.
36. Alcohol and Drug Abuse Policy
37. Rodents and Vermin Controls
38. Toxic and Hazardous Substances – Safety procedures for substances that Contractor's and subcontractor's employees can be exposed on project.
39. Noise Mitigation Plan – Completed project specific Noise Mitigation Plan, and noise mitigation procedures.
40. Confined Space Program – Project specific Confined Space Program, responsible staff, training records, equipment information, rescue procedure, list of project specific confined spaces, forms.
41. Construction Vehicles/Heavy Equipment – Type of construction vehicles/heavy equipment to be used on site, procedures
42. Dust Mitigation Plan – Completed project specific Dust Mitigation Plan, and dust mitigation procedures.
43. Working Over and Near Water. Diving Operations – safety procedures including personal protective equipment, fall protection, rescue services, etc.

The most critical component of the Site Safety Plan is the Job Hazard Analysis (JHA) section. The JHA form is a written document prepared by the Contractor. The Contractor will conduct a site and task assessment to identify the tasks and any potential safety or environmental hazards related to performance of the work, eliminate or implement controls for the potential hazards, and identify proper personal protective equipment for the task. The JHA will be communicated to all Contractor/subcontractor personnel on site. The JHA will include safety hazard identification and controls to protect employees, general public, and property.

The initial JHA will be included in the Contractor's Site Safety Plan and the current JHA form will be available at the construction site for reference. A JHA is a living document that will be re-evaluated and revised to address new hazards and tasks that may develop and will be present at the worksite and produced upon request.

VII. KICK-OFF MEETINGS/PRE-CONSTRUCTION AND SAFETY REVIEW

Prior to the start of construction activities on all DDC projects, RE will invite the Office of Construction Safety to the construction kick-off meeting. The Office of Construction Safety representative(s) will participate in this meeting with the Contractor and RE for the purpose of:

A. Reviewing DDC Contract Safety Requirements
B. Reviewing site-specific safety issues based on a project work scope, location, and any other factors which may impact safety of workers and general public.
C. Reviewing the Site Safety Plan and JHA requirements.
D. Reviewing Accident/Incident reporting and investigation procedures.
E. Reviewing designated safety contacts, roles, and responsibilities.
F. Discussing planned inspections and audits of the site by the Office of Construction Safety personnel.

VIII. EVALUATION DURING WORK IN PROGRESS

The Contractor's adherence to these Safety Requirements will be monitored throughout the project. This will be accomplished by the following:

A. Use of a safety checklist by a representative of the Office of Construction Safety (or other designated DDC representative) and the RE during regular inspections and comprehensive audits of the job site. Field Exit Conferences will be held with the RE and Contractor Project Safety Representatives.
B. The RE will continually monitor the safety and environmental performance of the Contractor's employees and work methods. Deficiencies will be brought to the attention of the Contractor's Project Safety Representative on site for immediate correction. The RE will maintain a written record of these deficiencies and have these records available upon request. Any critical deficiencies will be immediately reported to the Office of Construction Safety via telephone (718)391-1911.
C. If the Contractor's safety performance during the project is not up to DDC standards (safety performance measure, accident/incident rate, etc.) the Director – Office of Construction Safety, or his/her designee will meet with the Contractor's Project Safety Representative and other representatives, the RE, and the DDC Environmental Specialist (if environmental issues are involved). The purpose of this meeting is to 1) determine the level of non-compliance; 2) explain and clarify the safety/environmental provisions; 3) agree on a future course of action to correct the deficiencies.
D. If the deficiencies continue, the Commissioner may, without limitation, declare the Contractor in default.
E. The Contractor will within 1 hour inform the RE of all accidents/incidents/near misses including all fatalities, any injuries to employees or members of the general public, and property damage (e.g., structural damage, equipment rollovers, utility damage, loads dropped from crane). The RE will notify the Office of Construction Safety as per DDC's Construction Safety Emergency and Accident Notification and Response Procedure and will maintain a record of all Contractor accidents/incidents for the project.
F. The Contractor and the RE will notify the Office of Construction Safety within two (2) hours of the start of any NYS-DOL/ NYC-COSH/ OSHA/ EPA inspections.

IX. SAFETY PERFORMANCE EVALUATION

The Contractor's safety record, including accident/incident history and DDC safety inspection results, will be considered as part of the Contractor's performance evaluation at the conclusion of the project. Poor safety performance during the course of the project will be a reason to rate a Contractor unsatisfactory which may be reflected in the City's PASSPort system and will be considered for future procurement actions as set forth in the City's Procurement Policy Board Rules.

NOTICE TO BIDDERS

Please be advised that a Rider to the March 2017 New York City Standard Construction Contract regarding Non-Compensable Delays and Grounds for Extension has been attached and incorporated in this Invitation for Bid. Other than provisions specifically delineated in the Rider, all other terms of the March 2017 New York City Standard Construction Contract continue to apply in full force and effect.

RIDER TO NEW YORK CITY STANDARD CONSTRUCTION CONTRACT (MARCH 2017) REGARDING NON-COMPENSABLE DELAYS AND GROUNDS FOR EXTENSION

The following provisions supersede the corresponding provisions in the March 2017 version of the New York City Standard Construction Contract:

1. Section **11.5.1** provides as follows:

   11.5.1 The acts or omissions of public or government bodies (other than **City** agencies) or of any third parties who are disclosed in the **Contract Documents,** or those third parties who are ordinarily encountered or who are generally recognized as related to the **Work**, including but not limited to, **Other Contractors**, utilities or private enterprises;

2. Section **11.5.6** provides as follows:

   11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God; acts of war or of the public enemy or terrorist acts; disruption, outage or power failure caused by a utility's inability or failure to provide service, pandemics, epidemics, outbreaks of infectious disease or any other public health emergency; other states of emergency declared by the City, State or Federal government , quarantine restrictions, and freight embargoes; including the **City's** reasonable responses to any of the above; and

3. Section **13.3** provides as follows:

   13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

   13.3.1 By any of the acts or omissions of the **City**, its officials, agents or employees set forth in Articles **11.4.1.1** through **11.4.1.9**; or

   13.3.2 By or attributable to any of the items set forth in Articles **11.5.1** through **11.5.7**.

   13.3.3 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10.

CITY OF NEW YORK

STANDARD CONSTRUCTION CONTRACT

March 2017

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CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT

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WITNESSETH:

The parties, in consideration of the mutual agreements contained herein, agree as follows:

CHAPTER I: THE CONTRACT AND DEFINITIONS

ARTICLE 1. THE CONTRACT

1.1 Except for titles, subtitles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, shall be deemed to be part of this **Contract**:

1.1.1 All provisions required by law to be inserted in this **Contract**, whether actually inserted or not;

1.1.2 The Contract Drawings and Specifications;

1.1.3 The General Conditions and Special Conditions, if any;

1.1.4 The **Contract**;

1.1.5 The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet;

1.1.6 All Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed or the Order to Work.

1.2 Should any conflict occur in or between the Drawings and Specifications, the **Contractor** shall be deemed to have estimated the most expensive way of doing the **Work**, unless the **Contractor** shall have asked for and obtained a decision in writing from the **Commissioner** of the **Agency** that is entering into this **Contract**, before the submission of its bid, as to what shall govern.

ARTICLE 2. DEFINITIONS

2.1 The following words and expressions, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless a different meaning is clear from the context:

2.1.1 **"Addendum"** or **"Addenda"** shall mean the additional Contract provisions and/or technical clarifications issued in writing by the Commissioner prior to the receipt of bids.

2.1.2 **"Agency"** shall mean a city, county, borough or other office, position, department, division, bureau, board or commission, or a corporation, institution or agency of government, the expenses of which are paid in whole or in part from the City treasury.

2.1.3 **"Agency Chief Contracting Officer" (ACCO)** shall mean a person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the CCPO, or his/her duly authorized representative.

2.1.4 **"Allowance"** shall mean a sum of money which the Agency may include in the total amount of the Contract for such specific contingencies as the Agency believes may be necessary to complete the Work, *e.g.*, lead or asbestos remediation, and for which the Contractor will be paid on the basis of stipulated unit prices or a formula set forth in the Contract or negotiated between the parties provided, however, that if the Contractor is not directed to use the Allowance, the Contractor shall have no right to such money and it shall be deducted from the total amount of the Contract.

2.1.5 **"City"** shall mean the City of New York.

2.1.6 **"City Chief Procurement Officer" (CCPO)** shall mean a person delegated authority by the Mayor to coordinate and oversee the procurement activity of Mayoral agency staff, including the ACCO and any offices which have oversight responsibility for the procurement of construction, or his/her duly authorized representative.

2.1.7 **"Commissioner"** shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.

2.1.8 **"Comptroller"** shall mean the Comptroller of the City of New York.

2.1.9 **"Contract"** or **"Contract Documents"** shall mean each of the various parts of the contract referred to in Article 1 hereof, both as a whole and severally.

2.1.10 **"Contract Drawings"** shall mean only those drawings specifically entitled as such and listed in the Specifications or in any Addendum, or any drawings furnished by the Commissioner, pertaining or supplemental thereto.

2.1.11 **"Contract Work"** shall mean everything required to be furnished and done by the Contractor by any one or more of the parts of the Contract referred to in Article 1, except Extra Work as hereinafter defined.

2.1.12 **"Contractor"** shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and its, their, his/her successors, personal representatives, executors, administrators, and assigns, and any person, firm, partnership, joint venture, individual, or corporation which shall at any time be substituted in the place of the Contractor under this Contract.

2.1.13 **"Days"** shall mean calendar days, except where otherwise specified.

2.1.14 **"Engineer"** or **"Architect"** or **"Project Manager"** shall mean the person so designated in writing by the Commissioner in the Notice to Proceed or the Order to Work to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be. Subject to written approval by the Commissioner, the Engineer, Architect or Project Manager may designate an authorized representative.

2.1.15 **"Engineering Audit Officer" (EAO)** shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.

2.1.16 **"Extra Work"** shall mean Work other than that required by the Contract at the time of award which is authorized by the Commissioner pursuant to Chapter VI of this Contract.

2.1.17 **"Federal-Aid Contract"** shall mean a contract in which the United States (federal) Government provides financial funding as so designated in the Information for Bidders.

2.1.18 **"Final Acceptance"** shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.

2.1.19 **"Final Approved Punch List"** shall mean a list, approved pursuant to Article 14.2.2, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.

2.1.20 **"Law"** or **"Laws"** shall mean the Constitution of the State of New York, the New York City Charter, the New York City Administrative Code, a statute of the United States or of the State of New York, a local law of the City of New York, any ordinance, rule or regulation having the force of law, or common law.

2.1.21 **"Materialman"** shall mean any corporation, firm, partnership, joint venture, or individual, other than employees of the Contractor, who or which contracts with the Contractor or any Subcontractor, to fabricate or deliver, or who actually fabricates or delivers, plant, materials or equipment to be incorporated in the Work.

2.1.22 **"Means and Methods of Construction"** shall mean the labor, materials, temporary structures, tools, plant, and construction equipment, and the manner and time of their use, necessary to accomplish the result intended by this Contract.

2.1.23**"Notice to Proceed" or "Order to Work"** shall mean the written notice issued by the Commissioner specifying the time for commencement of the Work and the Engineer, Architect or Project Manager.

2.1.24 **"Other Contractor(s)"** shall mean any contractor (other than the entity which executed this Contract or its Subcontractors) who or which has a contract with the City for work on or adjacent to the building or Site of the Work.

2.1.25 **"Payroll Taxes"** shall mean State Unemployment Insurance (SUI), Federal Unemployment Insurance (FUI), and payments pursuant to the Federal Insurance Contributions Act (FICA).

2.1.26 **"Project"** shall mean the public improvement to which this Contract relates.

2.1.27 **"Procurement Policy Board" (PPB)** shall mean the Agency of the City of New York whose function is to establish comprehensive and consistent procurement policies and rules which shall have broad application throughout the City.

2.1.28 **"Required Quantity"** in a unit price Contract shall mean the actual quantity of any item of Work or materials which is required to be performed or furnished in order to comply with the Contract.

2.1.29 **"Resident Engineer"** shall mean the representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the Work.

2.1.30 **"Site"** shall mean the area upon or in which the Contractor's operations are carried on, and such other areas adjacent thereto as may be designated as such by the Engineer.

2.1.31 **"Small Tools"** shall mean items that are ordinarily required for a worker's job function, including but not limited to, equipment that ordinarily has no licensing, insurance or substantive storage costs associated with it; such as circular and chain saws, impact drills, threaders, benders, wrenches, socket tools, etc.

2.1.32 **"Specifications"** shall mean all of the directions, requirements, and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.

2.1.33 **"Subcontractor"** shall mean any person, firm or corporation, other than employees of the Contractor, who or which contracts with the Contractor or with its subcontractors to furnish, or actually furnishes labor, or labor and materials, or labor and equipment, or superintendence, supervision and/or management at the Site. Wherever the word Subcontractor appears, it shall also mean sub-Subcontractor.

2.1.34 **"Substantial Completion"** shall mean the written determination by the Engineer that the Work required under this Contract is substantially, but not entirely, complete and the approval of the **Final Approved Punch List**.

2.1.35 **"Work"** shall mean all services required to complete the Project in accordance with the Contract Documents, including without limitation, labor, material, superintendence, management, administration, equipment, and incidentals, and obtaining any and all permits, certifications and licenses as may be necessary and required to complete the Work, and shall include both Contract Work and Extra Work.

CHAPTER II: THE WORK AND ITS PERFORMANCE

ARTICLE 3. CHARACTER OF THE WORK

3.1 Unless otherwise expressly provided in the **Contract Drawings**, **Specifications,** and **Addenda**, the **Work** shall be performed in accordance with the best modern practice, utilizing, unless otherwise specified in writing, new and unused materials of standard first grade quality and workmanship and design of the highest quality, to the satisfaction of the **Commissioner**.

ARTICLE 4. MEANS AND METHODS OF CONSTRUCTION

4.1 Unless otherwise expressly provided in the **Contract Drawings**, **Specifications,** and **Addenda**, the **Means and Methods of Construction** shall be such as the **Contractor** may choose; subject, however, to the **Engineer's** right to reject the **Means and Methods of Construction** proposed by the **Contractor** which in the opinion of the **Engineer**:

4.1.1 Will constitute or create a hazard to the **Work**, or to persons or property; or

4.1.2 Will not produce finished **Work** in accordance with the terms of the **Contract**; or

4.1.3 Will be detrimental to the overall progress of the **Project**.

4.2 The **Engineer's** approval of the **Contractor's Means and Methods of Construction**, or his/her failure to exercise his/her right to reject such means or methods, shall not relieve the **Contractor**

of its obligation to complete the **Work** as provided in this **Contract**; nor shall the exercise of such right to reject create a cause of action for damages.

ARTICLE 5. COMPLIANCE WITH LAWS

5.1 The **Contractor** shall comply with all **Laws** applicable to this **Contract** and to the **Work** to be done hereunder.

5.2 Procurement Policy Board Rules: This **Contract** is subject to the Rules of the **PPB** ("**PPB** Rules") in effect at the time of the bid opening for this **Contract**. In the event of a conflict between the **PPB** Rules and a provision of this **Contract**, the **PPB** Rules shall take precedence.

5.3 Noise Control Code provisions.

5.3.1 In accordance with the provisions of Section 24-216(b) of the Administrative Code of the **City** ("Administrative Code"), Noise Abatement Contract Compliance, devices and activities which will be operated, conducted, constructed or manufactured pursuant to this **Contract** and which are subject to the provisions of the **City** Noise Control Code shall be operated, conducted, constructed, or manufactured without causing a violation of the Administrative Code. Such devices and activities shall incorporate advances in the art of noise control development for the kind and level of noise emitted or produced by such devices and activities, in accordance with regulations issued by the **Commissioner** of the **City** Department of Environmental Protection.

5.3.2 The **Contractor** agrees to comply with Section 24-219 of the Administrative Code and implementing rules codified at 15 Rules of the City of New York ("RCNY") Section 28-100 *et seq*. In accordance with such provisions, the **Contractor**, if the **Contractor** is the responsible party under such regulations, shall prepare and post a Construction Noise Mitigation Plan at each **Site**, in which the **Contractor** shall certify that all construction tools and equipment have been maintained so that they operate at normal manufacturers operating specifications. If the **Contractor** cannot make this certification, it must have in place an Alternative Noise Mitigation Plan approved by the **City** Department of Environmental Protection. In addition, the **Contractor**'s certified Construction Noise Mitigation Plan is subject inspection by the **City** Department of Environmental Protection in accordance with Section 28-101 of Title 15 of RCNY. No **Contract Work** may take place at a **Site** unless there is a Construction Noise Mitigation Plan or approved Alternative Noise Mitigation Plan in place. In addition, the **Contractor** shall create and implement a noise mitigation training program. Failure to comply with these requirements may result in fines and other penalties pursuant to the applicable provisions of the Administrative Code and RCNY.

5.4 Ultra Low Sulfur Diesel Fuel: In accordance with the provisions of Section 24-163.3 of the Administrative Code, the **Contractor** specifically agrees as follows:

5.4.1 Definitions. For purposes of this Article 5.4, the following definitions apply:

5.4.1(a) "Contractor" means any person or entity that enters into a Public Works Contract with a **City Agency**, or any person or entity that enters into an agreement with such person or entity, to perform work or provide labor or services related to such Public Works Contract.

5.4.1(b) "Motor Vehicle" means any self-propelled vehicle designed for transporting persons or property on a street or highway.

5.4.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.4.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this term shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) horsepower or less and that are not used in any construction program or project.

5.4.1(e) "Public Works Contract" means a contract with a **City Agency** for a construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; a contract with a **City Agency** for the preparation for any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; or a contract with a **City Agency** for any final work involved in the completion of any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge.

5.4.1(f) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.4.2 Ultra Low Sulfur Diesel Fuel

5.4.2(a) All **Contractors** shall use Ultra Low Sulfur Diesel Fuel in diesel-powered Nonroad Vehicles in the performance of this **Contract**.

5.4.2(b) Notwithstanding the requirements of Article 5.4.2(a), **Contractors** may use diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) to fulfill the requirements of this Article 5.4.2, where the Commissioner of the **City** Department of Environmental Protection ("DEP Commissioner") has issued a determination that a sufficient quantity of Ultra Low Sulfur Diesel Fuel is not available to meet the needs of **Agencies** and **Contractors**. Any such determination shall expire after six (6) months unless renewed.

5.4.2(c) **Contractors** shall not be required to comply with this Article 5.4.2 where the **City Agency** letting this **Contract** makes a written finding, which is approved, in writing, by the DEP Commissioner, that a sufficient quantity of Ultra Low Sulfur Diesel Fuel, or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is not available to meet the requirements of Section 24-163.3 of the Administrative Code, provided that such **Contractor** in its fulfillment of the

requirements of this **Contract**, to the extent practicable, shall use whatever quantity of Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm) is available. Any finding made pursuant to this Article 5.4.2(c) shall expire after sixty (60) **Days**, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the **City Agency** renews the finding in writing and such renewal is approved by the DEP Commissioner.

5.4.2(d) **Contractors** may check on determinations and approvals issued by the DEP Commissioner pursuant to Section 24-163.3 of the Administrative Code, if any, at www.dep.nyc.gov or by contacting the **City Agency** letting this **Contract**.

5.4.2(e) The requirements of this Article 5.4.2 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.3 Best Available Technology

5.4.3(a) All **Contractors** shall utilize the best available technology for reducing the emission of pollutants for diesel-powered Nonroad Vehicles in the performance of this **Contract**. For determinations of best available technology for each type of diesel-powered Nonroad Vehicle, **Contractors** shall comply with the regulations of the **City** Department of Environmental Protection, as and when adopted, Chapter 14 of Title 15 of the Rules of the City of New York (RCNY). The **Contractor** shall fully document all steps in the best available technology selection process and shall furnish such documentation to the **City Agency** or the DEP Commissioner upon request. The **Contractor** shall retain all documentation generated in the best available technology selection process for as long as the selected best available technology is in use.

5.4.3(b) No **Contractor** shall be required to replace best available technology for reducing the emission of pollutants or other authorized technology utilized for a diesel-powered Nonroad Vehicle in accordance with the provisions of this Article 5.4.3 within three (3) years of having first utilized such technology for such vehicle.

5.4.3(c) This Article 5.4.3 shall not apply to any vehicle used to satisfy the requirements of a specific Public Works Contract for fewer than twenty (20) **Days**.

5.4.3(d) The **Contractor** shall not be required to comply with this Article 5.4.3 with respect to a diesel-powered Nonroad Vehicle under the following circumstances:

5.4.3(d)(i) Where the **City Agency** makes a written finding, which is approved, in writing, by the DEP Commissioner, that the best available technology for reducing the emission of pollutants as required by this Article 5.4.3 is unavailable for such vehicle, the **Contractor** shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.

5.4.3(d)(ii) Where the DEP Commissioner has issued a written waiver based upon the **Contractor** having demonstrated to the DEP Commissioner that the use of the best available technology for reducing the emission of pollutants might endanger the operator of such vehicle or those working near such vehicle, due to engine malfunction, the **Contractor** shall use whatever technology for

reducing the emission of pollutants, if any, is available and appropriate for such vehicle, which would not endanger the operator of such vehicle or those working near such vehicle.

5.4.3(d)(iii) In determining which technology to use for the purposes of Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above, the **Contractor** shall primarily consider the reduction in emissions of particulate matter and secondarily consider the reduction in emissions of nitrogen oxides associated with the use of such technology, which shall in no event result in an increase in the emissions of either such pollutant.

5.4.3(d)(iv) The **Contractor** shall submit requests for a finding or a waiver pursuant to this Article 5.4.3(d) in writing to the DEP Commissioner, with a copy to the **ACCO** of the **City Agency** letting this **Contract**. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(i) and 5.4.3(d)(ii) above shall expire after one hundred eighty (180) **Days**, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the **City Agency** renews the finding, in writing, and the DEP Commissioner approves such finding, in writing, or the DEP Commissioner renews the waiver, in writing.

5.4.3(e) The requirements of this Article 5.4.3 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

5.4.4 Section 24-163 of the Administrative Code. The **Contractor** shall comply with Section 24-163 of the Administrative Code related to the idling of the engines of motor vehicles while parking.

5.4.5 Compliance

5.4.5(a) The **Contractor's** compliance with Article 5.4 may be independently monitored. If it is determined that the **Contractor** has failed to comply with any provision of Article 5.4, any costs associated with any independent monitoring incurred by the **City** shall be reimbursed by the **Contractor**.

5.4.5(b) Any **Contractor** who violates any provision of Article 5.4, except as provided in Article 5.4.5(c) below, shall be liable for a civil penalty between the amounts of one thousand ($1,000) and ten thousand ($10,000) dollars, in addition to twice the amount of money saved by such **Contractor** for failure to comply with Article 5.4.

5.4.5(c) No **Contractor** shall make a false claim with respect to the provisions of Article 5.4 to a **City Agency**. Where a **Contractor** has been found to have done so, such **Contractor** shall be liable for a civil penalty of twenty thousand ($20,000) dollars, in addition to twice the amount of money saved by such **Contractor** in association with having made such false claim.

5.4.6 Reporting

5.4.6(a) For all Public Works Contracts covered by this Article 5.4, the **Contractor** shall report to the **City Agency** the following information:

5.4.6(a)(i) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;

5.4.6(a)(ii) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;

5.4.6(a)(iii) The number of such Nonroad Vehicles that utilized the best available technology for reducing the emission of pollutants, including a breakdown by vehicle model and the type of technology;

5.4.6(a)(iv) The number of such Nonroad Vehicles that utilized such other authorized technology in accordance with Article 5.4.3, including a breakdown by vehicle model and the type of technology used for each such vehicle;

5.4.6(a)(v) The locations where such Nonroad Vehicles were used; and

5.4.6(a)(vi) Where a determination is in effect pursuant to Article 5.4.2(b) or 5.4.2(c), detailed information concerning the **Contractor's** efforts to obtain Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million (30 ppm).

5.4.6(b) The **Contractor** shall submit the information required by Article 5.4.6(a) at the completion of **Work** under the Public Works Contract and on a yearly basis no later than August 1 throughout the term of the Public Works Contract. The yearly report shall cover **Work** performed during the preceding fiscal year (July 1 - June 30).

5.5 Ultra Low Sulfur Diesel Fuel. In accordance with the Coordinated Construction Act for Lower Manhattan, as amended:

5.5.1 Definitions. For purposes of this Article 5.5, the following definitions apply:

5.5.1(a) "Lower Manhattan" means the area to the south of and within the following lines: a line beginning at a point where the United States pierhead line in the Hudson River as it exists now or may be extended would intersect with the southerly line of West Houston Street in the Borough of Manhattan extended, thence easterly along the southerly side of West Houston Street to the southerly side of Houston Street, thence easterly along the southerly side of Houston Street to the southerly side of East Houston Street, thence northeasterly along the southerly side of East Houston Street to the point where it would intersect with the United States pierhead line in the East River as it exists now or may be extended, including tax lots within or immediately adjacent thereto.

5.5.1(b) "Lower Manhattan Redevelopment Project" means any project in Lower Manhattan that is funded in whole or in part with federal or State funding, or any project intended to improve transportation between Lower Manhattan and the two air terminals in the **City** known as LaGuardia Airport and John F. Kennedy International Airport, or between Lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.

5.5.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under Section 7411 or Section 7521 of Title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.5.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty (50) horsepower (HP) and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers, and similar equipment, except that this terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five (65) HP or less and that are not used in any construction program or project.

5.5.1(e) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million (15 ppm).

5.5.2 Requirements. **Contractors** and **Subcontractors** are required to use only Ultra Low Sulfur Diesel Fuel to power the diesel-powered Nonroad Vehicles with engine HP rating of fifty (50) HP and above used on a Lower Manhattan Redevelopment Project and, where practicable, to reduce the emission of pollutants by retrofitting such Nonroad Vehicles with oxidation catalysts, particulate filters, or technology that achieves lowest particulate matter emissions.

5.6 Pesticides. In accordance with Section 17-1209 of the Administrative Code, to the extent that the **Contractor** or any **Subcontractor** applies pesticides to any property owned or leased by the **City**, the **Contractor,** and any **Subcontractor** shall comply with Chapter 12 of the Administrative Code.

5.7 Waste Treatment, Storage, and Disposal Facilities and Transporters. In connection with the **Work**, the **Contractor** and any **Subcontractor** shall use only those waste treatment, storage, and disposal facilities and waste transporters that possess the requisite license, permit or other governmental approval necessary to treat, store, dispose, or transport the waste, materials or hazardous substances.

5.8 Environmentally Preferable Purchasing. The **Contractor** shall ensure that products purchased or leased by the **Contractor** or any **Subcontractor** for the **Work** that are not specified by the **City** or are submitted as equivalents to a product specified by the **City** comply with the requirements of the New York City Environmentally Preferable Purchasing Program contained in Chapter 11 of Title 43 of the RCNY, pursuant to Chapter 3 of Title 6 of the Administrative Code.

ARTICLE 6. INSPECTION

6.1 During the progress of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall at all times afford the representatives of the **City** every reasonable, safe, and proper facility for inspecting all **Work** done or being done at the **Site** and also for inspecting the manufacture or preparation of materials and equipment at the place of such manufacture or preparation.

6.2 The **Contractor's** obligation hereunder shall include the uncovering or taking down of finished **Work** and its restoration thereafter; provided, however, that the order to uncover, take down and restore shall be in writing, and further provided that if **Work** thus exposed proves satisfactory, and if the **Contractor** has complied with Article 6.1, such uncovering or taking down and restoration shall be

considered an item of **Extra Work** to be paid for in accordance with the provisions of Article 26. If the **Work** thus exposed proves unsatisfactory, the **City** has no obligation to compensate the **Contractor** for the uncovering, taking down or restoration.

6.3 Inspection and approval by the **Commissioner**, the **Engineer**, **Project Manager**, or **Resident Engineer**, of finished **Work** or of **Work** being performed, or of materials and equipment at the place of manufacture or preparation, shall not relieve the **Contractor** of its obligation to perform the **Work** in strict accordance with the **Contract**. Finished or unfinished **Work** not found to be in strict accordance with the **Contract** shall be replaced as directed by the **Engineer**, even though such **Work** may have been previously approved and paid for. Such corrective **Work** is **Contract Work** and shall not be deemed **Extra Work**.

6.4 Rejected **Work** and materials shall be promptly taken down and removed from the **Site**, which must at all times be kept in a reasonably clean and neat condition.

ARTICLE 7. PROTECTION OF WORK AND OF PERSONS AND PROPERTY; NOTICES AND INDEMNIFICATION

7.1 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall be under an absolute obligation to protect the finished and unfinished **Work** against any damage, loss, injury, theft and/or vandalism and in the event of such damage, loss, injury, theft and/or vandalism, it shall promptly replace and/or repair such **Work** at the **Contractor's** sole cost and expense, as directed by the **Resident Engineer**. The obligation to deliver finished **Work** in strict accordance with the **Contract** prior to **Final Acceptance** shall be absolute and shall not be affected by the **Resident Engineer's** approval of, or failure to prohibit, the **Means and Methods of Construction** used by the **Contractor**.

7.2 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall take all reasonable precautions to protect all persons and the property of the **City** and of others from damage, loss or injury resulting from the **Contractor's**, and/or its **Subcontractors'** operations under this **Contract.** The **Contractor's** obligation to protect shall include the duty to provide, place or replace, and adequately maintain at or about the **Site** suitable and sufficient protection such as lights, barricades, and enclosures.

7.3 The **Contractor** shall comply with the notification requirements set forth below in the event of any loss, damage or injury to **Work**, persons or property, or any accidents arising out of the operations of the **Contractor** and/or its **Subcontractors** under this **Contract**.

7.3.1 The **Contractor** shall make a full and complete report in writing to the **Resident Engineer** within three (3) **Days** after the occurrence.

7.3.2 The **Contractor** shall also send written notice of any such event to all insurance carriers that issued potentially responsive policies (including commercial general liability insurance carriers for events relating to the **Contractor**'s own employees) no later than twenty (20) days after such event and again no later than twenty (20) days after the initiation of any claim and/or action resulting therefrom. Such notice shall contain the following information: the number of the insurance policy, the name of the Named Insured, the date and location of the incident, and the identity of the persons injured or property damaged. For any policy on which the **City** and/or the **Engineer**, **Architect**, or **Project Manager** are Additional Insureds, such notice shall expressly specify that "this notice is

being given on behalf of the City of New York as Additional Insured, such other Additional Insureds, as well as the Named Insured."

7.3.2(a) Whenever such notice is sent under a policy on which the **City** is an Additional Insured, the **Contractor** shall provide copies of the notice to the **Comptroller,** the **Commissioner** and the **City** Corporation Counsel. The copy to the **Comptroller** shall be sent to the Insurance Unit, NYC Comptroller's Office, 1 Centre Street – Room 1222, New York, New York, 10007. The copy to the **Commissioner** shall be sent to the address set forth in Schedule A of the General Conditions. The copy to the **City** Corporation Counsel shall be sent to Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

7.3.2(b) If the **Contractor** fails to provide any of the foregoing notices to any appropriate insurance carrier(s) in a timely and complete manner, the **Contractor** shall indemnify the **City** for all losses, judgments, settlements, and expenses, including reasonable attorneys' fees, arising from an insurer's disclaimer of coverage citing late notice by or on behalf of the **City**.

7.4 To the fullest extent permitted by law, the **Contractor** shall defend, indemnify, and hold the **City**, its employees, and officials (the "Indemnitees") harmless against any and all claims (including but not limited to claims asserted by any employee of the **Contractor** and/or its **Subcontractors**) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract** or from the **Contractor's** and/or its **Subcontractors'** failure to comply with any of the provisions of this **Contract** or of the **Law**. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article 7.4 by way of cross-claim, third-party claim, declaratory action or otherwise. The parties expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of **Law** or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of **Law**, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

7.4.1 Indemnification under Article 7.4 or any other provision of the **Contract** shall operate whether or not **Contractor** or its **Subcontractors** have placed and maintained the insurance specified under Article 22.

7.5 The provisions of this Article 7 shall not be deemed to create any new right of action in favor of third parties against the **Contractor** or the **City**.

CHAPTER III: TIME PROVISIONS

ARTICLE 8. COMMENCEMENT AND PROSECUTION OF THE WORK

8.1 The **Contractor** shall commence the **Work** on the date specified in the **Notice to Proceed** or the **Order to Work**. The time for performance of the **Work** under the **Contract** shall be computed from

the date specified in the **Notice to Proceed** or the **Order to Work**. **TIME BEING OF THE ESSENCE** to the **City**, the **Contractor** shall thereafter prosecute the **Work** diligently, using such **Means and Methods of Construction** as are in accord with Article 4 herein and as will assure its completion not later than the date specified in this Contract, or on the date to which the time for completion may be extended.

ARTICLE 9. PROGRESS SCHEDULES

9.1 To enable the **Work** to be performed in an orderly and expeditious manner, the **Contractor**, within fifteen (15) **Days** after the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule based on the Critical Path Method in the form of a bar graph or in such other form as specified by the **Engineer**, and monthly cash flow requirements, showing:

9.1.1 The anticipated time of commencement and completion of each of the various operations to be performed under this **Contract**; and

9.1.2 The sequence and interrelation of each of these operations with the others and with those of other related contracts; and

9.1.3 The estimated time required for fabrication or delivery, or both, of all materials and equipment required for the **Work**, including the anticipated time for obtaining required approvals pursuant to Article 10; and

9.1.4 The estimated amount in dollars the **Contractor** will claim on a monthly basis.

9.2 The proposed schedule shall be revised as directed by the **Engineer**, until finally approved by the **Engineer**, and after such approval, subject to the provisions of Article 11, shall be strictly adhered to by the **Contractor**.

9.3 If the **Contractor** shall fail to adhere to the approved progress schedule, or to the schedule as revised pursuant to Article 11, it shall promptly adopt such other or additional **Means and Methods of Construction**, at its sole cost and expense, as will make up for the time lost and will assure completion in accordance with the approved progress schedule. The approval by the **City** of a progress schedule which is shorter than the time allotted under the **Contract** shall not create any liability for the **City** if the approved progress schedule is not met.

9.4 The **Contractor** will not receive any payments until the proposed progress schedule is submitted.

ARTICLE 10. REQUESTS FOR INFORMATION OR APPROVAL

10.1 From time to time as the **Work** progresses and in the sequence indicated by the approved progress schedule, the **Contractor** shall submit to the **Engineer** a specific request in writing for each item of information or approval required by the **Contractor**. These requests shall state the latest date upon which the information or approval is actually required by the **Contractor**, and shall be submitted in a reasonable time in advance thereof to provide the **Engineer** a sufficient time to act upon such submissions, or any necessary re-submissions thereof.

10.2 The **Contractor** shall not have any right to an extension of time on account of delays due to the **Contractor's** failure to submit requests for the required information or the required approval in accordance with the above requirements.

ARTICLE 11. NOTICE OF CONDITIONS CAUSING DELAY AND DOCUMENTATION OF DAMAGES CAUSED BY DELAY

11.1 After the commencement of any condition which is causing or may cause a delay in completion of the **Work**, including conditions for which the **Contractor** may be entitled to an extension of time, the following notifications and submittals are required:

11.1.1 Within fifteen (15) **Days** after the **Contractor** becomes aware or reasonably should be aware of each such condition, the **Contractor** must notify the **Resident Engineer** or **Engineer**, as directed by the **Commissioner**, in writing of the existence, nature and effect of such condition upon the approved progress schedule and the **Work**, and must state why and in what respects, if any, the condition is causing or may cause a delay. Such notice shall include a description of the construction activities that are or could be affected by the condition and may include any recommendations the **Contractor** may have to address the delay condition and any activities the **Contractor** may take to avoid or minimize the delay.

11.1.2 If the **Contractor** shall claim to be sustaining damages for delay as provided for in this Article 11,within forty-five (45) **Days** from the time such damages are first incurred for each such condition, the **Contractor** shall submit to the **Commissioner** a verified written statement of the details and estimates of the amounts of such damages, including categories of expected damages and projected monthly costs, together with documentary evidence of such damages as the **Contractor** may have at the time of submission ("statement of delay damages"), as further detailed in Article 11.6. The **Contractor** may submit the above statement within such additional time as may be granted by the **Commissioner** in writing upon written request therefor.

11.1.3 Articles 11.1.1 and 11.1.2 do not relieve the **Contractor** of its obligation to comply with the provisions of Article 44.

11.2 Failure of the **Contractor** to strictly comply with the requirements of Article 11.1.1 may, in the discretion of the **Commissioner**, be deemed sufficient cause to deny any extension of time on account of delay arising out of such condition. Failure of the **Contractor** to strictly comply with the requirements of both Articles 11.1.1 and 11.1.2 shall be deemed a conclusive waiver by the **Contractor** of any and all claims for damages for delay arising from such condition and no right to recover on such claims shall exist.

11.3 When appropriate and directed by the **Engineer**, the progress schedule shall be revised by the **Contractor** until finally approved by the **Engineer**. The revised progress schedule must be strictly adhered to by the **Contractor**.

11.4 Compensable Delays

11.4.1 The **Contractor** agrees to make claim only for additional costs attributable to delay in the performance of this **Contrac**t necessarily extending the time for completion of the **Work** or resulting from acceleration directed by the **Commissioner** and required to maintain the progress schedule, occasioned solely by any act or omission to act of the **City** listed below. The **Contractor** also agrees that delay from any other cause shall be

compensated, if at all, solely by an extension of time to complete the performance of the **Work**.

11.4.1.1 The failure of the **City** to take reasonable measures to coordinate and progress the **Work** to the extent required by the **Contract**, except that the City shall not be responsible for the **Contractor's** obligation to coordinate and progress the **Work** of its **Subcontractors**.

11.4.1.2 Unreasonable delays attributable to the review of shop drawings, the issuance of change orders, or the cumulative impact of change orders that were not brought about by any act or omission of the **Contractor**.

11.4.1.3 The unavailability of the **Site** caused by acts or omissions of the **City**..

11.4.1.4 The issuance by the **Engineer** of a stop work order that was not brought about through any act or omission of the **Contractor**.

11.4.1.5 Differing site conditions or environmental hazards that were neither known nor reasonably ascertainable on a pre-bid inspection of the **Site** or review of the bid documents or other publicly available sources, and that are not ordinarily encountered in the **Project**'s geographical area or neighborhood or in the type of **Work** to be performed.

11.4.1.6 Delays caused by the **City's** bad faith or its willful, malicious, or grossly negligent conduct;

11.4.1.7 Delays not contemplated by the parties;

11.4.1.8 Delays so unreasonable that they constitute an intentional abandonment of the **Contract** by the **City**; and

11.4.1.9 Delays resulting from the **City's** breach of a fundamental obligation of the **Contract**.

11.4.2 No claim may be made for any alleged delay in **Substantial Completion** of the **Work** if the **Work** will be or is substantially completed by the date of **Substantial Completion** provided for in Schedule A unless acceleration has been directed by the **Commissioner** to meet the date of **Substantial Completion** set forth in Schedule A, or unless there is a provision in the **Contract** providing for additional compensation for early completion.

11.4.3 The provisions of this Article 11 apply only to claims for additional costs attributable to delay and do not preclude determinations by the **Commissioner** allowing reimbursements for additional costs for **Extra Work** pursuant to Articles 25 and 26 of this **Contract**. To the extent that any cost attributable to delay is reimbursed as part of a change order, no additional claim for compensation under this Article 11 shall be allowed.

11.5 Non-Compensable Delays. The **Contractor** agrees to make no claim for, and is deemed to have included in its bid prices for the various items of the **Contract**, the extra/additional costs attributable to any delays caused by or attributable to the items set forth below. For such items, the **Contractor** shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**, in accordance with the provisions of Article 13. Such extensions of time will be granted, if at all, pursuant to the grounds set forth in Article 13.3.

11.5.1 The acts or omissions of any third parties, including but not limited to **Other Contractors**, public/ governmental bodies (other than **City Agencies**), utilities or private enterprises, who are disclosed in the **Contract Documents** or are ordinarily encountered or generally recognized as related to the **Work**;

11.5.2 Any situation which was within the contemplation of the parties at the time of entering into the **Contract**, including any delay indicated or disclosed in the **Contract Documents** or that would be generally recognized by a reasonably prudent contractor as related to the nature of the **Work**, and/or the existence of any facility or appurtenance owned, operated or maintained by any third party, as indicated or disclosed in the **Contract Documents** or ordinarily encountered or generally recognized as related to the nature of the **Work**;

11.5.3 Restraining orders, injunctions or judgments issued by a court which were caused by a Contractor's submission, action or inaction or by a Contractor's **Means and Methods of Construction**, or by third parties, unless such order, injunction or judgment was the result of an act or omission by the **City**;

11.5.4 Any labor boycott, strike, picketing, lockout or similar situation;

11.5.5 Any shortages of supplies or materials, or unavailability of equipment, required by the **Contract Work**;

11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes or acts of God, or acts of war or of the public enemy or terrorist acts, including the **City's** reasonable responses thereto; and

11.5.7 **Extra Work** which does not significantly affect the overall completion of the **Contract**, reasonable delays in the review or issuance of change orders or field orders and/or in shop drawing reviews or approvals.

11.6 Required Content of Submission of Statement of Delay Damages

11.6.1 In the verified written statement of delay damages required by Article 11.1.2, the following information shall be provided by the **Contractor**:

11.6.1.1 For each delay, the start and end dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, an explanation of how they were delayed, and the reasons for the delay, including identifying the applicable act or omission of the City listed in Article 11.4.

11.6.1.2 A detailed factual statement of the claim providing all necessary dates, locations and items of **Work** affected by the claim.

11.6.1.3 The estimated amount of additional compensation sought and a breakdown of that amount into categories as described in Article 11.7.

11.6.1.4 Any additional information requested by the **Commissioner**.

11.7 Recoverable Costs

11.7.1 Delay damages may be recoverable for the following costs actually and necessarily incurred in the performance of the **Work**:

11.7.1.1 Direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits, based on time and materials records;

11.7.1.2 Necessary materials (including transportation to the **Site**), based on time and material records;

11.7.1.3 Reasonable rental value of necessary plant and equipment other than small tools, plus fuel/energy costs according to the applicable formula set forth in Articles 26.2.4 and/or 26.2.8, based on time and material records;

11.7.1.4 Additional insurance and bond costs;

11.7.1.5 Extended **Site** overhead, field office rental, salaries of field office staff, on-site project managers and superintendents, field office staff vehicles, **Project-**specific storage, field office utilities and telephone, and field office consumables;

11.7.1.6 Labor escalation costs based on actual costs;

11.7.1.7 Materials and equipment escalation costs based on applicable industry indices unless documentation of actual increased cost is provided;

11.7.1.8 Additional material and equipment storage costs based on actual documented costs and additional costs necessitated by extended manufacturer warranty periods; and

11.7.1.9 Extended home office overhead calculated based on the following formula:

(1) Subtract from the original **Contract** amount the amount earned by original contractual **Substantial Completion** date (not including change orders);

(2) Remove 15% overhead and profit from the calculation in item (1) by dividing the results of item (1) by 1.15;

(3) Multiply the result of item (2) by 7.25% for the total home office overhead;

(4) Multiply the result of item (3) by 7.25% for the total profit; and

(5) The total extended home office overhead will be the total of items (3) and (4).

11.7.2 Recoverable Subcontractor Costs. When the **Work** is performed by a **Subcontractor**, the **Contractor** may be paid the actual and necessary costs of such subcontracted **Work** as outlined above in Articles 11.7.1.1 through 11.7.1.8, and an additional overhead of 5% of the costs outlined in Articles 11.7.1.1 through 11.7.1.3.

11.7.3 Non-Recoverable Costs. The parties agree that the **City** will have no liability for the following items and the **Contractor** agrees it shall make no claim for the following items:

11.7.3.1 Profit, or loss of anticipated or unanticipated profit, except as provided in Article 11.7.1.9;

11.7.3.2 Consequential damages, including, but not limited to, construction or bridge loans or interest paid on such loans, loss of bonding capacity, bidding opportunities, or interest in investment, or any resulting insolvency;

11.7.3.3 Indirect costs or expenses of any nature except those included in Article 11.7.1;

11.7.3.4 Direct or indirect costs attributable to performance of **Work** where the **Contractor**, because of situations or conditions within its control, has not progressed the **Work** in a satisfactory manner; and

11.7.3.5 Attorneys' fees and dispute and claims preparation expenses.

11.8 Any claims for delay under this Article 11 are not subject to the jurisdiction of the Contract Dispute Resolution Board pursuant to the dispute resolution process set forth in Article 27.

11.9 Any compensation provided to the **Contractor** in accordance with this Article 11 will be made pursuant to a claim filed with the **Comptroller**. Nothing in this Article 11 extends the time for the **Contractor** to file an action with respect to a claim within six months after **Substantial Completion** pursuant to Article 56.

ARTICLE 12. COORDINATION WITH OTHER CONTRACTORS

12.1 During the progress of the **Work**, **Other Contractors** may be engaged in performing other work or may be awarded other contracts for additional work on this **Project**. In that event, the **Contractor** shall coordinate the **Work** to be done hereunder with the work of such **Other Contractors** and the **Contractor** shall fully cooperate with such **Other Contractors** and carefully fit its own **Work** to that provided under other contracts as may be directed by the **Engineer**. The **Contractor** shall not commit or permit any act which will interfere with the performance of work by any **Other Contractors**.

12.2 If the **Engineer** determines that the **Contractor** is failing to coordinate its **Work** with the work of **Other Contractors** as the **Engineer** has directed, then the **Commissioner** shall have the right to withhold any payments otherwise due hereunder until the **Contractor** completely complies with the **Engineer's** directions.

12.3 The **Contractor** shall notify the **Engineer** in writing if any **Other Contractor** on this **Project** is failing to coordinate its work with the **Work** of this **Contract**. If the **Engineer** finds such charges to be true, the **Engineer** shall promptly issue such directions to the **Other Contractor** with respect thereto as the situation may require. The **City** shall not, however, be liable for any damages suffered by any **Other Contractor's** failure to coordinate its work with the **Work** of this **Contract** or by reason of the **Other Contractor's** failure to promptly comply with the directions so issued by the **Engineer**, or by reason of any **Other Contractor's** default in performance, it being understood that the **City** does not guarantee the responsibility or continued efficiency of any contractor. The **Contractor** agrees to make no claim against the **City** for any damages relating to or arising out of any directions issued by the **Engineer** pursuant to this Article 12 (including but not limited to the failure of any **Other Contractor** to comply or promptly comply with such directions), or the failure of any **Other Contractor** to coordinate its work, or the default in performance of any **Other Contractor**.

12.4 The **Contractor** shall indemnify and hold the **City** harmless from any and all claims or judgments for damages and from costs and expenses to which the **City** may be subjected or which it may suffer or incur by reason of the **Contractor's** failure to comply with the **Engineer's** directions promptly; and the **Comptroller** shall have the right to exercise the powers reserved in Article 23 with respect to any claims which may be made for damages due to the **Contractor's** failure to comply with the **Engineer's** directions promptly. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.5 Should the **Contractor** sustain any damage through any act or omission of any **Other Contractor** having a contract with the **City** for the performance of work upon the **Site** or of work which may be necessary to be performed for the proper prosecution of the **Work** to be performed hereunder, or through any act or omission of a subcontractor of such **Other Contractor**, the **Contractor** shall have no claim against the **City** for such damage, but shall have a right to recover such damage from the **Other**

Contractor under the provision similar to the following provisions which apply to this **Contract** and have been or will be inserted in the contracts with such **Other Contractors**:

12.5.1 Should any **Other Contractor** having or who shall hereafter have a contract with the **City** for the performance of work upon the **Site** sustain any damage through any act or omission of the **Contractor** hereunder or through any act or omission of any **Subcontractor** of the **Contractor**, the **Contractor** agrees to reimburse such **Other Contractor** for all such damages and to defend at its own expense any action based upon such claim and if any judgment or claim (even if the allegations of the action are without merit) against the **City** shall be allowed the **Contractor** shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and agrees to indemnify and hold the **City** harmless from all such claims. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.6 The **City's** right to indemnification hereunder shall in no way be diminished, waived or discharged by its recourse to assessment of liquidated damages as provided in Article 15, or by the exercise of any other remedy provided for by **Contract** or by **Law**.

ARTICLE 13. EXTENSION OF TIME FOR PERFORMANCE

13.1 If performance by the **Contractor** is delayed for a reason set forth in Article 13.3, the **Contractor** may be allowed a reasonable extension of time in conformance with this Article 13 and the **PPB** Rules.

13.2 Any extension of time may be granted only by the **ACCO** or by the Board for the Extension of Time (hereafter "Board") (as set forth below) upon written application by the **Contractor**.

13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

13.3.1 By the acts or omissions of the **City**, its officials, agents or employees; or

13.3.2 By the act or omissions of **Other Contractors** on this **Project**; or

13.3.3 By supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, excessive inclement weather, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes not brought about by any act or omission of the **Contractor**).

13.3.4 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **ACCO** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10.

13.4 The **Contractor** shall not be entitled to receive a separate extension of time for each of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the **Work** as determined by the **ACCO** or the Board, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the **Contractor** or of its **Subcontractors** or **Materialmen**, and would of itself (irrespective

of the concurrent causes) have delayed the **Work**, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.

13.5 The determination made by the **ACCO** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.

13.6 The **ACCO** or the Board acting entirely within their discretion may grant an application for an extension of time for causes of delay other than those herein referred.

13.7 Permitting the **Contractor** to continue with the **Work** after the time fixed for its completion has expired, or after the time to which such completion may have been extended has expired, or the making of any payment to the **Contractor** after such time, shall in no way operate as a waiver on the part of the **City** of any of its rights under this **Contract**.

13.8 Application for Extension of Time:

13.8.1 Before the **Contractor's** time extension request will be considered, the **Contractor** shall notify the **ACCO** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **ACCO** identifying:

13.8.1(a) The **Contractor**; the registration number; and **Project** description;

13.8.1(b) Liquidated damage assessment rate, as specified in the **Contract**;

13.8.1(c) Original total bid price;

13.8.1(d) The original **Contract** start date and completion date;

13.8.1(e) Any previous time extensions granted (number and duration); and

13.8.1(f) The extension of time requested.

13.8.2 In addition, the application for extension of time shall set forth in detail:

13.8.2(a) The nature of each alleged cause of delay in completing the **Work**;

13.8.2(b) The date upon which each such cause of delay began and ended and the number of **Days** attributable to each such cause;

13.8.2(c) A statement that the **Contractor** waives all claims except for those delineated in the application, and the particulars of any claims which the **Contractor** does not agree to waive. For time extensions for **Substantial Completion** and final completion payments, the application shall include a detailed statement of the dollar amounts of each element of claim item reserved; and

13.8.2(d) A statement indicating the **Contractor's** understanding that the time extension is granted only for purposes of permitting continuation of **Contract** performance and payment for **Work** performed and that the **City** retains its right to conduct an investigation and assess liquidated damages as appropriate in the future.

13.9 Analysis and Approval of Time Extensions:

13.9.1 For time extensions for partial payments, a written determination shall be made by the **ACCO** who may, for good and sufficient cause, extend the time for the performance of the **Contract** as follows:

13.9.1(a) If the **Work** is to be completed within six (6) months, the time for performance may be extended for sixty (60) **Days**;

13.9.1(b) If the **Work** is to be completed within less than one (1) year but more than six (6) months, an extension of ninety (90) **Days** may be granted;

13.9.1(c) If the **Contract** period exceeds one (1) year, besides the extension granted in Article 13.9.1(b), an additional thirty (30) **Days** may be granted for each multiple of six (6) months involved beyond the one (1) year period; or

13.9.1(d) If exceptional circumstances exist, the **ACCO** may extend the time for performance beyond the extensions in Articles 13.9.1(a), 13.9.1(b), and 13.9.1(c). In that event, the **ACCO** shall file with the Mayor's Office of Contract Services a written explanation of the exceptional circumstances.

13.9.2 For extensions of time for **Substantial Completion** and final completion payments, the **Engineer**, in consultation with the **ACCO**, shall prepare a written analysis of the delay (including a preliminary determination of the causes of delay, the beginning and end dates for each such cause of delay, and whether the delays are excusable under the terms of this **Contract**). The report shall be subject to review by and approval of the Board, which shall have authority to question its analysis and determinations and request additional facts or documentation. The report as reviewed and made final by the Board shall be made a part of the **Agency** contract file. Neither the report itself nor anything contained therein shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

13.9.3 Approval Mechanism for Time Extensions for **Substantial Completion** or Final Completion Payments: An extension shall be granted only with the approval of the Board which is comprised of the **ACCO** of the **Agency**, the **City** Corporation Counsel, and the **Comptroller**, or their authorized representatives.

13.9.4 Neither the granting of any application for an extension of time to the **Contractor** or any **Other Contractor** on this **Project** nor the papers, records or reports related to any application for or grant of an extension of time or determination related thereto shall be referred to or offered in evidence by the **Contractor** or its attorneys in any action or proceeding.

13.10 No Damage for Delay: The **Contractor** agrees to make no claim for damages for delay in the performance of this **Contract** occasioned by any act or omission to act of the **City** or any of its representatives, except as provided for in Article 11.

ARTICLE 14. COMPLETION AND FINAL ACCEPTANCE OF THE WORK

14.1 Date for **Substantial Completion**: The **Contractor** shall substantially complete the **Work** within the time fixed in Schedule A of the General Conditions, or within the time to which such **Substantial Completion** may be extended.

14.2 Determining the Date of **Substantial Completion**: The **Work** will be deemed to be substantially complete when the two conditions set forth below have been met.

14.2.1 Inspection: The **Engineer** or **Resident Engineer**, as applicable, has inspected the **Work** and has made a written determination that it is substantially complete.

14.2.2 Approval of **Final Approved Punch List** and Date for **Final Acceptance**: Following inspection of the **Work**, the **Engineer/Resident Engineer** shall furnish the **Contractor** with a final punch list, specifying all items of **Work** to be completed and proposing dates for the completion of each specified item of **Work**. The **Contractor** shall then submit in writing to the **Engineer/Resident Engineer** within ten (10) **Days** of the **Engineer/Resident Engineer** furnishing the final punch list either acceptance of the dates or proposed alternative dates for the completion of each specified item of **Work**. If the **Contractor** neither accepts the dates nor proposes alternative dates within ten (10) **Days**, the schedule proposed by the **Engineer/Resident Engineer** shall be deemed accepted. If the **Contractor** proposes alternative dates, then, within a reasonable time after receipt, the **Engineer/Resident Engineer**, in a written notification to the **Contractor**, shall approve the **Contractor's** completion dates or, if they are unable to agree, the **Engineer/Resident Engineer** shall establish dates for the completion of each item of **Work**. The latest completion date specified shall be the date for **Final Acceptance** of the **Work**.

14.3 Date of **Substantial Completion**. The date of approval of the **Final Approved Punch List**, shall be the date of **Substantial Completion**. The date of approval of the **Final Approved Punch List** shall be either (a) if the **Contractor** approves the final punch list and proposed dates for completion furnished by the **Engineer/Resident Engineer**, the date of the **Contractor**'s approval; or (b) if the **Contractor** neither accepts the dates nor proposes alternative dates, ten (10) **Days** after the **Engineer/Resident Engineer** furnishes the **Contractor** with a final punch list and proposed dates for completion; or (c) if the **Contractor** proposes alternative dates, the date that the **Engineer/Resident Engineer** sends written notification to the **Contractor** either approving the **Contractor**'s proposed alternative dates or establishing dates for the completion for each item of **Work**.

14.4 Determining the Date of **Final Acceptance**: The **Work** will be accepted as final and complete as of the date of the **Engineer**'s/**Resident Engineer**'s inspection if, upon such inspection, the **Engineer/Resident Engineer** finds that all items on the **Final Approved Punch List** are complete and no further **Work** remains to be done. The **Commissioner** will then issue a written determination of **Final Acceptance**.

14.5 Request for Inspection: Inspection of the **Work** by the **Engineer/Resident Engineer** for the purpose of **Substantial Completion** or **Final Acceptance** shall be made within fourteen (14) **Days** after receipt of the **Contractor's** written request therefor.

14.6 Request for Re-inspection: If upon inspection for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer/Resident Engineer** determines that there are items of **Work** still to be performed, the **Contractor** shall promptly perform them and then request a re-inspection. If upon re-inspection, the **Engineer/Resident Engineer** determines that the **Work** is substantially complete or finally accepted, the date of such re-inspection shall be the date of **Substantial Completion** or **Final Acceptance**. Re-inspection by the **Engineer/Resident Engineer** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.7 Initiation of Inspection by the **Engineer/Resident Engineer**: If the **Contractor** does not request inspection or re-inspection of the **Work** for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer/Resident Engineer** may initiate such inspection or re-inspection.

ARTICLE 15. LIQUIDATED DAMAGES

15.1 In the event the **Contractor** fails to substantially complete the **Work** within the time fixed for such **Substantial Completion** in Schedule A of the General Conditions, plus authorized time extensions, or if the **Contractor**, in the sole determination of the **Commissioner**, has abandoned the **Work**, the **Contractor** shall pay to the **City** the sum fixed in Schedule A of the General Conditions, for each and every **Day** that the time consumed in substantially completing the **Work** exceeds the time allowed therefor; which said sum, in view of the difficulty of accurately ascertaining the loss which the **City** will suffer by reason of delay in the **Substantial Completion** of the **Work** hereunder, is hereby fixed and agreed as the liquidated damages that the **City** will suffer by reason of such delay, and not as a penalty. This Article 15 shall also apply to the **Contractor** whether or not the **Contractor** is defaulted pursuant to Chapter X of this **Contract**. Neither the failure to assess liquidated damages nor the granting of any time extension shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

15.2 Liquidated damages received hereunder are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the **City's** right to indemnification, or the **Contractor's** obligation to indemnify the **City**, or to any other remedy provided for in this **Contract** or by **Law**.

15.3 The **Commissioner** may deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages; and in case the amount which may become due hereunder shall be less than the amount of liquidated damages suffered by the **City**, the **Contractor** shall be liable to pay the difference.

ARTICLE 16. OCCUPATION OR USE PRIOR TO COMPLETION

16.1 Unless otherwise provided for in the **Specifications**, the **Commissioner** may take over, use, occupy or operate any part of the **Work** at any time prior to **Final Acceptance**, upon written notification to the **Contractor**. The **Engineer** or **Resident Engineer**, as applicable, shall inspect the part of the **Work** to be taken over, used, occupied, or operated, and will furnish the **Contractor** with a written statement of the **Work**, if any, which remains to be performed on such part. The **Contractor** shall not object to, nor interfere with, the **Commissioner's** decision to exercise the rights granted by Article 16. In the event the **Commissioner** takes over, uses, occupies, or operates any part of the **Work:**

16.1.1 the **Engineer/Resident Engineer** shall issue a written determination of **Substantial Completion** with respect to such part of the **Work**;

16.1.2 the **Contractor** shall be relieved of its absolute obligation to protect such part of the unfinished **Work** in accordance with Article 7;

16.1.3 the **Contractor's** guarantee on such part of the **Work** shall begin on the date of such use by the **City**; and;

16.1.4 the **Contractor** shall be entitled to a return of so much of the amount retained in accordance with Article 21 as it relates to such part of the **Work**, except so much thereof as may be retained under Articles 24 and 44.

CHAPTER IV: SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 17. SUBCONTRACTS

17.1 The **Contractor** shall not make subcontracts totaling an amount more than the percentage of the total **Contract** price fixed in Schedule A of the General Conditions, without prior written permission from the **Commissioner**. All subcontracts made by the **Contractor** shall be in writing. No **Work** may be performed by a **Subcontractor** prior to the **Contractor** entering into a written subcontract with the **Subcontractor** and complying with the provisions of this Article 17.

17.2 Before making any subcontracts, the **Contractor** shall submit a written statement to the **Commissioner** giving the name and address of the proposed **Subcontractor**; the portion of the **Work** and materials which it is to perform and furnish; the cost of the subcontract; the VENDEX questionnaire if required; the proposed subcontract if requested by the **Commissioner**; and any other information tending to prove that the proposed **Subcontractor** has the necessary facilities, skill, integrity, past experience, and financial resources to perform the **Work** in accordance with the terms and conditions of this **Contract**.

17.3 In addition to the requirements in Article 17.2, **Contractor** is required to list the **Subcontractor** in the web based Subcontractor Reporting System through the City's Payee Information Portal (PIP), available at www.nyc.gov/pip.[1] For each **Subcontractor** listed, **Contractor** is required to provide the following information: maximum contract value, description of **Subcontractor's** Work, start and end date of the subcontract and identification of the **Subcontractor**'s industry. Thereafter, **Contractor** will be required to report in the system the payments made to each **Subcontractor** within 30 days of making the payment. If any of the required information changes throughout the Term of the **Contract**, **Contractor** will be required to revise the information in the system.

Failure of the **Contractor** to list a **Subcontractor** and/or to report **Subcontractor** payments in a timely fashion may result in the **Commissioner** declaring the **Contractor** in default of the **Contract** and will subject **Contractor** to liquidated damages in the amount of $100 per day for each day that the **Contractor** fails to identify a **Subcontractor** along with the required information about the **Subcontractor** and/or fails to report payments to a **Subcontractor**, beyond the time frames set forth herein or in the notice from the **City**. Article 15 shall govern the issue of liquidated damages.

17.4 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed sub-subcontract shall be submitted in the same manner as directed above.

17.5 The **Commissioner** will notify the **Contractor** in writing whether the proposed **Subcontractor** is approved. If the proposed **Subcontractor** is not approved, the **Contractor** may submit another proposed **Subcontractor** unless the **Contractor** decides to do the **Work**. No **Subcontractor** shall be permitted to enter or perform any work on the **Site** unless approved.

17.6 Before entering into any subcontract hereunder, the **Contractor** shall provide the proposed **Subcontractor** with a complete copy of this document and inform the proposed **Subcontractor** fully and completely of all provisions and requirements of this **Contract** relating either directly or indirectly to the **Work** to be performed and the materials to be furnished under such subcontract, and every such

[1] In order to use the new system, a PIP account will be required. Detailed instructions on creating a PIP account and using the new system are also available at www.nyc.gov/pip. Additional assistance with PIP may be obtained by emailing the Financial Information Services Agency Help Desk at pip@fisa.nyc.gov.

Subcontractor shall expressly stipulate that all labor performed and materials furnished by the **Subcontractor** shall strictly comply with the requirements of this **Contract**.

17.7 Documents given to a prospective **Subcontractor** for the purpose of soliciting the **Subcontractor's** bid shall include either a copy of the bid cover or a separate information sheet setting forth the **Project** name, the **Contract** number (if available), the **Agency** (as noted in Article 2.1.6), and the **Project's** location.

17.8 The **Commissioner's** approval of a **Subcontractor** shall not relieve the **Contractor** of any of its responsibilities, duties, and liabilities hereunder. The **Contractor** shall be solely responsible to the **City** for the acts or defaults of its **Subcontractor** and of such **Subcontractor's** officers, agents, and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the **Contractor** to the extent of its subcontract.

17.9 If the **Subcontractor** fails to maintain the necessary facilities, skill, integrity, past experience, and financial resources (other than due to the **Contractor's** failure to make payments where required) to perform the **Work** in accordance with the terms and conditions of this **Contract**, the **Contractor** shall promptly notify the **Commissioner** and replace such **Subcontractor** with a newly approved **Subcontractor** in accordance with this Article 17.

17.10 The **Contractor** shall be responsible for ensuring that all **Subcontractors** performing **Work** at the **Site** maintain all insurance required by **Law**.

17.11 The **Contractor** shall promptly, upon request, file with the **Engineer** a conformed copy of the subcontract and its cost. The subcontract shall provide the following:

17.11.1 Payment to **Subcontractors**: The agreement between the **Contractor** and its **Subcontractor** shall contain the same terms and conditions as to method of payment for **Work**, labor, and materials, and as to retained percentages, as are contained in this **Contract**.

17.11.2 Prevailing Rate of Wages: The agreement between the **Contractor** and its **Subcontractor** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.

17.11.3 Section 6-123 of the Administrative Code: Pursuant to the requirements of Section 6-123 of the Administrative Code, every agreement between the **Contractor** and a **Subcontractor** in excess of fifty thousand ($50,000) dollars shall include a provision that the **Subcontractor** shall not engage in any unlawful discriminatory practice as defined in Title VIII of the Administrative Code (Section 8-101 *et seq*.).

17.11.4 All requirements required pursuant to federal and/or state grant agreement(s), if applicable to the **Work**.

17.12 The **Commissioner** may deduct from the amounts certified under this **Contract** to be due to the **Contractor**, the sum or sums due and owing from the **Contractor** to the **Subcontractors** according to the terms of the said subcontracts, and in case of dispute between the **Contractor** and its **Subcontractor**, or **Subcontractors**, as to the amount due and owing, the **Commissioner** may deduct and withhold from the amounts certified under this **Contract** to be due to the **Contractor** such sum or sums as may be claimed by such **Subcontractor**, or **Subcontractors**, in a sworn affidavit, to be due and owing until such time as such claim or claims shall have been finally resolved.

17.13 On contracts where performance bonds and payment bonds are executed, the **Contractor** shall include on each requisition for payment the following data: **Subcontractor's** name, value of the subcontract, total amount previously paid to **Subcontractor** for **Work** previously requisitioned, and the amount, including retainage, to be paid to the **Subcontractor** for **Work** included in the requisition.

17.14 On **Contracts** where performance bonds and payment bonds are not executed, the **Contractor** shall include with each requisition for payment submitted hereunder, a signed statement from each and every **Subcontractor** and/or **Materialman** for whom payment is requested in such requisition. Such signed statement shall be on the letterhead of the **Subcontractor** and/or **Materialman** for whom payment is requested and shall (i) verify that such **Subcontractor** and/or **Materialman** has been paid in full for all **Work** performed and/or material supplied to date, exclusive of any amount retained and any amount included on the current requisition, and (ii) state the total amount of retainage to date, exclusive of any amount retained on the current requisition.

ARTICLE 18. ASSIGNMENTS

18.1 The **Contractor** shall not assign, transfer, convey or otherwise dispose of this **Contract**, or the right to execute it, or the right, title or interest in or to it or any part thereof, or assign, by power of attorney or otherwise any of the monies due or to become due under this **Contract**, unless the previous written consent of the **Commissioner** shall first be obtained thereto, and the giving of any such consent to a particular assignment shall not dispense with the necessity of such consent to any further or other assignments.

18.2 Such assignment, transfer, conveyance or other disposition of this **Contract** shall not be valid until filed in the office of the **Commissioner** and the **Comptroller**, with the written consent of the **Commissioner** endorsed thereon or attached thereto.

18.3 Failure to obtain the previous written consent of the **Commissioner** to such an assignment, transfer, conveyance or other disposition, may result in the revocation and annulment of this **Contract**. The **City** shall thereupon be relieved and discharged from any further liability to the **Contractor**, its assignees, transferees or sublessees, who shall forfeit and lose all monies therefor earned under the **Contract**, except so much as may be required to pay the **Contractor's** employees.

18.4 The provisions of this clause shall not hinder, prevent, or affect an assignment by the **Contractor** for the benefit of its creditors made pursuant to the **Laws** of the State of New York.

18.5 This **Contract** may be assigned by the **City** to any corporation, agency or instrumentality having authority to accept such assignment.

CHAPTER V: CONTRACTOR'S SECURITY AND GUARANTEE

ARTICLE 19. SECURITY DEPOSIT

19.1 If performance and payment bonds are required, the **City** shall retain the bid security to ensure that the successful bidder executes the **Contract** and furnishes the required payment and performance security within ten (10) **Days** after notice of the award of the **Contract**. If the successful bidder fails to execute the **Contract** and furnish the required payment and performance security, the **City** shall retain such bid security as set forth in the Information for Bidders. If the successful bidder executes the

Contract and furnishes the required payment and performance security, the **City** shall return the bid security within a reasonable time after the furnishing of such bonds and execution of the **Contract** by the **City**.

19.2 If performance and payment bonds are not required, the bid security shall be retained by the **City** as security for the **Contractor**'s faithful performance of the **Contract**. If partial payments are provided, the bid security will be returned to the **Contractor** after the sum retained under Article 21 equals the amount of the bid security, subject to other provisions of this **Contract**. If partial payments are not provided, the bid security will be released when final payment is certified by the **City** for payment.

19.3 If the **Contractor** is declared in default under Article 48 prior to the return of the deposit, or if any claim is made such as referred to in Article 23, the amount of such deposit, or so much thereof as the **Comptroller** may deem necessary, may be retained and then applied by the **Comptroller**:

19.3.1 To compensate the **City** for any expense, loss or damage suffered or incurred by reason of or resulting from such default, including the cost of re-letting and liquidated damages; or

19.3.2 To indemnify the **City** against any and all claims.

ARTICLE 20. PAYMENT GUARANTEE

20.1 On **Contracts** where one hundred (100%) percent performance bonds and payment bonds are executed, this Article 20 does not apply.

20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond or where the **Contract** does not require a payment bond for one hundred (100%) percent of the **Contract** price, the **City** shall, in accordance with the terms of this Article 20, guarantee payment of all lawful claims for:

20.2.1 Wages and compensation for labor performed and/or services rendered; and

20.2.2 Materials, equipment, and supplies provided, whether incorporated into the **Work** or not, when demands have been filed with the **City** as provided hereinafter by any person, firm, or corporation which furnished labor, material, equipment, supplies, or any combination thereof, in connection with the **Work** performed hereunder (hereinafter referred to as the "beneficiary") at the direction of the **City** or the **Contractor**.

20.3 The provisions of Article 20.2 are subject to the following limitations and conditions:

20.3.1 If the **Contractor** provides a payment bond for a value that is less than one hundred (100%) percent of the value of the **Contract Work**, the payment bond provided by the **Contractor** shall be primary (and non-contributing) to the payment guarantee provided under this Article 20.

20.3.2 The guarantee is made for the benefit of all beneficiaries as defined in Article 20.2 provided that those beneficiaries strictly adhere to the terms and conditions of Article 20.3.4 and 20.3.5.

20.3.3 Nothing in this Article 20 shall prevent a beneficiary providing labor, services or material for the **Work** from suing the **Contractor** for any amounts due and owing the beneficiary by the **Contractor**.

20.3.4 Every person who has furnished labor or material, to the **Contractor** or to a **Subcontractor** of the **Contractor**, in the prosecution of the **Work** and who has not been paid in full therefor before the expiration of a period of ninety (90) **Days** after the date on which the last of the labor was performed or material was furnished by him/her for which the claim is made, shall have the right to sue on this payment guarantee in his/her own name for the amount, or the balance thereof, unpaid at the time of commencement of the action; provided, however, that a person having a direct contractual relationship with a **Subcontractor** of the **Contractor** but no contractual relationship express or implied with the **Contractor** shall not have a right of action upon the guarantee unless he/she shall have given written notice to the **Contractor** within one hundred twenty (120) **Days** from the date on which the last of the labor was performed or the last of the material was furnished, for which his/her claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the material was furnished or for whom the labor was performed. The notice shall be served by delivering the same personally to the **Contractor** or by mailing the same by registered mail, postage prepaid, in an envelope addressed to the **Contractor** at any place where it maintains an office or conducts its business; provided, however, that where such notice is actually received by the **Contractor** by other means, such notice shall be deemed sufficient.

20.3.5 Except as provided in Labor Law Section 220-g, no action on this payment guarantee shall be commenced after the expiration of the one-year limitations period set forth in Section 137(4)(b) of the State Finance Law.

20.3.6 The **Contractor** shall promptly forward to the **City** any notice or demand received pursuant to Article 20.3.4. The **Contractor** shall inform the **City** of any defenses to the notice or demand and shall forward to the **City** any documents the **City** requests concerning the notice or demand.

20.3.7 All demands made against the **City** by a beneficiary of this payment guarantee shall be presented to the **Engineer** along with all written documentation concerning the demand which the **Engineer** deems reasonably appropriate or necessary, which may include, but shall not be limited to: the subcontract; any invoices presented to the **Contractor** for payment; the notarized statement of the beneficiary that the demand is due and payable, that a request for payment has been made of the **Contractor** and that the demand has not been paid by the **Contractor** within the time allowed for such payment by the subcontract; and copies of any correspondence between the beneficiary and the **Contractor** concerning such demand. The **City** shall notify the **Contractor** that a demand has been made. The **Contractor** shall inform the **City** of any defenses to the demand and shall forward to the **City** any documents the **City** requests concerning the demand.

20.3.8 The **City** shall make payment only if, after considering all defenses presented by the **Contractor**, it determines that the payment is due and owing to the beneficiary making the demand.

20.3.9 No beneficiary shall be entitled to interest from the **City**, or to any other costs, including, but not limited to, attorneys' fees, except to the extent required by State Finance Law Section 137.

20.4 Upon the receipt by the **City** of a demand pursuant to this Article 20, the **City** may withhold from any payment otherwise due and owing to the **Contractor** under this **Contract** an amount sufficient to satisfy the demand.

20.4.1 In the event the **City** determines that the demand is valid, the **City** shall notify the **Contractor** of such determination and the amount thereof and direct the **Contractor** to immediately pay such amount to the beneficiary. In the event the **Contractor**, within seven (7) **Days** of receipt of such notification from the **City**, fails to pay the beneficiary, such failure shall constitute an automatic and irrevocable assignment of payment by the **Contractor** to the beneficiary for the amount of the demand determined by the **City** to be valid. The **Contractor**, without further notification or other process, hereby gives its unconditional consent to such assignment of payment to the beneficiary and authorizes the **City**, on its behalf, to take all necessary actions to implement such assignment of payment, including without limitation the execution of any instrument or documentation necessary to effectuate such assignment.

20.4.2 In the event that the amount otherwise due and owing to the **Contractor** by the **City** is insufficient to satisfy such demand, the **City** may, at its option, require payment from the **Contractor** of an amount sufficient to cover such demand and exercise any other right to require or recover payment which the **City** may have under **Law** or **Contract**.

20.4.3 In the event the **City** determines that the demand is invalid, any amount withheld pending the **City**'s review of such demand shall be paid to the **Contractor**; provided, however, no lien has been filed. In the event a claim or an action has been filed, the terms and conditions set forth in Article 23 shall apply. In the event a lien has been filed, the parties will be governed by the provisions of the Lien Law of the State of New York.

20.5 The provisions of this Article 20 shall not prevent the **City** and the **Contractor** from resolving disputes in accordance with the **PPB** Rules, where applicable.

20.6 In the event the **City** determines that the beneficiary is entitled to payment pursuant to this Article 20, such determination and any defenses and counterclaims raised by the **Contractor** shall be taken into account in evaluating the **Contractor's** performance.

20.7 Nothing in this Article 20 shall relieve the **Contractor** of the obligation to pay the claims of all persons with valid and lawful claims against the **Contractor** relating to the **Work**.

20.8 The **Contractor** shall not require any performance, payment or other bonds of any **Subcontractor** if this **Contract** does not require such bonds of the **Contractor**.

20.9 The payment guarantee made pursuant to this Article 20 shall be construed in a manner consistent with Section 137 of the State Finance Law and shall afford to persons furnishing labor or materials to the **Contractor** or its **Subcontractors** in the prosecution of the **Work** under this **Contract** all of the rights and remedies afforded to such persons by such section, including but not limited to, the right to commence an action against the **City** on the payment guarantee provided by this Article 20 within the one-year limitations period set forth in Section 137(4)(b).

ARTICLE 21. RETAINED PERCENTAGE

21.1 If this **Contract** requires one hundred (100%) percent performance and payment security, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and

retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.2 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded does not exceed one million ($1,000,000) dollars, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.3 If this **Contract** does not require one hundred (100%) percent performance and payment security and if the price for which this **Contract** was awarded exceeds one million ($1,000,000) dollars, then as further security for the faithful performance of this **Contract,** the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, up to ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher. The percentage to be retained is set forth in Schedule A of the General Conditions.

ARTICLE 22. INSURANCE

22.1 Types of Insurance: The **Contractor** shall procure and maintain the following types of insurance if, and as indicated, in Schedule A of the General Conditions (with the minimum limits and special conditions specified in Schedule A). Such insurance shall be maintained from the date the **Contractor** is required to provide Proof of Insurance pursuant to Article 22.3.1 through the date of completion of all required **Work** (including punch list work as certified in writing by the **Resident Engineer**), except for insurance required pursuant to Article 22.1.4, which may terminate upon **Substantial Completion** of the **Contract**. All insurance shall meet the requirements set forth in this Article 22. Wherever this Article requires that insurance coverage be "at least as broad" as a specified form (including all ISO forms), there is no obligation that the form itself be used, provided that the **Contractor** can demonstrate that the alternative form or endorsement contained in its policy provides coverage at least as broad as the specified form.

22.1.1 Commercial General Liability Insurance: The **Contractor** shall provide Commercial General Liability Insurance covering claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this **Contract**. Coverage under this insurance shall be at least as broad as that provided by the latest edition of Insurance Services Office ("ISO") Form CG 0001. Such insurance shall be "occurrence" based rather than "claims-made" and include, without limitation, the following types of coverage: premises operations; products and completed operations; contractual liability (including the tort liability of another assumed in a contract); broad form property damage; independent contractors; explosion, collapse and underground (XCU); construction means and methods; and incidental malpractice. Such insurance shall contain a "per project" aggregate limit, as specified in Schedule A, that applies separately to operations under this **Contract**.

22.1.1(a) Such Commercial General Liability Insurance shall name the **City** as an Additional Insured. Coverage for the City shall specifically include the **City's** officials and employees, be at least as broad as the latest edition of ISO Form CG 20 10 and provide completed operations coverage at least as broad as the latest edition of ISO Form CG 20 37.

22.1.1(b) Such Commercial General Liability Insurance shall name all other entities designated as additional insureds in Schedule A but only for claims arising from the

Contractor's operations under this **Contract**, with coverage at least as broad as the latest edition of ISO Form CG 20 26.

22.1.1(c) If the **Work** requires a permit from the Department of Buildings pursuant to 1 RCNY Section 101-08, the **Contractor** shall provide Commercial General Liability Insurance with limits of at least those required by 1 RCNY section 101-08 or greater limits required by the Agency in accordance with Schedule A. If the **Work** does not require such a permit, the minimum limits shall be those provided for in Schedule A.

22.1.1(d) If any of the **Work** includes repair of a waterborne vessel owned by or to be delivered to the **City**, such Commercial General Liability shall include, or be endorsed to include, Ship Repairer's Legal Liability Coverage to protect against, without limitation, liability arising from navigation of such vessels prior to delivery to and acceptance by the **City**.

22.1.2 Workers' Compensation Insurance, Employers' Liability Insurance, and Disability Benefits Insurance: The **Contractor** shall provide, and shall cause its **Subcontractors** to provide, Workers Compensation Insurance, Employers' Liability Insurance, and Disability Benefits Insurance in accordance with the **Laws** of the State of New York on behalf of all employees providing services under this **Contract** (except for those employees, if any, for which the **Laws** require insurance only pursuant to Article 22.1.3).

22.1.3 United States Longshoremen's and Harbor Workers Act and/or Jones Act Insurance: If specified in Schedule A of the General Conditions or if required by **Law**, the **Contractor** shall provide insurance in accordance with the United States Longshoremen's and Harbor Workers Act and/or the Jones Act, on behalf of all qualifying employees providing services under this **Contract**.

22.1.4 Builders Risk Insurance: If specified in Schedule A of the General Conditions, the **Contractor** shall provide Builders Risk Insurance on a completed value form for the total value of the **Work** through **Substantial Completion** of the **Work** in its entirety. Such insurance shall be provided on an All Risk basis and include coverage, without limitation, for windstorm (including named windstorm), storm surge, flood and earth movement. Unless waived by the **Commissioner**, it shall include coverage for ordinance and law, demolition and increased costs of construction, debris removal, pollutant clean up and removal, and expediting costs. Such insurance shall cover, without limitation, (a) all buildings and/or structures involved in the **Work**, as well as temporary structures at the **Site**, and (b) any property that is intended to become a permanent part of such building or structure, whether such property is on the **Site**, in transit or in temporary storage. Policies shall name the **Contractor** as Named Insured and list the **City** as both an Additional Insured and a Loss Payee as its interest may appear.

22.1.4(a) Policies of such insurance shall specify that, in the event a loss occurs at an occupied facility, occupancy of such facility is permitted without the consent of the issuing insurance company.

22.1.4(b) Such insurance may be provided through an Installation Floater, at the **Contractor's** option, if it otherwise conforms with the requirements of this Article 22.1.4.

22.1.5 Commercial Automobile Liability Insurance: The **Contractor** shall provide Commercial Automobile Liability Insurance for liability arising out of ownership,

maintenance or use of any owned (if any), non-owned and hired vehicles to be used in connection with this **Contract**. Coverage shall be at least as broad as the latest edition of ISO Form CA0001. If vehicles are used for transporting hazardous materials, the Automobile Liability Insurance shall be endorsed to provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90.

22.1.6 Contractors Pollution Liability Insurance: If specified in Schedule A of the General Conditions, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Contractors Pollution Liability Insurance covering bodily injury and property damage. Such insurance shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants (including asbestos), including any loss, cost or expense incurred as a result of any cleanup of pollutants (including asbestos) or in the investigation, settlement or defense of any claim, action, or proceedings arising from the operations under this **Contract**. Such insurance shall be in the **Contractor's** name and list the **City** as an Additional Insured and any other entity specified in Schedule A. Coverage shall include, without limitation, (a) loss of use of damaged property or of property that has not been physically injured, (b) transportation, and (c) non-owned disposal sites.

22.1.6(a) Coverage for the **City** as Additional Insured shall specifically include the **City's** officials and employees and be at least as broad as provided to the **Contractor** for this **Project**.

22.1.6(b) If such insurance is written on a claims-made policy, such policy shall have a retroactive date on or before the effective date of this **Contract**, and continuous coverage shall be maintained, or an extended discovery period exercised, for a period of not less than three (3) years from the time the **Work** under this **Contract** is completed.

22.1.7 Marine Insurance:

22.1.7(a) Marine Protection and Indemnity Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such Work to maintain, Marine Protection and Indemnity Insurance with coverage at least as broad as Form SP-23. The insurance shall provide coverage for the **Contractor** or **Subcontractor** (whichever is doing this **Work**) and for the **City** (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured for bodily injury and property damage arising from marine operations under this **Contract**. Coverage shall include, without limitation, injury or death of crew members (if not fully provided through other insurance), removal of wreck, damage to piers, wharves and other fixed or floating objects and loss of or damage to any other vessel or craft, or to property on such other vessel or craft.

22.1.7(b) Hull and Machinery Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such **Work** to maintain, Hull and Machinery Insurance with coverage for the **Contractor** or **Subcontractor** (whichever is doing this Work) and for the **City** (together with its officials and employees) as Additional Insured at least as broad as the latest edition of American Institute Tug Form for all tugs used under this

Contract and Collision Liability at least as broad as the latest edition of American Institute Hull Clauses.

22.1.7(c) Marine Pollution Liability Insurance: If specified in Schedule A of the General Conditions or if the **Contractor** engages in marine operations in the execution of any part of the **Work**, the **Contractor** shall maintain, or cause the **Subcontractor** doing such Work to maintain, Marine Pollution Liability Insurance covering itself (or the Subcontractor doing such Work) as Named Insured and the **City** (together with its officials and employees) and any other entity specified in Schedule A as an Additional Insured. Coverage shall be at least as broad as that provided by the latest edition of Water Quality Insurance Syndicate Form and include, without limitation, liability arising from the discharge or substantial threat of a discharge of oil, or from the release or threatened release of a hazardous substance including injury to, or economic losses resulting from, the destruction of or damage to real property, personal property or natural resources.

22.1.8 The **Contractor** shall provide such other types of insurance, at such minimum limits and with such conditions, as are specified in Schedule A of the General Conditions.

22.2 General Requirements for Insurance Coverage and Policies:

22.2.1 All required insurance policies shall be maintained with companies that may lawfully issue the required policy and have an A.M. Best rating of at least A-/VII or a Standard and Poor's rating of at least A, unless prior written approval is obtained from the **City** Corporation Counsel.

22.2.2 The **Contractor** shall be solely responsible for the payment of all premiums for all required policies and all deductibles and self-insured retentions to which such policies are subject, whether or not the **City** is an insured under the policy.

22.2.3 In his/her sole discretion, the **Commissioner** may, subject to the approval of the **Comptroller** and the **City** Corporation Counsel, accept Letters of Credit and/or custodial accounts in lieu of required insurance.

22.2.4 The **City's** limits of coverage for all types of insurance required pursuant to Schedule A of the General Conditions shall be the greater of (i) the minimum limits set forth in Schedule A or (ii) the limits provided to the **Contractor** as Named Insured under all primary, excess, and umbrella policies of that type of coverage.

22.2.5 The **Contractor** may satisfy its insurance obligations under this Article 22 through primary policies or a combination of primary and excess/umbrella policies, so long as all policies provide the scope of coverage required herein.

22.2.6 Policies of insurance provided pursuant to this Article 22 shall be primary and non-contributing to any insurance or self-insurance maintained by the **City**.

22.3 Proof of Insurance:

22.3.1 For all types of insurance required by Article 22.1 and Schedule A, except for insurance required by Articles 22.1.4 and 22.1.7, the **Contractor** shall file proof of insurance in accordance with this Article 22.3 within ten (10) **Days** of award. For insurance

provided pursuant to Articles 22.1.4 and 22.1.7, proof shall be filed by a date specified by the **Commissioner** or ten (10) **Days** prior to the commencement of the portion of the **Work** covered by such policy, whichever is earlier.

22.3.2 For Workers' Compensation Insurance provided pursuant to Article 22.1.2, the **Contractor** shall submit one of the following forms: C-105.2 Certificate of Workers' Compensation Insurance; U-26.3 - State Insurance Fund Certificate of Workers' Compensation Insurance; Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the **Commissioner**. For Disability Benefits Insurance provided pursuant to Article 22.1.2, the Contractor shall submit DB-120.1 - Certificate Of Insurance Coverage Under The NYS Disability Benefits Law, Request for WC/DB Exemption (Form CE-200); equivalent or successor forms used by the New York State Workers' Compensation Board; or other proof of insurance in a form acceptable to the **Commissioner**. ACORD forms are not acceptable.

22.3.3 For policies provided pursuant to all of Article 22.1 other than Article 22.1.2, the **Contractor** shall submit one or more Certificates of Insurance on forms acceptable to the **Commissioner**. All such Certificates of Insurance shall certify (a) the issuance and effectiveness of such policies of insurance, each with the specified minimum limits (b) for insurance secured pursuant to Article 22.1.1 that the **City** and any other entity specified in Schedule A is an Additional Insured thereunder; (c) in the event insurance is required pursuant to Article 22.1.6 and/or Article 22.1.7, that the City is an Additional Insured thereunder; (d) the company code issued to the insurance company by the National Association of Insurance Commissioners (the NAIC number); and (e) the number assigned to the **Contract** by the **City**. All such Certificates of Insurance shall be accompanied by either a duly executed "Certification by Insurance Broker or Agent" in the form contained in Part III of Schedule A or copies of all policies referenced in such Certificate of Insurance as certified by an authorized representative of the issuing insurance carrier. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

22.3.4 Documentation confirming renewals of insurance shall be submitted to the **Commissione**r prior to the expiration date of coverage of policies required under this **Contract**. Such proofs of insurance shall comply with the requirements of Articles 22.3.2 and 22.3.3.

22.3.5 The **Contractor** shall be obligated to provide the **City** with a copy of any policy of insurance provided pursuant to this Article 22 upon the demand for such policy by the **Commissioner** or the **City** Corporation Counsel.

22.4 Operations of the **Contractor**:

22.4.1 The **Contractor** shall not commence the **Work** unless and until all required certificates have been submitted to and accepted by the **Commissioner**. Acceptance by the **Commissioner** of a certificate does not excuse the **Contractor** from securing insurance consistent with all provisions of this Article 22 or of any liability arising from its failure to do so.

22.4.2 The **Contractor** shall be responsible for providing continuous insurance coverage in the manner, form, and limits required by this **Contract** and shall be authorized to perform **Work** only during the effective period of all required coverage.

22.4.3 In the event that any of the required insurance policies lapse, are revoked, suspended or otherwise terminated, for whatever cause, the **Contractor** shall immediately stop all **Work**, and shall not recommence **Work** until authorized in writing to do so by the **Commissioner**. Upon quitting the **Site**, except as otherwise directed by the **Commissioner**, the **Contractor** shall leave all plant, materials, equipment, tools, and supplies on the **Site**. **Contract** time shall continue to run during such periods and no extensions of time will be granted. The **Commissioner** may also declare the **Contractor** in default for failure to maintain required insurance.

22.4.4 In the event the **Contractor** receives notice, from an insurance company or other person, that any insurance policy required under this Article 22 shall be cancelled or terminated (or has been cancelled or terminated) for any reason, the **Contractor** shall immediately forward a copy of such notice to both the **Commissioner** and the New York City Comptroller, attn: Office of Contract Administration, Municipal Building, One Centre Street, room 1005, New York, New York 10007. Notwithstanding the foregoing, the **Contractor** shall ensure that there is no interruption in any of the insurance coverage required under this Article 22.

22.4.5 Where notice of loss, damage, occurrence, accident, claim or suit is required under an insurance policy maintained in accordance with this Article 22, the **Contractor** shall notify in writing all insurance carriers that issued potentially responsive policies of any such event relating to any operations under this **Contract** (including notice to Commercial General Liability insurance carriers for events relating to the **Contractor**'s own employees) no later than 20 days after such event. For any policy where the **City** is an Additional Insured, such notice shall expressly specify that "this notice is being given on behalf of the City of New York as Insured as well as the Named Insured." Such notice shall also contain the following information: the number of the insurance policy, the name of the named insured, the date and location of the damage, occurrence, or accident, and the identity of the persons or things injured, damaged or lost. The **Contractor** shall simultaneously send a copy of such notice to the City of New York c/o Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007.

22.4.6 In the event of any loss, accident, claim, action, or other event that does or can give rise to a claim under any insurance policy required under this Article 22, the **Contractor** shall at all times fully cooperate with the **City** with regard to such potential or actual claim.

22.5 **Subcontractor** Insurance: In the event the **Contractor** requires any **Subcontractor** to procure insurance with regard to any operations under this **Contract** and requires such **Subcontractor** to name the **Contractor** as an **Additional Insured** thereunder, the **Contractor** shall ensure that the **Subcontractor** name the **City**, including its officials and employees, as an Additional Insured with coverage at least as broad as the most recent edition of ISO Form CG 20 26.

22.6 Wherever reference is made in Article 7 or this Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth in Schedule A of the General Conditions. In the event no address is set forth in Schedule A, such documents are to be sent to the **Commissioner's** address as provided elsewhere in this **Contract**.

22.7 Apart from damages or losses covered by insurance provided pursuant to Articles 22.1.2, 22.1.3, or 22.1.5, the **Contractor** waives all rights against the **City**, including its officials and employees, for any damages or losses that are covered under any insurance required under this Article 22 (whether or

not such insurance is actually procured or claims are paid thereunder) or any other insurance applicable to the operations of the **Contractor** and/or its employees, agents, or **Subcontractors**.

22.8 In the event the **Contractor** utilizes a self-insurance program to satisfy any of the requirements of this Article 22, the **Contractor** shall ensure that any such self-insurance program provides the **City** with all rights that would be provided by traditional insurance under this Article 22, including but not limited to the defense and indemnification obligations that insurers are required to undertake in liability policies.

22.9 Materiality/Non-Waiver: The **Contractor's** failure to secure policies in complete conformity with this Article 22, or to give an insurance company timely notice of any sort required in this **Contract** or to do anything else required by this Article 22 shall constitute a material breach of this **Contract**. Such breach shall not be waived or otherwise excused by any action or inaction by the **City** at any time.

22.10 Pursuant to General Municipal Law Section 108, this **Contract** shall be void and of no effect unless **Contractor** maintains Workers' Compensation Insurance for the term of this **Contract** to the extent required and in compliance with the New York State Workers' Compensation Law.

22.11 Other Remedies: Insurance coverage provided pursuant to this Article 22 or otherwise shall not relieve the **Contractor** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions available to it under any other provisions of this **Contract** or **Law**.

ARTICLE 23. MONEY RETAINED AGAINST CLAIMS

23.1 If any claim shall be made by any person or entity (including **Other Contractors** with the **City** on this **Project**) against the **City** or against the **Contractor** and the **City** for any of the following:

(a) An alleged loss, damage, injury, theft or vandalism of any of the kinds referred to in Articles 7 and 12, plus the reasonable costs of defending the **City**, which in the opinion of the **Comptroller** may not be paid by an insurance company (for any reason whatsoever); or

(b) An infringement of copyrights, patents or use of patented articles, tools, etc., as referred to in Article 57; or

(c) Damage claimed to have been caused directly or indirectly by the failure of the **Contractor** to perform the **Work** in strict accordance with this **Contract,**

the amount of such claim, or so much thereof as the **Comptroller** may deem necessary, may be withheld by the **Comptroller**, as security against such claim, from any money due hereunder. The **Comptroller**, in his/her discretion, may permit the **Contractor** to substitute other satisfactory security in lieu of the monies so withheld.

23.2 If an action on such claim is timely commenced and the liability of the **City**, or the **Contractor**, or both, shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the **Contractor** to be valid, the **Comptroller** shall pay such judgment or admitted claim out of the monies retained by the **Comptroller** under the provisions of this Article 23, and return the balance, if any, without interest, to the **Contractor**.

ARTICLE 24. MAINTENANCE AND GUARANTY

24.1 The **Contractor** shall promptly repair, replace, restore or rebuild, as the **Commissioner** may determine, any finished **Work** in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of **Substantial Completion** (or use and occupancy in accordance with Article 16), except where other periods of maintenance and guaranty are provided for in Schedule A.

24.2 As security for the faithful performance of its obligations hereunder, the **Contractor**, upon filing its requisition for payment on **Substantial Completion**, shall deposit with the **Commissioner** a sum equal to one (1%) percent of the price (or the amount fixed in Schedule A of the General Conditions) in cash or certified check upon a state or national bank and trust company or a check of such bank and trust company signed by a duly authorized officer thereof and drawn to the order of the **Comptroller**, or obligations of the **City**, which the **Comptroller** may approve as of equal value with the sum so required.

24.3 In lieu of the above, the **Contractor** may make such security payment to the **City** by authorizing the **Commissioner** in writing to deduct the amount from the **Substantial Completion** payment which shall be deemed the deposit required above.

24.4 If the **Contractor** has faithfully performed all of its obligations hereunder the **Commissioner** shall so certify to the **Comptroller** within five (5) **Days** after the expiration of one (1) year from the date of **Substantial Completion** and acceptance of the **Work** or within thirty (30) **Days** after the expiration of the guarantee period fixed in the **Specifications**. The security payment shall be repaid to the **Contractor** without interest within thirty (30) **Days** after certification by the **Commissioner** to the **Comptroller** that the **Contractor** has faithfully performed all of its obligations hereunder.

24.5 Notice by the **Commissioner** to the **Contractor** to repair, replace, rebuild or restore such defective or damaged **Work** shall be timely, pursuant to this article, if given not later than ten (10) **Days** subsequent to the expiration of the one (1) year period or other periods provided for herein.

24.6 If the **Contractor** shall fail to repair, replace, rebuild or restore such defective or damaged **Work** promptly after receiving such notice, the **Commissioner** shall have the right to have the **Work** done by others in the same manner as provided for in the completion of a defaulted **Contract**, under Article 51.

24.7 If the security payment so deposited is insufficient to cover the cost of such **Work**, the **Contractor** shall be liable to pay such deficiency on demand by the **Commissioner**.

24.8 The **Engineer's** certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective **Work** when performed by one other than the **Contractor**, shall be binding and conclusive upon the **Contractor** as to the amount thereof.

24.9 The **Contractor** shall obtain all manufacturers' warranties and guaranties of all equipment and materials required by this **Contract** in the name of the **City** and shall deliver same to the **Commissioner**. All of the **City's** rights and title and interest in and to said manufacturers' warranties and guaranties may be assigned by the **City** to any subsequent purchasers of such equipment and materials or lessees of the premises into which the equipment and materials have been installed.

CHAPTER VI: CHANGES, EXTRA WORK, AND DOCUMENTATION OF CLAIM

ARTICLE 25. CHANGES

25.1 Changes may be made to this **Contract** only as duly authorized in writing by the **Commissioner** in accordance with the **Law** and this **Contract**. All such changes, modifications, and amendments will become a part of the **Contract**. **Work** so ordered shall be performed by the **Contractor**.

25.2 **Contract** changes will be made only for **Work** necessary to complete the **Work** included in the original scope of the **Contract** and/or for non-material changes to the scope of the **Contract**. Changes are not permitted for any material alteration in the scope of **Work** in the **Contract**.

25.3 The **Contractor** shall be entitled to a price adjustment for **Extra Work** performed pursuant to a written change order. Adjustments to price shall be computed in one or more of the following ways:

25.3.1 By applicable unit prices specified in the **Contract**; and/or

25.3.2 By agreement of a fixed price; and/or

25.3.3 By time and material records; and/or

25.3.4 In any other manner approved by the **CCPO**.

25.4 All payments for change orders are subject to pre-audit by the **Engineering Audit Officer** and may be post-audited by the **Comptroller** and/or the **Agency**.

ARTICLE 26. METHODS OF PAYMENT FOR OVERRUNS AND EXTRA WORK

26.1 Overrun of Unit Price Item: An overrun is any quantity of a unit price item which the **Contractor** is directed to provide which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule.

26.1.1For any unit price item, the **Contractor** will be paid at the unit price bid for any quantity up to one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule. If during the progress of the **Work**, the actual quantity of any unit price item required to complete the **Work** approaches the estimated quantity for that item, and for any reason it appears that the actual quantity of any unit price item necessary to complete the **Work** will exceed the estimated quantity for that item by twenty-five (25%) percent, the **Contractor** shall immediately notify the **Engineer** of such anticipated overrun. The **Contractor** shall not be compensated for any quantity of a unit price item provided which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule without written authorization from the **Engineer**.

26.1.2 If the actual quantity of any unit price item necessary to complete the **Work** will exceed one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule, the **City** reserves the right and the **Contractor** agrees to negotiate a new unit price for such item. In no event shall such negotiated new unit price exceed the unit bid price. If the **City** and **Contractor** cannot agree on a new unit price, then the **City** shall order the **Contractor** and the **Contractor** agrees to provide additional quantities of

the item on the basis of time and material records for the actual and reasonable cost as determined under Article 26.2, but in no event at a unit price exceeding the unit price bid.

26.2 **Extra Work:** For **Extra Work** where payment is by agreement on a fixed price in accordance with Article 25.3.2, the price to be paid for such **Extra Work** shall be based on the fair and reasonable estimated cost of the items set forth below. For **Extra Work** where payment is based on time and material records in accordance with Article 25.3.3, the price to be paid for such **Extra Work** shall be the actual and reasonable cost of the items set forth below, calculated in accordance with the formula specified therein, if any.

26.2.1 Necessary materials (including transportation to the **Site**); plus

26.2.2 Necessary direct labor, including payroll taxes (subject to statutory wage caps) and supplemental benefits; plus

26.2.3 Sales and personal property taxes, if any, required to be paid on materials not incorporated into such **Extra Work**; plus

26.2.4 Reasonable rental value of **Contractor**-owned (or **Subcontractor**-owned, as applicable), necessary plant and equipment other than **Small Tools**, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per operating hour: (.035) x (HP rating) x (Fuel cost/gallon). Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by Equipment Watch (the "Green Book"), or seventy-five percent of the monthly prorated rental rates established in the "Rental Rate Blue Book for Construction Equipment" published by Equipment Watch (the "Blue Book") (the applicable Blue Book rate being for rental only without the addition of any operational costs listed in the Blue Book). The reasonable rental value is deemed to be inclusive of all operating costs except for fuel/energy consumption and equipment operator's wages/costs. For multiple shift utilization, reimbursement shall be calculated as follows: first shift shall be seventy-five (75%) percent of such rental rates; second shift shall be sixty (60%) percent of the first shift rate; and third shift shall be forty (40%) percent of the first shift rate. Equipment on standby shall be reimbursed at one-third (1/3) the prorated monthly rental rate. **Contractor**-owned (or **Subcontractor**-owned, as applicable) equipment includes equipment from rental companies affiliated with or controlled by the **Contractor** (or **Subcontractor**, as applicable)**,** as determined by the **Commissioner**. In establishing cost reimbursement for non-operating **Contractor**-owned (or **Subcontractor**-owned, as applicable) equipment (scaffolding, sheeting systems, road plates, etc.), the **City** may restrict reimbursement to a purchase-salvage/life cycle basis if less than the computed rental costs; plus

26.2.5 Necessary installation and dismantling of such plant and equipment, including transportation to and from the **Site**, if any, provided that, in the case of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) equipment rented from a third party, the cost of installation and dismantling are not allowable if such costs are included in the rental rate; plus

26.2.6 Necessary fees charged by governmental entities; plus

26.2.7 Necessary construction-related service fees charged by non-governmental entities, such as landfill tipping fees; plus

26.2.8 Reasonable rental costs of non-**Contractor**-owned (or non-**Subcontractor**-owned, as applicable) necessary plant and equipment other than **Small Tools**, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per hour of operation: (.035) x (HP rating) x (Fuel cost/gallon). In lieu of renting, the **City** reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus

26.2.9 Workers' Compensation Insurance, and any insurance coverage expressly required by the **City** for the performance of the **Extra Work** which is different than the types of insurance required by Article 22 and Schedule A of the General Conditions. The cost of Workers' Compensation Insurance is subject to applicable payroll limitation caps and shall be based upon the carrier's Manual Rate for such insurance derived from the applicable class Loss Cost ("LC") and carrier's Lost Cost Multiplier ("LCM") approved by the New York State Department of Financial Services, and with the exception of experience rating, rate modifiers as promulgated by the New York Compensation Insurance Rating Board ("NYCIRB"); plus

26.2.10 Additional costs incurred as a result of the **Extra Work** for performance and payment bonds; plus

26.2.11 Twelve percent (12%) percent of the total of items in Articles 26.2.1 through 26.2.5 as compensation for overhead, except that no percentage for overhead will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes. Overhead shall include without limitation, all costs and expenses in connection with administration, management superintendence, small tools, and insurance required by Schedule A of the General Conditions other than Workers' Compensation Insurance; plus

26.2.12 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus the items in Article 26.2.11, as compensation for profit, except that no percentage for profit will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes; plus

26.2.13 Five (5%) percent of the total of items in Articles 26.2.6 through 26.2.10 as compensation for overhead and profit.

26.3 Where the **Extra Work** is performed in whole or in part by other than the **Contractor's** own forces pursuant to Article 26.2, the **Contractor** shall be paid, subject to pre-audit by the **Engineering Audit Officer**, the cost of such **Work** computed in accordance with Article 26.2 above, plus an additional allowance of five (5%) percent to cover the **Contractor's** overhead and profit.

26.4 Where a change is ordered, involving both **Extra Work** and omitted or reduced **Contract Work,** the **Contract** price shall be adjusted, subject to pre-audit by the **EAO**, in an amount based on the difference between the cost of such **Extra Work** and of the omitted or reduced **Work**.

26.5 Where the **Contractor** and the **Commissioner** can agree upon a fixed price for **Extra Work** in accordance with Article 25.3.2 or another method of payment for **Extra Work** in accordance with

Article 25.3.4, or for **Extra Work** ordered in connection with omitted **Work**, such method, subject to pre-audit by the **EAO**, may, at the option of the **Commissioner**, be substituted for the cost plus a percentage method provided in Article 26.2; provided, however, that if the **Extra Work** is performed by a **Subcontractor**, the **Contractor** shall not be entitled to receive more than an additional allowance of five (5%) percent for overhead and profit over the cost of such **Subcontractor's Work** as computed in accordance with Article 26.2.

ARTICLE 27. RESOLUTION OF DISPUTES

27.1 All disputes between the **City** and the **Contractor** of the kind delineated in this Article 27.1 that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this Article 27 and the **PPB** Rules. This procedure for resolving all disputes of the kind delineated herein shall be the exclusive means of resolving any such disputes.

27.1.1 This Article 27 shall not apply to disputes concerning matters dealt with in other sections of the **PPB** Rules, or to disputes involving patents, copyrights, trademarks, or trade secrets (as interpreted by the courts of New York State) relating to proprietary rights in computer software.

27.1.2 This Article 27 shall apply only to disputes about the scope of **Work** delineated by the **Contract**, the interpretation of **Contract** documents, the amount to be paid for **Extra Work** or disputed work performed in connection with the **Contract**, the conformity of the **Contractor's Work** to the **Contract**, and the acceptability and quality of the **Contractor's Work**; such disputes arise when the **Engineer**, **Resident Engineer**, **Engineering Audit Officer**, or other designee of the **Commissioner** makes a determination with which the **Contractor** disagrees.

27.2 All determinations required by this Article 27 shall be made in writing clearly stated, with a reasoned explanation for the determination based on the information and evidence presented to the party making the determination. Failure to make such determination within the time required by this Article 27 shall be deemed a non-determination without prejudice that will allow application to the next level.

27.3 During such time as any dispute is being presented, heard, and considered pursuant to this Article 27, the **Contract** terms shall remain in force and the **Contractor** shall continue to perform **Work** as directed by the **ACCO** or the **Engineer**. Failure of the **Contractor** to continue **Work** as directed shall constitute a waiver by the **Contractor** of its claim.

27.4 Presentation of Disputes to **Commissioner**.

Notice of Dispute and Agency Response. The **Contractor** shall present its dispute in writing ("Notice of Dispute") to the **Commissioner** within thirty (30) Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the **Contract**. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the **Contractor** relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the **Contractor** in the dispute was arrived at. Within thirty (30) Days after receipt of the detailed written submission comprising the complete Notice of Dispute, the **Engineer**, **Resident Engineer**, **Engineering Audit Officer**, or other designee of the **Commissioner** shall submit to the **Commissioner** all materials he or she deems pertinent to the dispute. Following initial submissions to the **Commissioner**, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise

protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the **Commissioner** whose decision shall be final. Willful failure of the **Contractor** to produce any requested material whose relevancy the **Contractor** has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the **Contractor** of its claim.

27.4.1 **Commissioner** Inquiry. The **Commissioner** shall examine the material and may, in his or her discretion, convene an informal conference with the **Contractor**, the **ACCO**, and the **Engineer**, **Resident Engineer**, **Engineering Audit Officer**, or other designee of the **Commissioner** to resolve the issue by mutual consent prior to reaching a determination. The **Commissioner** may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The **Commissioner's** ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the dispute presented, whether or not the **Commissioner** participated therein. The **Commissioner** may or, at the request of any party to the dispute, shall compel the participation of any **Other Contractor** with a contract related to the **Work** of this **Contract**, and that **Contractor** shall be bound by the decision of the **Commissioner**. Any **Other Contractor** thus brought into the dispute resolution proceeding shall have the same rights and obligations under this Article 27 as the **Contractor** initiating the dispute.

27.4.2 **Commissioner** Determination. Within thirty (30) **Days** after the receipt of all materials and information, or such longer time as may be agreed to by the parties, the **Commissioner** shall make his or her determination and shall deliver or send a copy of such determination to the **Contractor**, the **ACCO,** and **Engineer**, **Resident Engineer**, **Engineering Audit Officer**, or other designee of the **Commissioner**, as applicable, together with a statement concerning how the decision may be appealed.

27.4.3 Finality of **Commissioner's** Decision. The **Commissioner's** decision shall be final and binding on all parties, unless presented to the Contract Dispute Resolution Board pursuant to this Article 27. The **City** may not take a petition to the Contract Dispute Resolution Board. However, should the **Contractor** take such a petition, the **City** may seek, and the Contract Dispute Resolution Board may render, a determination less favorable to the **Contractor** and more favorable to the **City** than the decision of the **Commissioner**.

27.5 Presentation of Dispute to the **Comptroller**. Before any dispute may be brought by the **Contractor** to the Contract Dispute Resolution Board, the **Contractor** must first present its claim to the **Comptroller** for his or her review, investigation, and possible adjustment.

27.5.1 Time, Form, and Content of Notice. Within thirty (30) **Days** of its receipt of a decision by the **Commissioner,** the **Contractor** shall submit to the **Comptroller** and to the **Commissioner** a Notice of Claim regarding its dispute with the **Agency**. The Notice of Claim shall consist of (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written decision of the **Commissioner**; and (iii) a copy of all materials submitted by the **Contractor** to the **Agency**, including the Notice of Dispute. The **Contractor** may not present to the **Comptroller** any material not presented to the **Commissioner**, except at the request of the **Comptroller**.

27.5.2 Response. Within thirty (30) **Days** of receipt of the Notice of Claim, the **Agency** shall make available to the **Comptroller** a copy of all material submitted by the **Agency** to the **Commissioner** in connection with the dispute. The **Agency** may not present to the **Comptroller** any material not presented to the **Commissioner** except at the request of the **Comptroller**.

27.5.3 **Comptroller** Investigation. The **Comptroller** may investigate the claim in dispute and, in the course of such investigation, may exercise all powers provided in Sections 7-201 and 7-203 of the Administrative Code. In addition, the **Comptroller** may demand of either party, and such party shall provide, whatever additional material the **Comptroller** deems pertinent to the claim, including original business records of the **Contractor**. Willful failure of the **Contractor** to produce within fifteen (15) **Days** any material requested by the **Comptroller** shall constitute a waiver by the **Contractor** of its claim. The **Comptroller** may also schedule an informal conference to be attended by the **Contractor**, **Agency** representatives, and any other personnel desired by the **Comptroller**.

27.5.4 Opportunity of **Comptroller** to Compromise or Adjust Claim. The **Comptroller** shall have forty-five (45) **Days** from his or her receipt of all materials referred to in Article 27.5.3 to investigate the disputed claim. The period for investigation and compromise may be further extended by agreement between the **Contractor** and the **Comptroller**, to a maximum of ninety (90) **Days** from the **Comptroller's** receipt of all materials. The **Contractor** may not present its petition to the Contract Dispute Resolution Board until the period for investigation and compromise delineated in this Article 27.5.4 has expired. In compromising or adjusting any claim hereunder, the **Comptroller** may not revise or disregard the terms of the **Contract** between the parties.

27.6 Contract Dispute Resolution Board. There shall be a Contract Dispute Resolution Board composed of:

27.6.1 The chief administrative law judge of the Office of Administrative Trials and Hearings (OATH) or his/her designated OATH administrative law judge, who shall act as chairperson, and may adopt operational procedures and issue such orders consistent with this Article 27 as may be necessary in the execution of the Contract Dispute Resolution Board's functions, including, but not limited to, granting extensions of time to present or respond to submissions;

27.6.2 The **CCPO** or his/her designee; any designee shall have the requisite background to consider and resolve the merits of the dispute and shall not have participated personally and substantially in the particular matter that is the subject of the dispute or report to anyone who so participated; and

27.6.3 A person with appropriate expertise who is not an employee of the **City**. This person shall be selected by the presiding administrative law judge from a prequalified panel of individuals, established and administered by OATH with appropriate background to act as decision-makers in a dispute. Such individual may not have a contract or dispute with the **City** or be an officer or employee of any company or organization that does, or regularly represents persons, companies, or organizations having disputes with the **City**.

27.7 Petition to the Contract Dispute Resolution Board. In the event the claim has not been settled or adjusted by the **Comptroller** within the period provided in this Article 27, the **Contractor**,

within thirty (30) **Days** thereafter, may petition the Contract Dispute Resolution Board to review the **Commissioner's** determination.

27.7.1 Form and Content of Petition by **Contractor**. The **Contractor** shall present its dispute to the Contract Dispute Resolution Board in the form of a petition, which shall include (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed, and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written Decision of the **Commissioner,** (iii) copies of all materials submitted by the **Contractor** to the Agency; (iv) a copy of the written decision of the **Comptroller**, if any, and (v) copies of all correspondence with, or written material submitted by the **Contractor**, to the **Comptroller**. The **Contractor** shall concurrently submit four (4) complete sets of the Petition: one set to the **City** Corporation Counsel (Attn: Commercial and Real Estate Litigation Division) and three (3) sets to the Contract Dispute Resolution Board at OATH's offices with proof of service on the **City** Corporation Counsel. In addition, the **Contractor** shall submit a copy of the written statement of the substance of the dispute, cited in (i) above, to both the **Commissioner** and the **Comptroller**.

27.7.2 **Agency** Response. Within thirty (30) **Days** of its receipt of the Petition by the **City** Corporation Counsel, the **Agency** shall respond to the brief written statement of the **Contractor** and make available to the Contract Dispute Resolution Board all material it submitted to the **Commissioner** and **Comptroller**. Three (3) complete copies of the **Agency** response shall be provided to the Contract Dispute Resolution Board and one to the **Contractor**. Extensions of time for submittal of the **Agency** response shall be given as necessary upon a showing of good cause or, upon consent of the parties, for an initial period of up to thirty (30) Days.

27.7.3 Further Proceedings. The Contract Dispute Resolution Board shall permit the **Contractor** to present its case by submission of memoranda, briefs, and oral argument. The Contract Dispute Resolution Board shall also permit the **Agency** to present its case in response to the **Contractor** by submission of memoranda, briefs, and oral argument. If requested by the **City** Corporation Counsel, the **Comptroller** shall provide reasonable assistance in the preparation of the **Agency's** case. Neither the **Contractor** nor the **Agency** may support its case with any documentation or other material that was not considered by the **Comptroller**, unless requested by the Contract Dispute Resolution Board. The Contract Dispute Resolution Board, in its discretion, may seek such technical or other expert advice as it shall deem appropriate and may seek, on its own or upon application of a party, any such additional material from any party as it deems fit. The Contract Dispute Resolution Board, in its discretion, may combine more than one dispute between the parties for concurrent resolution.

27.7.4 Contract Dispute Resolution Board Determination. Within forty-five (45) **Days** of the conclusion of all written submissions and oral arguments, the Contract Dispute Resolution Board shall render a written decision resolving the dispute. In an unusually complex case, the Contract Dispute Resolution Board may render its decision in a longer period, not to exceed ninety (90) **Days**, and shall so advise the parties at the commencement of this period. The Contract Dispute Resolution Board's decision must be consistent with the terms of the **Contract**. Decisions of the Contract Dispute Resolution Board shall only resolve matters before the Contract Dispute Resolution Board and shall not have precedential effect with respect to matters not before the Contract Dispute Resolution Board.

27.7.5 Notification of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board shall send a copy of its decision to the **Contractor**, the **ACCO**, the Engineer, the **Comptroller**, the **City** Corporation Counsel, the CCPO, and the **PPB**. A decision in favor of the **Contractor** shall be subject to the prompt payment provisions of the **PPB** Rules. The Required Payment Date shall be thirty (30) Days after the date the parties are formally notified of the Contract Dispute Resolution Board's decision.

27.7.6 Finality of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board's decision shall be final and binding on all parties. Any party may seek review of the Contract Dispute Resolution Board's decision solely in the form of a challenge, filed within four (4) months of the date of the Contract Dispute Resolution Board's decision, in a court of competent jurisdiction of the State of New York, County of New York pursuant to Article 78 of the Civil Practice Law and Rules. Such review by the court shall be limited to the question of whether or not the Contract Dispute Resolution Board's decision was made in violation of lawful procedure, was affected by an error of **Law**, or was arbitrary and capricious or an abuse of discretion. No evidence or information shall be introduced or relied upon in such proceeding that was not presented to the Contract Dispute Resolution Board in accordance with this Article 27.

27.8 Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this Article 27 shall not affect or impair the ability of the **Commissioner** or Contract Dispute Resolution Board to make a binding and final decision pursuant to this Article 27.

ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK OR WORK ON A TIME & MATERIALS BASIS

28.1 While the **Contractor** or any of its **Subcontractors** is performing **Work** on a time and material basis or **Extra Work** on a time and material basis ordered by the **Commissioner** under Article 25, or where the **Contractor** believes that it or any of its **Subcontractors** is performing **Extra Work** but a final determination by **Agency** has not been made, or the **Contractor** or any of its **Subcontractors** is performing disputed **Work** (whether on or off the **Site**), or complying with a determination or order under protest in accordance with Articles 11, 27, and 30, in each such case the **Contractor** shall furnish the **Resident Engineer** daily with three (3) copies of written statements signed by the **Contractor's** representative at the **Site** showing:

28.1.1 The name, trade, and number of each worker employed on such **Work** or engaged in complying with such determination or order, the number of hours employed, and the character of the **Work** each is doing; and

28.1.2 The nature and quantity of any materials, plant and equipment furnished or used in connection with the performance of such **Work** or compliance with such determination or order, and from whom purchased or rented.

28.2 A copy of such statement will be countersigned by the **Resident Engineer**, noting thereon any items not agreed to or questioned, and will be returned to the **Contractor** within two (2) **Days** after submission.

28.3 The **Contractor** and its **Subcontractors**, when required by the **Commissioner**, or the **Comptroller**, shall also produce for inspection, at the office of the **Contractor** or **Subcontractor**, any and all of its books, bid documents, financial statements, vouchers, records, daily job diaries and reports,

and cancelled checks, and any other documents relating to showing the nature and quantity of the labor, materials, plant and equipment actually used in the performance of such **Work**, or in complying with such determination or order, and the amounts expended therefor, and shall permit the **Commissioner** and the **Comptroller** to make such extracts therefrom, or copies thereof, as they or either of them may desire.

28.4 In connection with the examination provided for herein, the **Commissioner**, upon demand therefor, will produce for inspection by the **Contractor** such records as the **Agency** may have with respect to such **Extra Work** or disputed **Work** performed under protest pursuant to order of the **Commissioner**, except those records and reports which may have been prepared for the purpose of determining the accuracy and validity of the **Contractor's** claim.

28.5 Failure to comply strictly with these requirements shall constitute a waiver of any claim for extra compensation or damages on account of the performance of such **Work** or compliance with such determination or order.

ARTICLE 29. OMITTED WORK

29.1 If any **Contract Work** in a lump sum **Contract**, or if any part of a lump sum item in a unit price, lump sum, or percentage-bid **Contract** is omitted by the **Commissioner** pursuant to Article 33, the **Contract** price, subject to audit by the EAO, shall be reduced by a pro rata portion of the lump sum bid amount based upon the percent of **Work** omitted subject to Article 29.4. For the purpose of determining the pro rata portion of the lump sum bid amount, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be the determining factor.

29.2 If the whole of a lump sum item or units of any other item is so omitted by the **Commissioner** in a unit price, lump sum, or percentage-bid **Contract**, then no payment will be made therefor except as provided in Article 29.4.

29.3 For units that have been ordered but are only partially completed, the unit price shall be reduced by a pro rata portion of the unit price bid based upon the percentage of **Work** omitted subject to Article 29.4.

29.4 In the event the **Contractor**, with respect to any omitted **Work**, has purchased any non-cancelable material and/or equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated into the **Work**, the **Contractor** shall be paid for such material and/or equipment in accordance with Article 64.2.1(b); provided, however, such payment is contingent upon the **Contractor's** delivery of such material and/or equipment in acceptable condition to a location designated by the **City**.

29.5 The **Contractor** agrees to make no claim for damages or for loss of overhead and profit with regard to any omitted **Work**.

ARTICLE 30. NOTICE AND DOCUMENTATION OF COSTS AND DAMAGES; PRODUCTION OF FINANCIAL RECORDS

30.1 If the **Contractor** shall claim to be sustaining damages by reason of any act or omission of the **City** or its agents, it shall submit to the **Commissioner** within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter to the extent additional damages are being incurred for the same condition, verified statements of the details and the amounts of such

damages, together with documentary evidence of such damages. The **Contractor** may submit any of the above statements within such additional time as may be granted by the **Commissioner** in writing upon written request therefor. Failure of the **Commissioner** to respond in writing to a written request for additional time within thirty (30) **Days** shall be deemed a denial of the request. On failure of the **Contractor** to strictly comply with the foregoing provisions, such claims shall be deemed waived and no right to recover on such claims shall exist. Damages that the **Contractor** may claim in any action or dispute resolution procedure arising under or by reason of this **Contract** shall not be different from or in excess of the statements and documentation made pursuant to this Article 30. This Article 30.1 does not apply to claims submitted to the **Commissioner** pursuant to Article 11 or to claims disputing a determination under Article 27.

30.2 In addition to the foregoing statements, the **Contractor** shall, upon notice from the **Commissioner**, produce for examination at the **Contractor's** office, by the **Engineer**, **Architect** or **Project Manager**, all of its books of account, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**, and submit itself and persons in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.3 In addition to the statements required under Article 28 and this Article 30, the **Contractor** and/or its **Subcontractor** shall, within thirty (30) **Days** upon notice from the **Commissioner** or **Comptroller**, produce for examination at the **Contractor's** and/or **Subcontractor's** office, by a representative of either the **Commissioner** or **Comptroller**, all of its books of account, bid documents, financial statements, accountant workpapers, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, and cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**. Further, the **Contractor** and/or its **Subcontractor** shall submit any person in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.4 Unless the information and examination required under Article 30.3 is provided by the **Contractor** and/or its **Subcontractor** upon thirty (30) **Days'** notice from the **Commissioner** or **Comptroller**, or upon the **Commissioner's** or **Comptroller's** written authorization to extend the time to comply, the **City** shall be released from all claims arising under, relating to or by reason of this **Contract**, except for sums certified by the **Commissioner** to be due under the provisions of this **Contract**. It is further stipulated and agreed that no person has the power to waive any of the foregoing provisions and that in any action or dispute resolution procedure against the **City** to recover any sum in excess of the sums certified by the **Commissioner** to be due under or by reason of this **Contract**, the **Contractor** must allege in its complaint and prove, at trial or during such dispute resolution procedure, compliance with the provisions of this Article 30.

30.5 In addition, after the commencement of any action or dispute resolution procedure by the **Contractor** arising under or by reason of this **Contract**, the **City** shall have the right to require the **Contractor** to produce for examination under oath, up until the trial of the action or hearing before the Contract Dispute Resolution Board, the books and documents described in Article 30.3 and submit itself and all persons in its employ for examination under oath. If this Article 30 is not complied with as required, then the **Contractor** hereby consents to the dismissal of the action or dispute resolution procedure.

CHAPTER VII: POWERS OF THE RESIDENT ENGINEER,THE ENGINEER OR ARCHITECT AND THE COMMISSIONER

ARTICLE 31. THE RESIDENT ENGINEER

31.1 The **Resident Engineer** shall have the power to inspect, supervise, and control the performance of the **Work**, subject to review by the **Commissioner**. The **Resident Engineer** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 32. THE ENGINEER OR ARCHITECT OR PROJECT MANAGER

32.1 The **Engineer** or **Architect** or **Project Manager**, in addition to those matters elsewhere herein delegated to the **Engineer** and expressly made subject to his/her determination, direction or approval, shall have the power, subject to review by the **Commissioner**:

32.1.1 To determine the amount, quality, and location of the **Work** to be paid for hereunder; and

32.1.2 To determine all questions in relation to the **Work**, to interpret the **Contract Drawings**, **Specifications**, and **Addenda**, and to resolve all patent inconsistencies or ambiguities therein; and

32.1.3 To determine how the **Work** of this **Contract** shall be coordinated with **Work** of **Other Contractors** engaged simultaneously on this **Project**, including the power to suspend any part of the **Work**, but not the whole thereof; and

32.1.4 To make minor changes in the **Work** as he/she deems necessary, provided such changes do not result in a net change in the cost to the **City** or to the **Contractor** of the **Work** to be done under the **Contract**; and

32.1.5 To amplify the **Contract Drawings**, add explanatory information and furnish additional **Specifications** and drawings, consistent with this **Contract**.

32.2 The foregoing enumeration shall not imply any limitation upon the power of the **Engineer** or **Architect** or **Project Manager**, for it is the intent of this **Contract** that all of the **Work** shall generally be subject to his/her determination, direction, and approval, except where the determination, direction or approval of someone other than the **Engineer** or **Architect** or **Project Manager** is expressly called for herein.

32.3 The **Engineer** or **Architect** or **Project Manager** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

ARTICLE 33. THE COMMISSIONER

33.1 The **Commissioner**, in addition to those matters elsewhere herein expressly made subject to his/her determination, direction or approval, shall have the power:

33.1.1 To review and make determinations on any and all questions in relation to this **Contract** and its performance; and

33.1.2 To modify or change this **Contract** so as to require the performance of **Extra Work** (subject, however, to the limitations specified in Article 25) or the omission of **Contract Work**; and

33.1.3 To suspend the whole or any part of the **Work** whenever in his/her judgment such suspension is required:

33.1.3(a) In the interest of the **City** generally; or

33.1.3(b) To coordinate the **Work** of the various contractors engaged on this **Project** pursuant to the provisions of Article 12; or

33.1.3(c) To expedite the completion of the entire **Project** even though the completion of this particular **Contract** may thereby be delayed.

ARTICLE 34. NO ESTOPPEL

34.1 Neither the **City** nor any **Agency**, official, agent or employee thereof, shall be bound, precluded or estopped by any determination, decision, approval, order, letter, payment or certificate made or given under or in connection with this **Contract** by the **City**, the **Commissioner**, the **Engineer**, the **Resident Engineer**, or any other official, agent or employee of the **City**, either before or after the final completion and acceptance of the **Work** and payment therefor:

34.1.1 From showing the true and correct classification, amount, quality or character of the **Work** actually done; or that any such determination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular, or that the **Work**, or any part thereof, does not in fact conform to the requirements of this **Contract**; and

34.1.2 From demanding and recovering from the **Contractor** any overpayment made to it, or such damages as the **City** may sustain by reason of the **Contractor's** failure to perform each and every part of its **Contract**.

CHAPTER VIII: LABOR PROVISIONS

ARTICLE 35. EMPLOYEES

35.1 The **Contractor** and its **Subcontractors** shall not employ on the **Work**:

35.1.1 Anyone who is not competent, faithful and skilled in the **Work** for which he/she shall be employed; and whenever the **Commissioner** shall inform the **Contractor**, in writing, that any employee is, in his/her opinion, incompetent, unfaithful or disobedient, that employee shall be discharged from the **Work** forthwith, and shall not again be employed upon it; or

35.1.2 Any labor, materials or means whose employment, or utilization during the course of this **Contract**, may tend to or in any way cause or result in strikes, work stoppages, delays, suspension of **Work** or similar troubles by workers employed by the **Contractor** or its **Subcontractors**, or by any of the trades working in or about the buildings and premises where **Work** is being performed under this **Contract**, or by **Other Contractors** or their **Subcontractors** pursuant to other contracts, or on any other building or premises owned or operated by the **City**, its **Agencies**, departments, boards or authorities. Any violation by the **Contractor** of this requirement may, upon certification of the **Commissioner**, be considered as proper and sufficient cause for declaring the **Contractor** to be in default, and for the **City** to take action against it as set forth in Chapter X of this **Contract**, or such other article of this **Contract** as the Commissioner may deem proper; or

35.1.3 In accordance with Section 220.3-e of the Labor Law of the State of New York (hereinafter "Labor Law"), the **Contractor** and its **Subcontractors** shall not employ on the **Work** any apprentice, unless he/she is a registered individual, under a bona fide program registered with the New York State Department of Labor. The allowable ratio of apprentices to journey-level workers in any craft classification shall not be greater than the ratio permitted to the **Contractor** as to its work force on any job under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the **Comptroller** of the **City** for the classification of **Work** actually performed. The **Contractor** or **Subcontractor** will be required to furnish written evidence of the registration of its program and apprentices as well as all the appropriate ratios and wage rates, for the area of the construction prior to using any apprentices on the **Contract Work**.

35.2 If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand ($250,000) dollars, all laborers, workers, and mechanics employed in the performance of the **Contract** on the public work site, either by the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by the **Contract**, shall be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration.

35.3 In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the Administrative Code, respectively,

35.3.1 The **Contractor** shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making a report of information concerning conduct which such officer or employee knows or reasonably believes to involve corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority by any officer or employee relating to this **Contract** to (a) the Commissioner of the Department of Investigation, (b) a member of the New York City Council, the Public Advocate, or the **Comptroller**, or (c) the **CCPO**, **ACCO**, **Agency** head, or **Commissioner**.

35.3.2 If any of the **Contractor**'s officers or employees believes that he or she has been the subject of an adverse personnel action in violation of Article 35.3.1, he or she shall be entitled to bring a cause of action against the **Contractor** to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (a) an injunction to restrain continued retaliation, (b) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (c) reinstatement of full fringe benefits and seniority rights, (d) payment of two times back

pay, plus interest, and (e) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.

35.3.3 The **Contractor** shall post a notice provided by the **City** in a prominent and accessible place on any site where work pursuant to the **Contract** is performed that contains information about:

35.3.3(a) how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the **Contract**; and

35.3.3(b) the rights and remedies afforded to its employees under Administrative Code sections 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the reporting of allegations of fraud, false claims, criminality or corruption in connection with the **Contract**.

35.3.4 For the purposes of this Article 35.3, "adverse personnel action" includes dismissal, demotion, suspension, disciplinary action, negative performance evaluation, any action resulting in loss of staff, office space, equipment or other benefit, failure to appoint, failure to promote, or any transfer or assignment or failure to transfer or assign against the wishes of the affected officer or employee.

35.3.5 This Article 35.3 is applicable to all of the **Contractor**'s **Subcontractors** having subcontracts with a value in excess of $100,000; accordingly, the **Contractor** shall include this rider in all subcontracts with a value a value in excess of $100,000.

35.4 Article 35.3 is not applicable to this **Contract** if it is valued at $100,000 or less. Articles 35.3.1, 35.3.2, 35.3.4, and 35.3.5 are not applicable to this **Contract** if it was solicited pursuant to a finding of an emergency.

35.5 Paid Sick Leave Law.

35.5.1 Introduction and General Provisions.

35.5.1(a) The Earned Sick Time Act, also known as the Paid Sick Leave Law ("PSLL"), requires covered employees who annually perform more than 80 hours of work in New York City to be provided with paid sick time.[2] Contractors of the **City** or of other governmental entities may be required to provide sick time pursuant to the PSLL.

35.5.1(b) The PSLL became effective on April 1, 2014, and is codified at Title 20, Chapter 8, of the New York City Administrative Code. It is administered by the City's Department of Consumer Affairs ("DCA"); DCA's rules promulgated under the PSLL are codified at Chapter 7 of Title 6 of the Rules of the City of New York ("Rules").

[2] Pursuant to the PSLL, if fewer than five employees work for the same employer, as determined pursuant to New York City Administrative Code § 20-912(g), such employer has the option of providing such employees uncompensated sick time.

35.5.1(c) The **Contractor** agrees to comply in all respects with the PSLL and the Rules, and as amended, if applicable, in the performance of this **Contract**. The **Contractor** further acknowledges that such compliance is a material term of this **Contract** and that failure to comply with the PSLL in performance of this **Contract** may result in its termination.

35.5.1(d) The **Contractor** must notify the **Agency Chief Contracting Officer** of the **Agency** with whom it is contracting in writing within ten (10) days of receipt of a complaint (whether oral or written) regarding the PSLL involving the performance of this **Contract**. Additionally, the **Contractor** must cooperate with DCA's education efforts and must comply with DCA's subpoenas and other document demands as set forth in the PSLL and Rules.

35.5.1(e) The PSLL is summarized below for the convenience of the **Contractor**. The **Contractor** is advised to review the PSLL and Rules in their entirety. On the website www.nyc.gov/PaidSickLeave there are links to the PSLL and the associated Rules as well as additional resources for employers, such as Frequently Asked Questions, timekeeping tools and model forms, and an event calendar of upcoming presentations and webinars at which the **Contractor** can get more information about how to comply with the PSLL. The **Contractor** acknowledges that it is responsible for compliance with the PSLL notwithstanding any inconsistent language contained herein.

35.5.2 Pursuant to the PSLL and the Rules: Applicability, Accrual, and Use.

35.5.2(a) An employee who works within the City of New York for more than eighty hours in any consecutive 12-month period designated by the employer as its "calendar year" pursuant to the PSLL ("Year") must be provided sick time. Employers must provide a minimum of one hour of sick time for every 30 hours worked by an employee and compensation for such sick time must be provided at the greater of the employee's regular hourly rate or the minimum wage. Employers are not required to provide more than 40 hours of sick time to an employee in any Year.

35.5.2(b) An employee has the right to determine how much sick time he or she will use, provided that employers may set a reasonable minimum increment for the use of sick time not to exceed four hours per **Day**. In addition, an employee may carry over up to 40 hours of unused sick time to the following Year, provided that no employer is required to allow the use of more than forty hours of sick time in a Year or carry over unused paid sick time if the employee is paid for such unused sick time and the employer provides the employee with at least the legally required amount of paid sick time for such employee for the immediately subsequent Year on the first **Day** of such Year.

35.5.2(c) An employee entitled to sick time pursuant to the PSLL may use sick time for any of the following:

i. such employee's mental illness, physical illness, injury, or health condition or the care of such illness, injury, or condition or such employee's need for medical diagnosis or preventive medical care;
ii. such employee's care of a family member (an employee's child, spouse, domestic partner, parent, sibling, grandchild or grandparent, or the child or parent of an employee's spouse or domestic partner) who has a mental

illness, physical illness, injury or health condition or who has a need for medical diagnosis or preventive medical care;

iii. closure of such employee's place of business by order of a public official due to a public health emergency; or

iv. such employee's need to care for a child whose school or childcare provider has been closed due to a public health emergency.

35.5.2(d) An employer must not require an employee, as a condition of taking sick time, to search for a replacement. However, an employer may require an employee to provide: reasonable notice of the need to use sick time; reasonable documentation that the use of sick time was needed for a reason above if for an absence of more than three consecutive work days; and/or written confirmation that an employee used sick time pursuant to the PSLL. However, an employer may not require documentation specifying the nature of a medical condition or otherwise require disclosure of the details of a medical condition as a condition of providing sick time and health information obtained solely due to an employee's use of sick time pursuant to the PSLL must be treated by the employer as confidential.

35.5.2(e) If an employer chooses to impose any permissible discretionary requirement as a condition of using sick time, it must provide to all employees a written policy containing those requirements, using a delivery method that reasonably ensures that employees receive the policy. If such employer has not provided its written policy, it may not deny sick time to an employee because of non-compliance with such a policy.

35.5.2(f) Sick time to which an employee is entitled must be paid no later than the payday for the next regular payroll period beginning after the sick time was used.

35.5.3 Exemptions and Exceptions. Notwithstanding the above, the PSLL does not apply to any of the following:

35.5.3(a) an independent contractor who does not meet the definition of employee under section 190(2) of the New York State Labor Law;

35.5.3(b) an employee covered by a valid collective bargaining agreement in effect on April 1, 2014, until the termination of such agreement;

35.5.3(c) an employee in the construction or grocery industry covered by a valid collective bargaining agreement if the provisions of the PSLL are expressly waived in such collective bargaining agreement;

35.5.3(d) an employee covered by another valid collective bargaining agreement if such provisions are expressly waived in such agreement and such agreement provides a benefit comparable to that provided by the PSLL for such employee;

35.5.3(e) an audiologist, occupational therapist, physical therapist, or speech language pathologist who is licensed by the New York State Department of Education and who calls in for work assignments at will, determines his or her own schedule, has the ability to reject or accept any assignment referred to him or her, and is paid an average hourly wage that is at least four times the federal minimum wage;

35.5.3(f) an employee in a work study program under Section 2753 of Chapter 42 of the United States Code;

35.5.3(g) an employee whose work is compensated by a qualified scholarship program as that term is defined in the Internal Revenue Code, Section 117 of Chapter 20 of the United States Code; or

35.5.3(h) a participant in a Work Experience Program (WEP) under section 336-c of the New York State Social Services Law.

35.5.4 Retaliation Prohibited. An employer may not threaten or engage in retaliation against an employee for exercising or attempting in good faith to exercise any right provided by the PSLL. In addition, an employer may not interfere with any investigation, proceeding, or hearing pursuant to the PSLL.

35.5.5 Notice of Rights.

35.5.5(a) An employer must provide its employees with written notice of their rights pursuant to the PSLL. Such notice must be in English and the primary language spoken by an employee, provided that DCA has made available a translation into such language. Downloadable notices are available on DCA's website at http://www.nyc.gov/html/dca/html/law/PaidSickLeave.shtml.

35.5.5(b) Any person or entity that willfully violates these notice requirements is subject to a civil penalty in an amount not to exceed fifty dollars for each employee who was not given appropriate notice.

35.5.6 Records. An employer must retain records documenting its compliance with the PSLL for a period of at least three years, and must allow DCA to access such records in furtherance of an investigation related to an alleged violation of the PSLL.

35.5.7 Enforcement and Penalties.

35.5.7(a) Upon receiving a complaint alleging a violation of the PSLL, DCA has the right to investigate such complaint and attempt to resolve it through mediation. Within 30 **Days** of written notification of a complaint by DCA, or sooner in certain circumstances, the employer must provide DCA with a written response and such other information as DCA may request. If DCA believes that a violation of the PSLL has occurred, it has the right to issue a notice of violation to the employer.

35.5.7(b) DCA has the power to grant an employee or former employee all appropriate relief as set forth in New York City Administrative Code § 20-924(d). Such relief may include, among other remedies, treble damages for the wages that should have been paid, damages for unlawful retaliation, and damages and reinstatement for unlawful discharge. In addition, DCA may impose on an employer found to have violated the PSLL civil penalties not to exceed $500 for a first violation, $750 for a second violation within two years of the first violation, and $1,000 for each succeeding violation within two years of the previous violation.

35.5.8 More Generous Polices and Other Legal Requirements. Nothing in the PSLL is intended to discourage, prohibit, diminish, or impair the adoption or retention of a more generous sick time policy, or the obligation of an employer to comply with any contract,

collective bargaining agreement, employment benefit plan or other agreement providing more generous sick time. The PSLL provides minimum requirements pertaining to sick time and does not preempt, limit or otherwise affect the applicability of any other law, regulation, rule, requirement, policy or standard that provides for greater accrual or use by employees of sick leave or time, whether paid or unpaid, or that extends other protections to employees. The PSLL may not be construed as creating or imposing any requirement in conflict with any federal or state law, rule or regulation.

35.6 HireNYC: Hiring and Reporting Requirements. This Article 35.6 applies to construction contracts of $1,000,000 or more. The **Contractor** shall comply with the requirements of Articles 35.6.1-35.6.5 for all non-trades jobs (e.g., for an administrative position arising out of **Work** ant located in New York City). The **Contractor** shall reasonably cooperate with SBS and the **City** on specific outreach events, including "Hire-on-the-Spot" events, for the hiring of trades workers in connection with the **Work**. If provided elsewhere in this **Contract**, this **Contract** is subject to a project labor agreement.

35.6.1 Enrollment. The **Contractor** shall enroll with the HireNYC system, found at www.nyc.gov/sbs, within thirty (30) days after the registration of this **Contract** pursuant to Section 328 of the New York City Charter. The **Contractor** shall provide information about the business, designate a primary contact and say whether it intends to hire for any entry to mid-level job opportunities arising from this **Contract** and located in New York City, and, if so, the approximate start date of the first hire.

35.6.2 Job Posting Requirements.

35.6.2(a) Once enrolled in HireNYC, the **Contractor** agrees to update the HireNYC portal with all entry to mid-level job opportunities arising from this **Contract** and located in New York City, if any, which shall be defined as jobs requiring no more than an associate degree, as provided by the New York State Department of Labor (see Column F of https://labor.ny.gov/stats/2012-2022- NYS-Employment-Prospects.xls). The information to be updated includes the types of entry and mid-level positions made available from the work arising from the **Contract** and located in New York City, the number of positions, the anticipated schedule of initiating the hiring process for these positions, and the contact information for the **Contractor's** representative charged with overseeing hiring. The **Contractor** must update the HireNYC portal with any hiring needs arising from the contract and located in New York City, and the requirements of the jobs to be filled, no less than three weeks prior to the intended first day of employment for each new position, except with the permission of SBS, not to be unreasonably withheld, and must also update the HireNYC portal as set forth below.

35.6.2(b) After enrollment through HireNYC and submission of relevant information, SBS will work with the **Contractor** to develop a recruitment plan which will outline the candidate screening process, and will provide clear instructions as to when, where, and how interviews will take place. HireNYC will screen applicants based on employer requirements and refer applicants whom it believes are qualified to the **Contractor** for interviews. The **Contractor** must interview referred applicants whom it believes are qualified.

35.6.2(c) After completing an interview of a candidate referred by HireNYC, the **Contractor** must provide feedback via the portal within twenty (20) business days to indicate which candidates were interviewed and hired, if any. In addition, the **Contractor** shall provide the start date of new hires, and additional information

reasonably related to such hires, within twenty (20) business days after the start date. In the event the **Contractor** does not have any job openings covered by this Rider in any given year, the **Contractor** shall be required to provide an annual update to HireNYC to that effect. For this purpose, the reporting year shall run from the date of the registration of the **Contract** pursuant to Charter section 328 and each anniversary date.

35.6.2(d) These requirements do not limit the **Contractor's** ability to assess the qualifications of prospective workers, and to make final hiring and retention decisions. No provision of this Article 35.6 shall be interpreted so as to require the **Contractor** to employ any particular worker.

35.6.2(e) In addition, the provisions of this Article 35.6 shall not apply to positions that the **Contractor** intends to fill with employees employed pursuant to the job retention provision of Section 22-505 of the Administrative Code of the City of New York. The **Contractor** shall not be required to report such openings with HireNYC. However, the **Contractor** shall enroll with the HireNYC system pursuant to Article 35.6.1, above, and, if such positions subsequently become open, then the remaining provisions of this Article 35.6 will apply.

35.6.3 Breach and Liquidated Damages. If the **Contractor** fails to comply with the terms of the **ContrSact** and this Article 35.6 (l) by not enrolling its business with HireNYC; (2) by not informing HireNYC, as required, of open positions; or (3) by failing to interview a qualified candidate, the **Agency** may assess liquidated damages in the amount of two-thousand five hundred dollars ($2,500) per breach. For all other events of noncompliance with the terms of this Article 35.6, the **Agency** may assess liquidated damages in the amount of five hundred dollars ($500) per breach. Furthermore, in the event the **Contractor** breaches the requirements of this Article 35.6 during the term of the **Contract**, the **City** may hold the **Contractor** in default of this **Contract**.

35.6.4 Audit Compliance. In addition to the auditing requirements set forth in other parts of the **Contract**, the **Contractor** shall permit SBS and the **City** to inspect any and all records concerning or relating to job openings or the hiring of individuals for work arising from the **Contract** and located in New York City. The **Contractor** shall permit an inspection within seven (7) business days of the request.

35.6.5 Other Reporting Requirements. The **Contractor** shall report to the **City**, on a monthly basis, all information reasonably requested by the **City** that is necessary for the **City** to comply with any reporting requirements imposed by **Law**, including any requirement that the **City** maintain a publicly accessible database. In addition, the **Contractor** agrees to comply with all reporting requirements imposed by **Law**, or as otherwise requested by the **City**.

35.6.6 Federal Hiring Requirements. If this **Contract** is federally funded (as indicated elsewhere in this Contract), the **Contractor** shall comply with all federal hiring requirements as may be set forth in this **Contract**, including, as applicable: (a) Section 3 of the HUD Act of 1968, which requires, to the greatest extent feasible, economic opportunities for 30 percent of new hires be given to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing and Executive Order 11246, which prohibits discrimination in employment due to race, color, religion, sex or national origin, and requires the implementation of goals for minority and female participation for work involving any construction trade.

ARTICLE 36. NO DISCRIMINATION

36.1 The **Contractor** specifically agrees, as required by Labor Law Section 220-e, as amended, that:

36.1.1 In the hiring of employees for the performance of **Work** under this **Contract** or any subcontract hereunder, neither the **Contractor**, **Subcontractor**, nor any person acting on behalf of such **Contractor** or **Subcontractor**, shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the **Work** to which the employment relates;

36.1.2 Neither the **Contractor**, **Subcontractor**, nor any person on its behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of **Work** under this **Contract** on account of race, creed, color or national origin;

36.1.3 There may be deducted from the amount payable to the **Contractor** by the **City** under this **Contract** a penalty of fifty ($50.00) dollars for each person for each **Day** during which such person was discriminated against or intimidated in violation of the provisions of this **Contract**; and

36.1.4 This **Contract** may be cancelled or terminated by the **City** and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this Article 36.

36.1.5 This Article 36 covers all construction, alteration and repair of any public building or public work occurring in the State of New York and the manufacture, sale, and distribution of materials, equipment, and supplies to the extent that such operations are performed within the State of New York pursuant to this **Contract**.

36.2 The **Contractor** specifically agrees, as required by Section 6-108 of the Administrative Code, as amended, that:

36.2.1 It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a **Contract** with the **City** or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a **Contract** with the **City** to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

36.2.2 It shall be unlawful for any person or any servant, agent or employee of any person, described in Article 36.1.2, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color or creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.

36.2.3 Breach of the foregoing provisions shall be deemed a violation of a material provision of this **Contract**.

36.2.4 Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this Article 36.2 shall, upon

conviction thereof, be punished by a fine of not more than one hundred ($100.00) dollars or by imprisonment for not more than thirty (30) **Days**, or both.

36.3 This **Contract** is subject to the requirements of Executive Order No. 50 (1980) ("E.O. 50"), as revised, and the rules and regulations promulgated thereunder. No contract will be awarded unless and until these requirements have been complied with in their entirety. By signing this **Contract**, the **Contractor** agrees that it:

36.3.1 Will not engage in any unlawful discrimination against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment; and

36.3.2 Will not engage in any unlawful discrimination in the selection of **Subcontractors** on the basis of the owner's race, color, creed, national origin, sex, age, disability, marital status or sexual orientation; and

36.3.3 Will state in all solicitations or advertisements for employees placed by or on behalf of the **Contractor** that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, creed, color, national origin, sex, age, citizens status, disability, marital status, sexual orientation, or that it is an equal employment opportunity employer; and

36.3.4 Will send to each labor organization or representative of workers with which it has a collective bargaining agreement or other contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the rules and regulations promulgated thereunder; and

36.3.5 Will furnish, before the award of the **Contract**, all information and reports, including an employment report, that are required by E.O. 50, the rules and regulations promulgated thereunder, and orders of the **City** Department of Business Services, Division of Labor Services (**DLS**) and will permit access to its books, records, and accounts by the **DLS** for the purposes of investigation to ascertain compliance with such rules, regulations, and orders.

36.4 The **Contractor** understands that in the event of its noncompliance with the nondiscrimination clauses of this **Contract** or with any of such rules, regulations, or orders, such noncompliance shall constitute a material breach of this **Contract** and noncompliance with E.O. 50 and the rules and regulations promulgated thereunder. After a hearing held pursuant to the rules of the **DLS**, the Director of the **DLS** may direct the **Commissioner** to impose any or all of the following sanctions:

36.4.1 Disapproval of the **Contractor**; and/or

36.4.2 Suspension or termination of the **Contract**; and/or

36.4.3 Declaring the **Contractor** in default; and/or

36.4.4 In lieu of any of the foregoing sanctions, the Director of the **DLS** may impose an employment program.

In addition to any actions taken under this **Contract**, failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in a **City Agency** declaring the **Contractor** to be non-responsible in future procurements. The **Contractor** further agrees that it will refrain from entering into any **Contract** or **Contract** modification subject to E.O. 50 and the rules and regulations promulgated thereunder with a **Subcontractor** who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder.

36.5 The **Contractor** specifically agrees, as required by Section 6-123 of the Administrative Code, that:

36.5.1 The **Contractor** will not engage in any unlawful discriminatory practice in violation of Title 8 of the Administrative Code; and

36.5.2 Any failure to comply with this Article 36.5 may subject the **Contractor** to the remedies set forth in Section 6-123 of the Administrative Code, including, where appropriate, sanctions such as withholding of payment, imposition of an employment program, finding the **Contractor** to be in default, cancellation of the **Contract**, or any other sanction or remedy provided by **Law** or **Contract**.

ARTICLE 37. LABOR LAW REQUIREMENTS

37.1 The **Contractor** shall strictly comply with all applicable provisions of the Labor Law, as amended. Such compliance is a material term of this **Contract**.

37.2 The **Contractor** specifically agrees, as required by Labor Law Sections 220 and 220-d, as amended, that:

37.2.1 Hours of **Work**: No laborer, worker, or mechanic in the employ of the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by this **Contract** shall be permitted or required to work more than eight (8) hours in any one (1) **Day**, or more than five (5) **Days** in any one (1) week, except as provided in the Labor Law and in cases of extraordinary emergency including fire, flood, or danger to life or property, or in the case of national emergency when so proclaimed by the President of the United States of America.

37.2.2 In situations in which there are not sufficient laborers, workers, and mechanics who may be employed to carry on expeditiously the **Work** contemplated by this **Contract** as a result of such restrictions upon the number of hours and **Days** of labor, and the immediate commencement or prosecution or completion without undue delay of the **Work** is necessary for the preservation of the **Site** and/or for the protection of the life and limb of the persons using the same, such laborers, workers, and mechanics shall be permitted or required to work more than eight (8) hours in any one (1) **Day**; or five (5) **Days** in any one (1) week; provided, however, that upon application of any **Contractor**, the **Commissioner** shall have first certified to the Commissioner of Labor of the State of New York (hereinafter "Commissioner of Labor") that such public **Work** is of an important nature and that a delay in carrying it to completion would result in serious disadvantage to the public; and provided, further, that such Commissioner of Labor shall have determined that such an emergency does in fact exist as provided in Labor Law Section 220.2.

37.2.3 Failure of the **Commissioner** to make such a certification to the Commissioner of Labor shall not entitle the **Contractor** to damages for delay or for any cause whatsoever.

37.2.4 Prevailing Rate of Wages: The wages to be paid for a legal day's **Work** to laborers, workers, or mechanics employed upon the **Work** contemplated by this **Contract** or upon any materials to be used thereon shall not be less than the "prevailing rate of wage" as defined in Labor Law Section 220, and as fixed by the **Comptroller** in the attached Schedule of Wage Rates and in updated schedules thereof. The prevailing wage rates and supplemental benefits to be paid are those in effect at the time the **Work** is being performed.

37.2.5 Requests for interpretation or correction in the Information for Bidders includes all requests for clarification of the classification of trades to be employed in the performance of the **Work** under this **Contract**. In the event that a trade not listed in the **Contract** is in fact employed during the performance of this **Contract**, the **Contractor** shall be required to obtain from the **Agency** the prevailing wage rates and supplementary benefits for the trades used and to complete the performance of this **Contract** at the price at which the **Contract** was awarded.

37.2.6 Minimum Wages: Except for employees whose wage is required to be fixed pursuant to Labor Law Section 220, all persons employed by the **Contractor** and any **Subcontractor** in the manufacture or furnishing of the supplies, materials, or equipment, or the furnishing of work, labor, or services, used in the performance of this **Contract**, shall be paid, without subsequent deduction or rebate unless expressly authorized by **Law**, not less than the sum mandated by **Law**.

37.3 Working Conditions: No part of the **Work**, labor or services shall be performed or rendered by the **Contractor** in any plants, factories, buildings or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of this **Contract**. Compliance with the safety, sanitary, and factory inspection **Laws** of the state in which the **Work** is to be performed shall be prima facie evidence of compliance with this Article 37.3.

37.4 Prevailing Wage Enforcement: The **Contractor** agrees to pay for all costs incurred by the **City** in enforcing prevailing wage requirements, including the cost of any investigation conducted by or on behalf of the **Agency** or the **Comptroller,** where the **City** discovers a failure to comply with any of the requirements of this Article 37 by the **Contractor** or its **Subcontractor(s)**. The **Contractor** also agrees that, should it fail or refuse to pay for any such investigation, the **Agency** is hereby authorized to deduct from a **Contractor's** account an amount equal to the cost of such investigation.

37.4.1 The Labor Law Section 220 and Section 220-d, as amended, provide that this **Contract** shall be forfeited and no sum paid for any **Work** done hereunder on a second conviction for willfully paying less than:

37.4.1(a) The stipulated prevailing wage scale as provided in Labor Law section 220, as amended, or

37.4.1(b) The stipulated minimum hourly wage scale as provided in Labor Law section 220-d, as amended.

37.4.2 For any breach or violation of either working conditions (Article 37.3) or minimum wages (Article 37.2.6) provisions, the party responsible therefor shall be liable to the **City** for liquidated damages, which may be withheld from any amounts due on any contracts with the **City** of such party responsible, or may be recovered in actions brought by the **City**

Corporation Counsel in the name of the **City**, in addition to damages for any other breach of this **Contract**, for a sum equal to the amount of any underpayment of wages due to any employee engaged in the performance of this **Contract**. In addition, the **Commissioner** shall have the right to cancel contracts and enter into other contracts for the completion of the original contract, with or without public letting, and the original **Contractor** shall be liable for any additional cost. All sums withheld or recovered as deductions, rebates, refunds, or underpayment of wages hereunder, shall be held in a special deposit account and shall be paid without interest, on order of the **Comptroller**, directly to the employees who have been paid less than minimum rates of pay as set forth herein and on whose account such sums were withheld or recovered, provided that no claims by employees for such payments shall be entertained unless made within two (2) years from the date of actual notice to the **Contractor** of the withholding or recovery of such sums by the **City**.

37.4.3 A determination by the **Comptroller** that a **Contractor** and/or its **Subcontractor** willfully violated Labor Law Section 220 will be forwarded to the **City's** five District Attorneys for review.

37.4.4 The **Contractor's** or **Subcontractor's** noncompliance with this Article 37.4 and Labor Law Section 220 may result in an unsatisfactory performance evaluation and the **Comptroller** may also find and determine that the **Contractor** or **Subcontractor** willfully violated the New York Labor **Law**.

37.4.4(a) An unsatisfactory performance evaluation for noncompliance with this Article 37.4 may result in a determination that the **Contractor** is a non-responsible bidder on subsequent procurements with the **City** and thus a rejection of a future award of a contract with the **City**, as well as any other sanctions provided for by **Law**.

37.4.4(b) Labor Law Section 220-b, as amended, provides that when two (2) final determinations have been rendered against a **Contractor** or **Subcontractor** within any consecutive six (6) year period determining that such **Contractor** or **Subcontractor** has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with the Labor Law and this Article 37.4, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public works projects are rendered simultaneously, such **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public works contract with the **City** for a period of five (5) years from the second final determination. If the final determination involves the falsification of payroll records or the kickback of wages or supplements, the **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public works contract with the **City** for a period of five (5) years from the first final determination.

37.4.4(c) Labor Law Section 220, as amended, provides that the **Contractor** or **Subcontractor** found to have violated this Article 37.4 may be directed to make payment of wages or supplements including interest found to be due, and the **Contractor** or **Subcontractor** may be directed to make payment of a further sum as a civil penalty in an amount not exceeding twenty-five (25%) percent of the total amount found to be due.

37.5 The **Contractor** and its **Subcontractors** shall within ten (10) **Days** after mailing of a Notice of Award or written order, post in prominent and conspicuous places in each and every plant, factory, building, and structure where employees of the **Contractor** and its **Subcontractors** engaged in the

performance of this **Contract** are employed, notices furnished by the **City**, in relation to prevailing wages and supplements, minimum wages, and other stipulations contained in Sections 220 and 220-h of the Labor Law, and the **Contractor** and its **Subcontractors** shall continue to keep such notices posted in such prominent and conspicuous places until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services required to be furnished or rendered under this **Contract**.

37.6 The **Contractor** shall strictly comply with all of the provisions of Articles 37.6.1 through 37.6.5, and provide for all workers, laborers or mechanics in its employ, the following:

37.6.1 Notices Posted At **Site**: Post, in a location designated by the **City**, schedules of prevailing wages and supplements for this **Project**, a copy of all re-determinations of such schedules for the **Project**, the Workers' Compensation **Law** Section 51 notice, all other notices required by **Law** to be posted at the **Site**, the **City** notice that this **Project** is a public works project on which each worker is entitled to receive the prevailing wages and supplements for the occupation at which he or she is working, and all other notices which the **City** directs the **Contractor** to post. The **Contractor** shall provide a surface for such notices which is satisfactory to the **City**. The **Contractor** shall maintain and keep current such notices in a legible manner and shall replace any notice or schedule which is damaged, defaced, illegible or removed for any reason. The **Contractor** shall post such notices before commencing any **Work** on the **Site** and shall maintain such notices until all **Work** on the **Site** is complete; and

37.6.2 Daily **Site** Sign-in Sheets: Maintain daily **Site** sign-in sheets, and require that **Subcontractors** maintain daily **Site** sign-in sheets for its employees, which include blank spaces for an employee's name to be both printed and signed, job title, date started and Social Security number, the time the employee began work and the time the employee left work, until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services to be furnished or rendered under this **Contract** unless exception is granted by the **Comptroller** upon application by the **Agency**. In the alternative, subject to the approval of the **CCPO**, the **Contractor** and **Subcontractor** may maintain an electronic or biometric sign-in system, which provides the information required by this Article 37.6.2; and

37.6.3 Individual Employee Information Notices: Distribute a notice to each worker, laborer or mechanic employed under this **Contract**, in a form provided by the **Agency**, that this **Project** is a public works project on which each worker, laborer or mechanic is entitled to receive the prevailing rate of wages and supplements for the occupation at which he or she is working. If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand ($250,000) dollars, such notice shall also include a statement that each worker, laborer or mechanic must be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration. Such notice shall be distributed to each worker before he or she starts performing any **Work** of this **Contract** and with the first paycheck after July first of each year. "Worker, laborer or mechanic" includes employees of the **Contractor** and all **Subcontractors** and all employees of suppliers entering the **Site**. At the time of distribution, the **Contractor** shall have each worker, laborer or mechanic sign a statement, in a form provided by the **Agency**, certifying that the worker has received the notice required by this Article 37.6.3, which signed statement shall be maintained with the payroll records required by this **Contract**; and

37.6.3(a) The **Contractor** and each **Subcontractor** shall notify each worker, laborer or mechanic employed under this **Contract** in writing of the prevailing rate of

wages for their particular job classification. Such notification shall be given to every worker, laborer, and mechanic on their first pay stub and with every pay stub thereafter; and

37.6.4 **Site** Laminated Identification Badges: The **Contractor** shall provide laminated identification badges which include a photograph of the worker's, laborer's or mechanic's face and indicate the worker's, laborer's or mechanic's name, trade, employer's name, and employment starting date (month/day/year). Further, the **Contractor** shall require as a condition of employment on the **Site**, that each and every worker, laborer or mechanic wear the laminated identification badge at all times and that it may be seen by any representative of the **City**. The **Commissioner** may grant a written waiver from the requirement that the laminated identification badge include a photograph if the **Contractor** demonstrates that the identity of an individual wearing a laminated identification badge can be easily verified by another method; and

37.6.5 Language Other Than English Used On **Site**: Provide the **ACCO** notice when three (3) or more employees (worker and/or laborer and/or mechanic) on the **Site**, at any time, speak a language other than English. The **ACCO** will then provide the **Contractor** the notices described in Article 37.6.1 in that language or languages as may be required. The **Contractor** is responsible for all distributions under this Article 37; and

37.6.6 Provision of Records: The **Contractor** and **Subcontractor(s)** shall produce within five (5) **Days** on the **Site** of the **Work** and upon a written order of the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, or the **Comptroller,** such records as are required to be kept by this Article 37.6; and

37.6.7 The **Contractor** and **Subcontractor(s)** shall pay employees by check or direct deposit. If this **Contract** is for an amount greater than one million ($1,000,000) dollars, checks issued by the **Contractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**). For any subcontract for an amount greater than seven hundred fifty thousand ($750,000) dollars, checks issued by a **Subcontractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**); and

37.6.8 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 37.6.1 through 37.6.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

37.7 The **Contractor** and its **Subcontractors** shall keep such employment and payroll records as are required by Section 220 of the Labor Law. The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of this Article 37.7 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract.**

37.8 At the time the **Contractor** makes application for each partial payment and for final payment, the **Contractor** shall submit to the **Commissioner** a written payroll certification, in the form provided by this **Contract**, of compliance with the prevailing wage, minimum wage, and other provisions and stipulations required by Labor Law Section 220 and of compliance with the training requirements of Labor Law Section 220-h set forth in Article 35.2. This certification of compliance shall be a condition precedent to payment and no payment shall be made to the **Contractor** unless and until each such certification shall have been submitted to and received by the **Commissioner**.

37.9 This **Contract** is executed by the **Contractor** with the express warranty and representation that the **Contractor** is not disqualified under the provisions of Section 220 of the Labor Law from the award of the **Contract**.

37.10 Any breach or violation of any of the foregoing shall be deemed a breach or violation of a material provision of this **Contract**, and grounds for cancellation thereof by the **City**.

ARTICLE 38. PAYROLL REPORTS

38.1 The **Contractor** and its **Subcontractor(s)** shall maintain on the **Site** during the performance of the **Work** the original payrolls or transcripts thereof which the **Contractor** and its **Subcontractor(s)** are required to maintain and shall submit such original payrolls or transcripts, subscribed and affirmed by it as true, within thirty (30) **Days** after issuance of its first payroll, and every thirty (30) **Days** thereafter, pursuant to Labor Law Section 220(3-a)(a)(iii). The **Contractor** and **Subcontractor(s)** shall submit such original payrolls or transcripts along with each and every payment requisition. If payment requisitions are not submitted at least once a month, the **Contractor** and its **Subcontractor(s)** shall submit original payrolls and transcripts both along with its payment requisitions and independently of its payment requisitions.

38.2 The **Contractor** shall maintain payrolls or transcripts thereof for six (6) years from the date of completion of the **Work** on this **Contract**. If such payrolls and transcripts are maintained outside of New York City after the completion of the **Work** and their production is required pursuant to this Article 38, the **Contractor** shall produce such records in New York City upon request by the City.

38.3 The **Contractor** and **Subcontractor(s)** shall comply with any written order, direction, or request made by the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, the **Agency Labor Law Investigator(s)**, or the **Comptroller**, to provide to the requesting party any of the following information and/or records within five (5) **Days** of such written order, direction, or request:

38.3.1 Such original payrolls or transcripts thereof subscribed and affirmed by it as true and the statements signed by each worker pursuant to this Chapter VIII; and/or

38.3.2 Attendance sheets for each **Day** on which any employee of the **Contractor** and/or any of the **Subcontractor(s)** performed **Work** on the **Site**, which attendance sheet shall be in a form acceptable to the **Agency** and shall provide information acceptable to the **Agency** to identify each such employee; and/or

38.3.3 Any other information to satisfy the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, the **Agency Labor Law Investigator(s)** or the **Comptroller**, that this Chapter VIII and the Labor Law, as to the hours of employment and prevailing rates of wages and/or supplemental benefits, are being observed.

38.4 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 38.1 and/or 38.2 may result in the **Commissioner** declaring the **Contractor** in default and/or the withholding of payments otherwise due under the **Contract**.

ARTICLE 39. DUST HAZARDS

39.1 Should a harmful dust hazard be created in performing the **Work** of this **Contract**, for the elimination of which appliances or methods have been approved by the Board of Standards and Appeals

of the City of New York, such appliances and methods shall be installed, maintained, and effectively operated during the continuance of such harmful dust hazard. Failure to comply with this provision after notice shall make this **Contract** voidable at the sole discretion of the **City**.

CHAPTER IX: PARTIAL AND FINAL PAYMENTS

ARTICLE 40. CONTRACT PRICE

40.1 The **City** shall pay, and the **Contractor** agrees to accept, in full consideration for the **Contractor's** performance of the **Work** subject to the terms and conditions hereof, the lump sum price or unit prices for which this **Contract** was awarded, plus the amount required to be paid for any **Extra Work** ordered by the **Commissioner** under Article 25, less credit for any **Work** omitted pursuant to Article 29.

ARTICLE 41. BID BREAKDOWN ON LUMP SUM

41.1 Within fifteen (15) **Days** after the commencement date specified in the **Notice to Proceed** or **Order to Work**, unless otherwise directed by the **Resident Engineer**, the **Contractor** shall submit to the **Resident Engineer** a breakdown of its bid price, or of lump sums bid for items of the **Contract**, showing the various operations to be performed under the **Contract**, as directed in the progress schedule required under Article 9, and the value of each of such operations, the total of such items to equal the lump sum price bid. Said breakdown must be approved in writing by the **Resident Engineer**.

41.2 No partial payment will be approved until the **Contractor** submits a bid breakdown that is acceptable to the **Resident Engineer**.

41.3 The **Contractor** shall also submit such other information relating to the bid breakdown as directed by the **Resident Engineer**. Thereafter, the breakdown may be used only for checking the **Contractor's** applications for partial payments hereunder, but shall not be binding upon the **City**, the **Commissioner**, or the **Engineer** for any purpose whatsoever.

ARTICLE 42. PARTIAL PAYMENTS

42.1 From time to time as the **Work** progresses satisfactorily, but not more often than once each calendar month (except where the **Commissioner** approves in writing the submission of invoices on a more frequent basis and for invoices relating to **Work** performed pursuant to a change order), the **Contractor** may submit to the **Engineer** a requisition for a partial payment in the prescribed form, which shall contain an estimate of the quantity and the fair value of the **Work** done during the payment period.

42.2 Partial payments may be made for materials, fixtures, and equipment in advance of their actual incorporation in the **Work**, as the **Commissioner** may approve, and upon the terms and conditions set forth in the General Conditions.

42.3 The **Contractor** shall also submit to the **Commissioner** in connection with every application for partial payment a verified statement in the form prescribed by the **Comptroller** setting forth the information required under Labor Law Section 220-a.

42.4 Within thirty (30) **Days** after receipt of a satisfactory payment application, and within sixty (60) **Days** after receipt of a satisfactory payment application in relation to **Work** performed pursuant to a change order, the **Engineer** will prepare and certify, and the **Commissioner** will approve, a voucher for a partial payment in the amount of such approved estimate, less any and all deductions authorized to be made by the **Commissioner** under the terms of this **Contract** or by **Law**.

ARTICLE 43. PROMPT PAYMENT

43.1 The Prompt Payment provisions of the **PPB** Rules in effect at the time of the bid will be applicable to payments made under this **Contract**. The provisions require the payment to the **Contractor** of interest on payments made after the required payment date, except as set forth in the **PPB** Rules.

43.2 The **Contractor** shall submit a proper invoice to receive payment, except where the **Contract** provides that the **Contractor** will be paid at predetermined intervals without having to submit an invoice for each scheduled payment.

43.3 Determination of interest due will be made in accordance with the **PPB** Rules.

43.4 If the **Contractor** is paid interest, the proportionate share(s) of that interest shall be forwarded by the **Contractor** to its **Subcontractor(s)**.

43.5 The **Contractor** shall pay each **Subcontractor** or **Materialman** not later than seven (7) **Days** after receipt of payment out of amounts paid to the **Contractor** by the **City** for **Work** performed by the **Subcontractor** or **Materialman** under this **Contract**.

> 43.5.1 If **Contractor** fails to make any payment to any **Subcontractor** or **Materialman** within seven (7) **Days** after receipt of payment by the **City** pursuant to this Article 43.5, then the **Contractor** shall pay interest on amounts due to such **Subcontractor** or **Materialman** at the rate of interest in effect on the date such payment is made by the **Contractor** computed in accordance with Section 756-b (1)(b) of the New York General Business Law. Accrual of interest shall commence on the **Day** immediately following the expiration of the seventh **Day** following receipt of payment by the **Contractor** from the **City** and shall end on the date on which payment is made.

43.6 The **Contractor** shall include in each of its subcontracts a provision requiring each **Subcontractor** to make payment to each of its **Subcontractors** or **Materialmen** for **Work** performed under this **Contract** in the same manner and within the same time period set forth above.

ARTICLE 44. SUBSTANTIAL COMPLETION PAYMENT

44.1 The **Contractor** shall submit with the **Substantial Completion** requisition:

> 44.1.1 A final verified statement of any pending Article 27 disputes in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the

Contractor claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay.

44.1.1(a) With respect to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the **City** Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 44.1.1(a) is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor** upon acceptance of the **Substantial Completion** payment pursuant to this Article 44, will have waived any such claims.

44.1.2 A **Final Approved Punch List**.

44.1.3 Where required, a request for an extension of time to achieve **Substantial Completion** or final extension of time.

44.2 The **Commissioner** shall issue a voucher calling for payment of any part or all of the balance due for **Work** performed under the **Contract**, including monies retained under Article 21, less any and all deductions authorized to be made by the **Commissioner**, under this **Contract** or by **Law**, and less twice the amount the **Commissioner** considers necessary to ensure the completion of the balance of the **Work** by the **Contractor**. Such a payment shall be considered a partial and not a final payment. No **Substantial Completion** payment shall be made under this Article 44 where the **Contractor** failed to complete the **Work** within the time fixed for such completion in the Schedule A of the General Conditions, or within the time to which completion may have been extended, until an extension or extensions of time for the completion of **Work** have been acted upon pursuant to Article 13.

44.3 No further partial payments shall be made to the **Contractor** after **Substantial Completion**, except the **Substantial Completion** payment and payment pursuant to any **Contractor's** requisition that were properly filed with the **Commissioner** prior to the date of **Substantial Completion**; however, the **Commissioner** may grant a waiver for further partial payments after the date of **Substantial Completion** to permit payments for change order **Work** and/or release of retainage and deposits pursuant to Articles 21 and 24. Such waiver shall be in writing.

44.4 The **Contractor** acknowledges that nothing contained in this Article 44 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 45. FINAL PAYMENT

45.1 After completion and **Final Acceptance** of the **Work**, the **Contractor** shall submit all required certificates and documents, together with a requisition for the balance claimed to be due under the **Contract**, less the amount authorized to be retained for maintenance under Article 24. Such submission shall be within 90 days of the date of the **Commissioner's** written determination of **Final Acceptance**, or within such additional time as may be granted by the **Commissioner** in writing. If the **Contractor** fails to submit all required certificates and documents within the time allowed, no payment of the balance claimed shall be made to the **Contractor** and the **Contractor** shall be deemed to have forfeited its right to payment of any balance claimed. A verified statement similar to that required in connection with applications for partial payments shall also be submitted to the **Commissioner**.

45.2 Amended Verified Statement of Claims: The **Contractor** shall also submit with the final requisition any amendments to the final verified statement of any pending dispute resolution procedures in accordance with the **PPB** Rules and this **Contract** and any and all alleged claims against the **City**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) that have occurred subsequent to **Substantial Completion**, setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each such item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay. With reference to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the **City** Corporation Counsel shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this Article 45.2, is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor**, upon acceptance of the Final Payment pursuant to Article 46, will have waived any such claims.

45.3 Preparation of Final Voucher: Upon determining the balance due hereunder other than on account of claims, the **Engineer** will prepare and certify, for the Commissioner's approval, a voucher for final payment in that amount less any and all deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**. In the case of a lump sum **Contract**, the **Commissioner** shall certify the voucher for final payment within thirty (30) **Days** from the date of completion and acceptance of the **Work**, provided all requests for extensions of time have been acted upon.

45.3.1 All prior certificates and vouchers upon which partial payments were made, being merely estimates made to enable the **Contractor** to prosecute the **Work** more advantageously, shall be subject to correction in the final voucher, and the certification of the **Engineer** thereon and the approval of the **Commissioner** thereof, shall be conditions precedent to the right of the **Contractor** to receive any money hereunder. Such final voucher shall be binding and conclusive upon the **Contractor**.

45.3.2 Payment pursuant to such final voucher, less any deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**, shall constitute the final payment, and shall be made by the **Comptroller** within thirty (30) **Days** after the filing of such voucher in his/her office.

45.4 The **Contractor** acknowledges that nothing contained in this Article 45 is intended to or shall in any way diminish the force and effect of Article 13.

ARTICLE 46. ACCEPTANCE OF FINAL PAYMENT

46.1 The acceptance by the **Contractor**, or by anyone claiming by or through it, of the final payment, whether such payment be made pursuant to any judgment of any court, or otherwise, shall constitute and operate as a release of the **City** from any and all claims of and liability to the **Contractor** for anything heretofore done or furnished for the **Contractor** relating to or arising out of this **Contract** and the **Work** done hereunder, and for any prior act, neglect or default on the part of the **City** or any of its officials, agents or employees, excepting only a claim against the **City** for the amounts deducted or retained in accordance with the terms and provisions of this **Contract** or by **Law**, and excepting any claims, not otherwise waived, or any pending dispute resolution procedures which are contained in the

verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45.

46.2 The **Contractor** is warned that the execution by it of a release, in connection with the acceptance of the final payment, containing language purporting to reserve claims other than those herein specifically excepted from the operation of this Article 46, or those for amounts deducted by the **Commissioner** from the final requisition or from the final payment as certified by the **Engineer** and approved by the **Commissioner**, shall not be effective to reserve such claims, anything stated to the **Contractor** orally or in writing by any official, agent or employee of the **City** to the contrary notwithstanding.

46.3 Should the **Contractor** refuse to accept the final payment as tendered by the **Comptroller**, it shall constitute a waiver of any right to interest thereon.

46.4 The **Contractor**, however, shall not be barred by this Article 46 from commencing an action for breach of **Contract** to the extent permitted by **Law** and by the terms of the **Contract** for any claims that are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45 or that arose after submission of the final payment requisition, provided that a detailed and verified statement of claim is served upon the contracting **Agency** and **Comptroller** not later than forty (40) **Days** after the making of such final payment by electronic funds transfer (EFT) or the mailing of such final payment. The statement shall specify the items upon which the claim will be based and any such claim shall be limited to such items.

ARTICLE 47. APPROVAL BY PUBLIC DESIGN COMMISSION

47.1 All works of art, including paintings, mural decorations, stained glass, statues, bas-reliefs, and other sculptures, monuments, fountains, arches, and other structures of a permanent character intended for ornament or commemoration, and every design of the same to be used in the performance of this **Contract**, and the design of all bridges, approaches, buildings, gates, fences, lamps, or structures to be erected, pursuant to the terms of this **Contract**, shall be submitted to the Art Commission, d/b/a the Public Design Commission of the City of New York, and shall be approved by the Public Design Commission prior to the erection or placing in position of the same. The final payment shall not become due or payable under this **Contract** unless and until the Public Design Commission shall certify that the design for the **Work** herein contracted for has been approved by the said Public Design Commission, and that the same has been executed in substantial accordance with the design so approved, pursuant to the provisions of Chapter 37, Section 854 of the **City** Charter, as amended.

CHAPTER X: CONTRACTOR'S DEFAULT

ARTICLE 48. COMMISSIONER'S RIGHT TO DECLARE CONTRACTOR IN DEFAULT

48.1 In addition to those instances specifically referred to in other Articles herein, the **Commissioner** shall have the right to declare the **Contractor** in default of this **Contract** if:

48.1.1 The **Contractor** fails to commence **Work** when notified to do so by the **Commissioner**; or if

48.1.2 The **Contractor** shall abandon the **Work**; or if

48.1.3 The **Contractor** shall refuse to proceed with the **Work** when and as directed by the **Commissioner**; or if

48.1.4 The **Contractor** shall, without just cause, reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the **Commissioner**, to complete the **Work** in accordance with the progress schedule; or if

48.1.5 The **Contractor** shall fail or refuse to increase sufficiently such working force when ordered to do so by the **Commissioner**; or if

48.1.6 The **Contractor** shall sublet, assign, transfer, convert or otherwise dispose of this **Contract** other than as herein specified; or sell or assign a majority interest in the **Contractor**; or if

48.1.7 The **Contractor** fails to secure and maintain all required insurance; or if

48.1.8 A receiver or receivers are appointed to take charge of the **Contractor's** property or affairs; or if

48.1.9 The **Commissioner** shall be of the opinion that the **Contractor** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the **Work**, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if

48.1.10 The **Commissioner** shall be of the opinion that the **Contractor** is or has been willfully or in bad faith violating any of the provisions of this **Contract**; or if

48.1.11 The **Commissioner** shall be of the opinion that the **Work** cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the **Commissioner's** opinion, attributable to conditions within the **Contractor's** control; or if

48.1.12 The **Work** is not completed within the time herein provided therefor or within the time to which the **Contractor** may be entitled to have such completion extended; or if

48.1.13 Any statement or representation of the **Contractor** in the **Contract** or in any document submitted by the **Contractor** with respect to the **Work**, the **Project**, or the **Contract** (or for purposes of securing the **Contract**) was untrue or incorrect when made; or if

48.1.14 The **Contractor** or any of its officers, directors, partners, five (5%) percent shareholders, principals, or other persons substantially involved in its activities, commits any of the acts or omissions specified as the grounds for debarment in the **PPB** Rules.

48.2 Before the **Commissioner** shall exercise his/her right to declare the **Contractor** in default, the **Commissioner** shall give the **Contractor** an opportunity to be heard, upon not less than two (2) **Days**' notice.

ARTICLE 49. EXERCISE OF THE RIGHT TO DECLARE DEFAULT

49.1 The right to declare the **Contractor** in default for any of the grounds specified or referred to in Article 48 shall be exercised by sending the **Contractor** a notice, signed by the **Commissioner**, setting forth the ground or grounds upon which such default is declared (hereinafter referred to as a "Notice of Default").

49.2 The **Commissioner's** determination that the **Contractor** is in default shall be conclusive, final, and binding on the parties and such a finding shall preclude the **Contractor** from commencing a plenary action for any damages relating to the **Contract**. If the **Contractor** protests the determination of the **Commissioner**, the **Contractor** may commence an action in a court of competent jurisdiction of the State of New York under Article 78 of the New York Civil Practice Law and Rules.

ARTICLE 50. QUITTING THE SITE

50.1 Upon receipt of such notice the **Contractor** shall immediately discontinue all further operations under this **Contract** and shall immediately quit the **Site**, leaving untouched all plant, materials, equipment, tools, and supplies then on the **Site**.

ARTICLE 51. COMPLETION OF THE WORK

51.1 The **Commissioner**, after declaring the **Contractor** in default, may then have the **Work** completed by such means and in such manner, by contract with or without public letting, or otherwise, as he/she may deem advisable, utilizing for such purpose such of the **Contractor's** plant, materials, equipment, tools, and supplies remaining on the **Site**, and also such **Subcontractors**, as he/she may deem advisable.

51.2 After such completion, the **Commissioner** shall make a certificate stating the expense incurred in such completion, which shall include the cost of re-letting and also the total amount of liquidated damages (at the rate provided for in the **Contract**) from the date when the **Work** should have been completed by the **Contractor** in accordance with the terms hereof to the date of actual completion of the **Work**. Such certificate shall be binding and conclusive upon the **Contractor**, its sureties, and any person claiming under the **Contractor**, as to the amount thereof.

51.3 The expense of such completion, including any and all related and incidental costs, as so certified by the **Commissioner**, and any liquidated damages assessed against the **Contractor**, shall be charged against and deducted out of monies which are earned by the **Contractor** prior to the date of default. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

ARTICLE 52. PARTIAL DEFAULT

52.1 In case the **Commissioner** shall declare the **Contractor** in default as to a part of the **Work** only, the **Contractor** shall discontinue such part, shall continue performing the remainder of the **Work** in strict conformity with the terms of this **Contract**, and shall in no way hinder or interfere with any **Other Contractor(s)** or persons whom the **Commissioner** may engage to complete the **Work** as to which the **Contractor** was declared in default.

52.2 The provisions of this Chapter relating to declaring the **Contractor** in default as to the entire **Work** shall be equally applicable to a declaration of partial default, except that the **Commissioner** shall be entitled to utilize for completion of the part of the **Work** as to which the **Contractor** was declared in default only such plant, materials, equipment, tools, and supplies as had been previously used by the **Contractor** on such part.

ARTICLE 53. PERFORMANCE OF UNCOMPLETED WORK

53.1 In completing the whole or any part of the **Work** under the provisions of this Chapter X, the **Commissioner** shall have the power to depart from or change or vary the terms and provisions of this **Contract**, provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variation, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the **Commissioner's** certificate of the cost of completion referred to in Article 51, nor shall it constitute a defense to an action to recover the amount by which such certificate exceeds the amount which would have been payable to the **Contractor** hereunder but for its default.

ARTICLE 54. OTHER REMEDIES

54.1 In addition to the right to declare the **Contractor** in default pursuant to this Chapter X, the **Commissioner** shall have the absolute right, in his/her sole discretion and without a hearing, to complete or cause to be completed in the same manner as described in Articles 51 and 53, any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List**. A written notice of the exercise of this right shall be sent to the **Contractor** who shall immediately quit the **Site** in accordance with the provisions of Article 50.

54.2 The expense of completion permitted under Article 54.1, including any and all related and incidental costs, as so certified by the **Commissioner**, shall be charged against and deducted out of monies which have been earned by the **Contractor** prior to the date of the exercise of the right set forth in Article 54.1; the balance of such monies, if any, subject to the other provisions of this **Contract**, to be paid to the **Contractor** without interest after such completion. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

54.3 The previous provisions of this Chapter X shall be in addition to any and all other remedies available under **Law** or in equity.

54.4 The exercise by the **City** of any remedy set forth herein shall not be deemed a waiver by the **City** of any other legal or equitable remedy contained in this **Contract** or provided under **Law**.

CHAPTER XI: MISCELLANEOUS PROVISIONS

ARTICLE 55. CONTRACTOR'S WARRANTIES

55.1 In consideration of, and to induce, the award of this **Contract** to the **Contractor**, the **Contractor** represents and warrants:

55.1.1 That it is financially solvent, sufficiently experienced and competent to perform the **Work**; and

55.1.2 That the facts stated in its bid and the information given by it pursuant to the Information for Bidders is true and correct in all respects; and

55.1.3 That it has read and complied with all requirements set forth in the **Contract**.

ARTICLE 56. CLAIMS AND ACTIONS THEREON

56.1 Any claim, that is not subject to dispute resolution under the **PPB** Rules or this **Contract**, against the **City** for damages for breach of **Contract** shall not be made or asserted in any action, unless the **Contractor** shall have strictly complied with all requirements relating to the giving of notice and of information with respect to such claims, as herein before provided.

56.2 Nor shall any action be instituted or maintained on any such claims unless such action is commenced within six (6) months after **Substantial Completion**; except that:

56.2.1 Any claims arising out of events occurring after **Substantial Completion** and before **Final Acceptance** of the **Work** shall be asserted within six (6) months of **Final Acceptance** of the **Work**;

56.2.2 If the **Commissioner** exercises his/her right to complete or cause to complete any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the **Final Approved Punch List** pursuant to Article 54, any such action shall be commenced within six (6) months from the date the **Commissioner** notifies the **Contractor** in writing that he/she has exercised such right. Any claims for monies deducted, retained or withheld under the provisions of this **Contract** shall be asserted within six (6) months after the date when such monies otherwise become due and payable hereunder; and

56.2.3 If the **Commissioner** exercises his/her right to terminate the **Contract** pursuant to Article 64, any such action shall be commenced within six (6) months of the date the **Commissioner** exercises said right.

ARTICLE 57. INFRINGEMENT

57.1 The **Contractor** shall be solely responsible for and shall defend, indemnify, and hold the **City** harmless from any and all claims (even if the allegations of the lawsuit are without merit) and judgments for damages and from costs and expenses to which the **City** may be subject to or which it may suffer or incur allegedly arising out of or in connection with any infringement by the **Contractor** of any copyright, trade secrets, trademark or patent rights or any other property or personal right of any third party by the **Contractor** and/or its **Subcontractors** in the performance or completion of the **Work**. Insofar as the facts or **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent permitted by **Law**.

ARTICLE 58. NO CLAIM AGAINST OFFICIALS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any official, agent or employee of the **City** for, or on account of, anything done or omitted to be done in connection with this **Contract**.

ARTICLE 59. SERVICE OF NOTICES

59.1 The **Contractor** hereby designates the business address, fax number, and email address specified in its bid, as the place where all notices, directions or other communications to the **Contractor** may be delivered, or to which they may be mailed. Any notice, direction, or communication from either party to the other shall be in writing and shall be deemed to have been given when (i) delivered personally; (ii) sent by certified mail, return receipt requested; (iii) delivered by overnight or same day courier service in a properly addressed envelope with confirmation; or (iv) sent by fax or email and, unless receipt of the fax or e-mail is acknowledged by the recipient by fax or e-mail, deposited in a post office box regularly maintained by the United States Postal Service in a properly addressed, postage pre-paid envelope.

59.2 **Contractor's** notice address, email address, or fax number may be changed at any time by an instrument in writing, executed and acknowledged by the **Contractor**, and delivered to the **Commissioner**.

59.3 Nothing herein contained shall, however, be deemed to preclude or render inoperative the service of any notice, direction or other communication upon the **Contractor** personally, or, if the **Contractor** is a corporation, upon any officer thereof.

ARTICLE 60. UNLAWFUL PROVISIONS DEEMED STRICKEN FROM CONTRACT

60.1 If this **Contract** contains any unlawful provision not an essential part of the **Contract** and which shall not appear to have been a controlling or material inducement to the making thereof, the same shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the **Contract** without affecting the binding force of the remainder.

ARTICLE 61. ALL LEGAL PROVISIONS DEEMED INCLUDED

61.1 It is the intent and understanding of the parties to this **Contract** that each and every provision of **Law** required to be inserted in this **Contract** shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is to be deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted, or is not inserted in correct form, then this **Contract** shall forthwith upon the application of either party be amended by such insertion so as to comply strictly with the **Law** and without prejudice to the rights of either party hereunder.

ARTICLE 62. TAX EXEMPTION

62.1 The **City** is exempt from payment of Federal, State, and local taxes, including sales and compensating use taxes of the State of New York and its cities and counties on all tangible personal property sold to the **City** pursuant to the provisions of this **Contract**. These taxes are not to be included in bids. However, this exemption does not apply to tools, machinery, equipment or other property leased by or to the **Contractor**, **Subcontractor** or **Materialman** or to tangible personal property which, even

though it is consumed, is not incorporated into the completed **Work** (consumable supplies) and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**. The **Contractor** and its **Subcontractors** and **Materialmen** shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such consumable supplies and tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**.

62.2 The **Contractor** agrees to sell and the **City** agrees to purchase all tangible personal property, other than consumable supplies and other tangible personal property that the **Contractor** is required to remove from the **Site** during or upon completion of the **Work**, that is required, necessary or proper for or incidental to the construction of the **Project** covered by this **Contract**. The sum paid under this **Contract** for such tangible personal property shall be in full payment and consideration for the sale of such tangible personal property.

62.2.1 The **Contractor** agrees to construct the **Project** and to perform all **Work**, labor and services rendered, necessary, proper or incidental thereto for the sum shown in the bid for the performance of such **Work**, labor, and services, and the sum so paid pursuant to this **Contract** for such **Work**, labor, and services, shall be in full consideration for the performance by the **Contractor** of all its duties and obligations under this **Contract** in connection with said **Work,** labor, and services.

62.3 20 NYCRR Section 541.3(d) provides that a **Contractor**'s purchases of tangible personal property that is either incorporated into real property owned by a governmental entity or purchased for and sold to a governmental entity are exempt from sales and use tax. The **City** shall not pay sales tax for any such tangible personal property that it purchases from the **Contractor** pursuant to the **Contract.** With respect to such tangible personal property, the **Contractor**, at the request of the **City**, shall furnish to the **City** such bills of sale and other instruments as may be required by the **City**, properly executed, acknowledged and delivered assuring to the **City** title to such tangible personal property, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such tangible personal property as the property of the **City**.

62.4 Title to all tangible personal property to be sold by the **Contractor** to the **City** pursuant to the provisions of the **Contract** shall immediately vest in and become the sole property of the **City** upon delivery of such tangible personal property to the **Site**. Notwithstanding such transfer of title, the **Contractor** shall have the full and continuing responsibility to install such tangible personal property in accordance with the provisions of this **Contract**, protect it, maintain it in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional tangible personal property in place of any that may be lost, stolen or rendered unusable, without cost to the **City**, until such time as the **Work** covered by the **Contract** is fully accepted by the **City**. Such transfer of title shall in no way affect any of the **Contractor's** obligations hereunder. In the event that, after title has passed to the **City**, any of the tangible personal property is rejected as being defective or otherwise unsatisfactory, title to all such tangible personal property shall be deemed to have been transferred back to the **Contractor**.

62.5 The purchase by **Subcontractors** or **Materialmen** of tangible personal property to be sold hereunder shall be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid sales and compensating use taxes, provided that the subcontracts and purchase agreements provide for the resale of such tangible personal property and that such subcontracts and purchase agreements are in a form similar to this **Contract** with respect to the separation of the sale of consumable supplies and tangible personal property that the

Contractor is required to remove from the **Site** during or upon completion of the **Work** from the **Work** and labor, services, and any other matters to be provided, and provided further that the subcontracts and purchase agreements provide separate prices for tangible personal property and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for tangible personal property from the payments for other **Work** and labor and other things to be provided.

62.6 The **Contractor** and its **Subcontractors** and **Materialmen** shall furnish a **Contractor** Exempt Purchase Certificate to all persons, firms or corporations from which they purchase tangible personal property for the performance of the **Work** covered by this **Contract**.

62.7 In the event any of the provisions of this Article 62 shall be deemed to be in conflict with any other provisions of this **Contract** or create any ambiguity, then the provisions of this Article 62 shall control.

ARTICLE 63. INVESTIGATION(S) CLAUSE

63.1 The parties to this **Contract** agree to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a United States, a State of New York (State) or a **City** governmental agency or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental agency that is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit or license that is the subject of the investigation, audit or inquiry.

63.2 If any person who has been advised that his/her statement, and any information from such statement, will not be used against him/her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, contract, or license entered into with the **City**, the State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the **City**, or any public benefit corporation organized under the **Laws** of the State of New York, or;

63.3 If any person refuses to testify for a reason other than the assertion of his/her privilege against self incrimination in an investigation, audit or inquiry conducted by a **City** or State governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental agency that is a party in interest in, and is seeking testimony concerning the award of, or performance under any transaction, agreement, lease, permit, contract, or license entered into with the **City**, the State, or any political subdivision thereof or any local development corporation within the **City**, then;

63.4 The **Commissioner** whose **Agency** is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit, or license shall convene a hearing, upon not less than five (5) **Days**' written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.

63.5 If any non-governmental party to the hearing requests an adjournment, the **Commissioner** who convened the hearing may, upon granting the adjournment, suspend any contract, lease, permit, or license, pending the final determination pursuant to Article 63.7 without the **City** incurring any penalty or damages for delay or otherwise.

63.6 The penalties which may attach after a final determination by the **Commissioner** may include but shall not exceed:

63.6.1 The disqualification for a period not to exceed five (5) years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any contract, lease, permit or license with or from the **City**; and/or

63.6.2 The cancellation or termination of any and all such existing **City** contracts, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this **Contract**, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the **City** incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, work done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the **City**.

63.7 The **Commissioner** shall consider and address in reaching his/her determination and in assessing an appropriate penalty the factors in Articles 63.7.1 and 63.7.2. The **Commissioner** may also consider, if relevant and appropriate, the criteria established in Articles 63.7.3 and 63.7.4, in addition to any other information which may be relevant and appropriate:

63.7.1 The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.

63.7.2 The relationship of the person who refused to testify to any entity that is a party to the hearing, including but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.

63.7.3 The nexus of the testimony sought to the subject entity and its contracts, leases, permits or licenses with the **City**.

63.7.4 The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Article 63.6, provided that the party or entity has given actual notice to the **Commissioner** upon the acquisition of the interest, or at the hearing called for in Article 63.4, gives notice and proves that such interest was previously acquired. Under either circumstance the party or entity shall present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

63.8 Definitions:

63.8.1 The term "license" or "permit" as used in this Article 63 shall be defined as a license, permit, franchise or concession not granted as a matter of right.

63.8.2 The term "person" as used in this Article 63 shall be defined as any natural person doing business alone or associated with another person or entity as a partner, director, officer, principal or employee.

63.8.3 The term "entity" as used in this Article 63 shall be defined as any firm, partnership, corporation, association, joint venture, or person that receives monies, benefits, licenses, leases, or permits from or through the **City** or otherwise transacts business with the **City**.

63.8.4 The term "member" as used in this Article 63 shall be defined as any person associated with another person or entity as a partner, director, officer, principal or employee.

63.9 In addition to and notwithstanding any other provision of this **Contract**, the **Commissioner** may in his/her sole discretion terminate this **Contract** upon not less than three (3) **Days'** written notice in the event the **Contractor** fails to promptly report in writing to the **Commissioner** of the Department of Investigations ("DOI") of the **City** any solicitation of money, goods, requests for future employment or other benefit or thing of value, by or on behalf of any employee of the **City** or other person, firm, corporation or entity for any purpose which may be related to the procurement or obtaining of this **Contract** by the **Contractor**, or affecting the performance of this **Contract**.

ARTICLE 64. TERMINATION BY THE CITY

64.1 In addition to termination pursuant to any other article of this **Contract**, the **Commissioner** may, at any time, terminate this **Contract** by written notice to the **Contractor**. In the event of termination, the **Contractor** shall, upon receipt of such notice, unless otherwise directed by the **Commissioner**:

64.1.1 Stop **Work** on the date specified in the notice;

64.1.2 Take such action as may be necessary for the protection and preservation of the **City's** materials and property;

64.1.3 Cancel all cancelable orders for material and equipment;

64.1.4 Assign to the **City** and deliver to the **Site** or another location designated by the **Commissioner**, any non-cancelable orders for material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract** and not incorporated in the **Work**;

64.1.5 Take no action which will increase the amounts payable by the **City** under this **Contract**.

64.2 In the event of termination by the **City** pursuant to this Article 64, payment to the **Contractor** shall be in accordance with Articles 64.2.1, 64.2.2 or 64.2.3, to the extent that each respective article applies.

64.2.1 Lump Sum Contracts or Items: On all lump sum **Contracts**, or on lump sum items in a **Contract**, the **City** will pay the **Contractor** the sum of the amounts described in Articles 64.2.1(a) and 64.2.1(b), less all payments previously made pursuant to this **Contract**. On lump sum **Contracts** only, the **City** will also pay the **Contractor** an additional sum as provided in Article 64.2.1(c).

64.2.1(a) For **Work** completed prior to the notice of termination, the **Contractor** shall be paid a pro rata portion of the lump sum bid amount, plus approved change orders, based upon the percent completion of the **Work**, as determined by the

Commissioner. For the purpose of determining the pro rata portion of the lump sum bid amount to which the **Contractor** is entitled, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be dispositive. The **Commissioner's** determination hereunder shall be final, binding, and conclusive.

64.2.1(b) For non-cancelable material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated in the **Work**, the **Contractor** shall be paid the lesser of the following, less salvage value:

64.2.1(b)(i) The Direct Cost, as defined in Article 64.2.4; or

64.2.1(b)(ii) The fair and reasonable value, if less than Direct Cost, of such material and equipment, plus necessary and reasonable delivery costs.

64.2.1(b)(iii) In addition, the **Contractor** shall be paid five (5%) percent of the amount described in Article 64.2.1(b)(i) or Article 64.2.1(b)(ii), whichever applies.

64.2.1(c) Except as otherwise provided in Article 64.2.1(d), on all lump sum **Contracts**, the **Contractor** shall be paid the percentage indicated below applied to the difference between the total lump sum bid amount and the total of all payments made prior to the notice of termination plus all payments allowed pursuant to Articles 64.2.1(a) and 64.2.1(b):

64.2.1(c)(i) Five (5%) percent of the first five million ($5,000,000) dollars; and

64.2.1(c)(ii) Three (3%) percent of any amount between five million ($5,000,000) dollars and fifteen million ($15,000,000) dollars; plus

64.2.1(c)(iii) One (1%) percent of any amount over fifteen million ($15,000,000) dollars.

64.2.1(d) In the event the **City** terminates a lump sum **Contract** pursuant to this Article 64 within ninety (90) **Days** after registration of the **Contract** with the **Comptroller**, the **Contractor** shall be paid one (1%) percent of the difference between the lump sum bid amount and the total of all payments made pursuant to this Article 64.2.

64.2.2 Unit Price Contracts or Items: On all unit price **Contracts**, or on unit price items in a **Contract**, the **City** will pay the **Contractor** the sum of the amounts described in Articles 64.2.2(a) and 64.2.2(b), less all payments previously made pursuant to this **Contract**:

64.2.2(a) For all completed units, the unit price stated in the **Contract**, and

64.2.2(b) For units that have been ordered but are only partially completed, the **Contractor** will be paid:

64.2.2(b)(i) A pro rata portion of the unit price stated in the **Contract** based upon the percent completion of the unit and

64.2.2(b)(ii) For non-cancelable material and equipment, payment will be made pursuant to Article 64.2.1(b).

64.2.3 Time and Materials Contracts or Items Based on Time and Material Records: On all **Contracts** or items in a **Contract** where payment for the **Work** is based on time and material records, the **Contractor** shall be paid in accordance with Article 26, less all payments previously made pursuant to this **Contract**.

64.2.4 Direct Costs: Direct Costs as used in this Article 64.2 shall mean:

64.2.4(a) The actual purchase price of material and equipment, plus necessary and reasonable delivery costs,

64.2.4(b) The actual cost of labor involved in construction and installation at the **Site**, and

64.2.4(c) The actual cost of necessary bonds and insurance purchased pursuant to requirements of this **Contract** less any amounts that have been or should be refunded by the **Contractor's** sureties or insurance carriers.

64.2.4(d) Direct Costs shall not include overhead.

64.3 In no event shall any payments under this Article 64 exceed the **Contract** price for such items.

64.4 All payments pursuant to Article 64 shall be in the nature of liquidated damages and shall be accepted by the **Contractor** in full satisfaction of all claims against the **City**.

64.5 The **City** may deduct or set off against any sums due and payable pursuant to this Article 64, any deductions authorized by this **Contract** or by **Law** (including but not limited to liquidated damages) and any claims it may have against the **Contractor**. The **City's** exercise of the right to terminate the **Contract** pursuant to this Article 64 shall not impair or otherwise effect the **City's** right to assert any claims it may have against the **Contractor** in a plenary action.

64.6 Where the **Work** covered by the **Contract** has been substantially completed, as determined in writing by the **Commissioner**, termination of the **Work** shall be handled as an omission of **Work** pursuant to Articles 29 and 33, in which case a change order will be issued to reflect an appropriate reduction in the **Contract** sum, or if the amount is determined after final payment, such amount shall be paid by the **Contractor**.

ARTICLE 65. CHOICE OF LAW, CONSENT TO JURISDICTION AND VENUE

65.1 This **Contract** shall be deemed to be executed in the **City** regardless of the domicile of the **Contractor**, and shall be governed by and construed in accordance with the **Laws** of the State of New York and the **Laws** of the United States, where applicable.

65.2 The parties agree that any and all claims asserted against the **City** arising under this **Contract** or related thereto shall be heard and determined in the courts of the State of New York ("New York State Courts") located in the **City** and County of New York. To effect this **Contract** and intent, the **Contractor** agrees:

65.2.1 If the **City** initiates any action against the **Contractor** in Federal court or in a New York State Court, service of process may be made on the **Contractor** either in person, wherever such **Contractor** may be found, or by registered mail addressed to the **Contractor** at its address as set forth in this **Contract**, or to such other address as the **Contractor** may provide to the **City** in writing; and

65.2.2 With respect to any action between the **City** and the **Contractor** in a New York State Court, the **Contractor** hereby expressly waives and relinquishes any rights it might otherwise have:

65.2.2(a) To move to dismiss on grounds of forum non conveniens;

65.2.2(b) To remove to Federal Court; and

65.2.2(c) To move for a change of venue to a New York State Court outside New York County.

65.2.3 With respect to any action brought by the **City** against the **Contractor** in a Federal Court located in the **City**, the **Contractor** expressly waives and relinquishes any right it might otherwise have to move to transfer the action to a Federal Court outside the **City**.

65.2.4 If the **Contractor** commences any action against the **City** in a court located other than in the **City** and County of New York, upon request of the **City**, the **Contractor** shall either consent to a transfer of the action to a New York State Court of competent jurisdiction located in the **City** and County of New York or, if the Court where the action is initially brought will not or cannot transfer the action, the **Contractor** shall consent to dismiss such action without prejudice and may thereafter reinstate the action in a New York State Court of competent jurisdiction in New York County.

65.3 If any provision(s) of this Article 65 is held unenforceable for any reason, each and all other provision(s) shall nevertheless remain in full force and effect.

ARTICLE 66. PARTICIPATION IN AN INTERNATIONAL BOYCOTT

66.1 The **Contractor** agrees that neither the **Contractor** nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the Federal Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce (Commerce Department) promulgated thereunder.

66.2 Upon the final determination by the Commerce Department or any other agency of the United States as to, or conviction of the **Contractor** or a substantially-owned affiliated company thereof for participation in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations promulgated thereunder, the **Comptroller** may, at his/her option, render forfeit and void this **Contract**.

66.3 The **Contractor** shall comply in all respects, with the provisions of Section 6-114 of the Administrative Code and the rules and regulations issued by the **Comptroller** thereunder.

ARTICLE 67. LOCALLY BASED ENTERPRISE PROGRAM

67.1 This **Contract** is subject to the requirements of Section 6-108.1 of the Administrative Code and regulations promulgated thereunder. No construction contract shall be awarded unless and until these requirements have been complied with in their entirety; however, compliance with this Article 67 is not required if the Agency sets Subcontractor Participation Goals for Minority- and Women-Owned Business Enterprises (M/WBEs).

67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the **City** Department of Business Services, if any portion of the **Contract** is subcontracted, not less than ten (10%) percent of the total dollar amount of the **Contract** shall be awarded to locally based enterprises (LBEs); except that where less than ten (10%) percent of the total dollar amount of the **Contract** is subcontracted, such lesser percentage shall be so awarded.

67.3 The **Contractor** shall not require performance and payment bonds from LBE **Subcontractors**.

67.4 If the **Contractor** has indicated prior to award that no **Work** will be subcontracted, no **Work** shall be subcontracted without the prior approval of the **Commissioner**, which shall be granted only if the **Contractor** makes a good faith effort beginning at least six (6) weeks before the **Work** is to be performed to obtain LBE **Subcontractors** to perform the **Work**.

67.5 If the **Contractor** has not identified sufficient LBE **Subcontractors** prior to award, it shall sign a letter of compliance stating that it complies with Section 6-108.1 of the Administrative Code, recognizes that achieving the LBE requirement is a condition of its **Contract**, and shall submit documentation demonstrating its good faith efforts to obtain LBEs. After award, the **Contractor** shall begin to solicit LBE's to perform subcontracted **Work** at least six (6) weeks before the date such **Work** is to be performed and shall demonstrate that a good faith effort has been made to obtain LBEs on each subcontract until it meets the required percentage.

67.6 Failure of the **Contractor** to comply with the requirements of Section 6-108.1 of the Administrative Code and the regulations promulgated thereunder shall constitute a material breach of this **Contract**. Remedy for such breach may include the imposition of any or all of the following sanctions:

67.6.1 Reducing the **Contractor's** compensation by an amount equal to the dollar value of the percentage of the LBE subcontracting requirement not complied with;

67.6.2 Declaring the **Contractor** in default;

67.6.3 If the **Contractor** is an LBE, de-certifying and declaring the **Contractor** ineligible to participate in the LBE program for a period of up to three (3) years.

ARTICLE 68. ANTITRUST

68.1 The **Contractor** hereby assigns, sells, and transfers to the **City** all right, title, and interest in and to any claims and causes of action arising under the antitrust **Laws** of New York State or of the United States relating to the particular goods or services purchased or procured by the **City** under this **Contract**.

ARTICLE 69. MacBRIDE PRINCIPLES PROVISIONS

69.1 Notice To All Prospective **Contractors**:

69.1.1 Local Law No. 34 of 1991 became effective on September 10, 1991 and added Section 6-115.1 of the Administrative Code. The local **Law** provides for certain restrictions on **City Contracts** to express the opposition of the people of the **City** to employment discrimination practices in Northern Ireland to promote freedom of work-place opportunity.

69.1.2 Pursuant to Section 6-115.1, prospective **Contractors** for **Contracts** to provide goods or services involving an expenditure of an amount greater than ten thousand ($10,000.) dollars, or for construction involving an amount greater than fifteen thousand ($15,000.) dollars, are asked to sign a rider in which they covenant and represent, as a material condition of their **Contract**, that any business operations in Northern Ireland conducted by the **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** will be conducted in accordance with the MacBride Principles of nondiscrimination in employment.

69.1.3 Prospective **Contractors** are not required to agree to these conditions. However, in the case of **Contracts** let by competitive sealed bidding, whenever the lowest responsible bidder has not agreed to stipulate to the conditions set forth in this notice and another bidder who has agreed to stipulate to such conditions has submitted a bid within five (5%) percent of the lowest responsible bid for a **Contract** to supply goods, services or contraction of comparable quality, the **Agency** shall refer such bids to the Mayor, the Speaker or other officials, as appropriate, who may determine, in accordance with applicable **Law**, that it is in the best interest of the **City** that the **Contract** be awarded to other than the lowest responsible pursuant to Section 313(b)(2) of the **City** Charter.

69.1.4 In the case of **Contracts** let by other than competitive sealed bidding, if a prospective **Contractor** does not agree to these conditions, no **Agency**, elected official or the **City** Council shall award the **Contract** to that bidder unless the **Agency** seeking to use the goods, services or construction certifies in writing that the **Contract** is necessary for the **Agency** to perform its functions and there is no other responsible **Contractor** who will supply goods, services or construction of comparable quality at a comparable price.

69.2 In accordance with Section 6-115.1 of the Administrative Code, the **Contractor** stipulates that such **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** either:

69.2.1 Have no business operations in Northern Ireland, or

69.2.2 Shall take lawful steps in good faith to conduct any business operations they have in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.

69.3 For purposes of this Article, the following terms shall have the following meanings:

69.3.1 "MacBride Principles" shall mean those principles relating to nondiscrimination in employment and freedom of work-place opportunity which require employers doing business in Northern Ireland to:

69.3.1(a) increase the representation of individuals from under-represented religious groups in the workforce, including managerial, supervisory, administrative, clerical and technical jobs;

69.3.1(b) take steps to promote adequate security for the protection of employees from under-represented religious groups both at the work-place and while traveling to and from **Work**;

69.3.1(c) ban provocative religious or political emblems from the workplace;

69.3.1(d) publicly advertise all job openings and make special recruitment efforts to attract applicants from under-represented religious groups;

69.3.1(e) establish layoff, recall, and termination procedures which do not in practice favor a particular religious group;

69.3.1(f) abolish all job reservations, apprenticeship restrictions and different employment criteria which discriminate on the basis of religion;

69.3.1(g) develop training programs that will prepare substantial numbers of current employees from under-represented religious groups for skilled jobs, including the expansion of existing programs and the creation of new programs to train, upgrade, and improve the skills of workers from under-represented religious groups;

69.3.1(h) establish procedures to asses, identify, and actively recruit employees from under-represented religious groups with potential for further advancement; and

69.3.1(i) appoint a senior management staff member to oversee affirmative action efforts and develop a timetable to ensure their full implementation.

69.4 The **Contractor** agrees that the covenants and representations in Article 69.2 are material conditions to this **Contract**. In the event the **Agency** receives information that the **Contractor** who made the stipulation required by this Article 69 is in violation thereof, the **Agency** shall review such information and give the **Contractor** an opportunity to respond. If the **Agency** finds that a violation has occurred, the **Agency** shall have the right to declare the **Contractor** in default in default and/or terminate this **Contract** for cause and procure supplies, services or **Work** from another source in the manner the **Agency** deems proper. In the event of such termination, the **Contractor** shall pay to the **Agency**, or the **Agency** in its sole discretion may withhold from any amounts otherwise payable to the **Contractor**, the difference between the **Contract** price for the uncompleted portion of this **Contract** and the cost to the **Agency** of completing performance of this **Contract** either itself or by engaging another **Contractor** or **Contractors**. In the case of a requirement **Contract**, the **Contractor** shall be liable for such difference in price for the entire amount of supplies required by the **Agency** for the uncompleted term of **Contractor's Contract**. In the case of a construction **Contract**, the **Agency** shall also have the right to hold the **Contractor** in partial or total default in accordance with the default provisions of this **Contract**, and/or may seek debarment or suspension of the **Contractor**. The rights and remedies of the **Agency** hereunder shall be in addition to, and not in lieu of, any rights and remedies the **Agency** has pursuant to this **Contract** or by operation of **Law**.

ARTICLE 70. ELECTRONIC FILING/NYC DEVELOPMENT HUB

70.1 The **Contractor** shall electronically file all alteration type-2 and alteration type-3 applications via the New York City Development Hub Web site, except applications for the following types of minor alterations: enlargements, curb cuts, legalizations, fire alarms, builders pavement plans, and jobs filed on Landmark Preservation Commission calendared properties. All such filings must be professionally certified. Information about electronic filing via the New York City Development Hub is available on the **City** Department of Buildings Web site at www.nyc.gov/buildings.

ARTICLE 71. PROHIBITION OF TROPICAL HARDWOODS

71.1 Tropical hardwoods, as defined in Section 165 of the New York State Finance Law (Finance Law), shall not be utilized in the performance of this **Contract** except as expressly permitted by Section 165 of the Finance Law.

ARTICLE 72. CONFLICTS OF INTEREST

72.1 Section 2604 of the **City** Charter and other related provisions of the **City** Charter, the Administrative Code, and the Penal Law are applicable under the terms of this **Contract** in relation to conflicts of interest and shall be extended to **Subcontractors** authorized to perform **Work**, labor and services pursuant to this **Contract** and further, it shall be the duty and responsibility of the **Contractor** to so inform its respective **Subcontractors**. Notice is hereby given that, under certain circumstances, penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

ARTICLE 73. MERGER CLAUSE

73.1 The written **Contract** herein, contains all the terms and conditions agreed upon by the parties hereto, and no other agreement, oral or otherwise, regarding the subject matter of this **Contract** shall be deemed to exist or to bind any of the parties hereto, or to vary any of the terms contained herein.

ARTICLE 74. STATEMENT OF WORK

74.1 The **Contractor** shall furnish all labor and materials and perform all **Work** in strict accordance with the **Specifications** and **Addenda** thereto, numbered as shown in Schedule A.

ARTICLE 75. COMPENSATION TO BE PAID TO CONTRACTOR

75.1 The **City** will pay and the **Contractor** will accept in full consideration for the performance of the **Contract**, subject to additions and deductions as provided herein, the total sum shown in Schedule A, this said sum being the amount at which the **Contract** was awarded to the **Contractor** at a public letting thereof, based upon the **Contractor's** bid for the **Contract**.

ARTICLE 76. ELECTRONIC FUNDS TRANSFER

76.1 In accordance with Section 6-107.1 of the Administrative Code, the **Contractor** agrees to accept payments under this **Contract** from the **City** by electronic funds transfer (EFT). An EFT is any

transfer of funds, other than a transaction originated by check, draft or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument or computer or magnetic tape so as to order, instruct or authorize a financial institution to debit or credit an account. Prior to the first payment made under this **Contract**, the **Contractor** shall designate one financial institution or other authorized payment agent and shall complete the attached "EFT Vendor Payment Enrollment Form" in order to provide the Commissioner of the **City** Department of Finance with information necessary for the **Contractor** to receive electronic funds transfer payments through a designated financial institution or authorized payment agent. The crediting of the amount of a payment to the appropriate account on the books of a financial institution or other authorized payment agent designated by the **Contractor** shall constitute full satisfaction by the **City** for the amount of the payment under this **Contract**. The account information supplied by the **Contractor** to facilitate the electronic funds transfer shall remain confidential to the fullest extent provided by **Law**.

76.2 The **Commissioner** may waive the application of the requirements of this Article 76 to payments on contracts entered into pursuant to Section 315 of the **City** Charter. In addition, the Commissioner of the Department of Finance and the Comptroller may jointly issue standards pursuant to which the **Agency** may waive the requirements of this Article 76 for payments in the following circumstances: (i) for individuals or classes of individuals for whom compliance imposes a hardship; (ii) for classifications or types of checks; or (iii) in other circumstances as may be necessary in the interest of the **City**.

ARTICLE 77. RECORDS RETENTION

77.1 The **Contractor** agrees to retain all books, records, and other documents relevant to this **Contract** for six years after the final payment or termination of this **Contract**, whichever is later. **City**, state, and federal auditors and any other persons duly authorized by the **City** shall have full access to and the right to examine any such books, records, and other documents during the retention period.

ARTICLE 78. EXAMINATION AND VIEWING OF SITE, CONSIDERATION OF OTHER SOURCES OF INFORMATION AND CHANGED SITE CONDITIONS

78.1 Pre-Bidding (Investigation) Viewing of Site – Bidders must carefully view and examine the **Site** of the proposed **Work**, as well as its adjacent area, and seek other usual sources of information, for they will be conclusively presumed to have full knowledge of any and all conditions and hazards on, about or above the **Site** relating to or affecting in any way the performance of the **Work** to be done under the **Contract** that were or should have been known by a reasonably prudent bidder. To arrange a date for visiting the **Site**, bidders are to contact the **Agency** contact person specified in the bid documents.

78.2 Should the **Contractor** encounter during the progress of the Work site conditions or environmental hazards at the **Site** materially differing from any shown on the **Contract Drawings** or indicated in the **Specifications** or such conditions or environmental hazards as could not reasonably have been anticipated by the **Contractor**, which conditions or hazards will materially affect the cost of the **Work** to be done under the **Contract**, the attention of the **Commissioner** must be called immediately to such conditions or hazards before they are disturbed. The **Commissioner** shall thereupon promptly investigate the conditions or hazards. If the **Commissioner** finds that they do so materially differ, and that they could not have been reasonably anticipated by the **Contractor**, the **Contract** may be modified with the **Commissioner**'s written approval.

ARTICLE 79. PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS ENTERPRISES IN CITY PROCUREMENT

NOTICE TO ALL PROSPECTIVE CONTRACTORS

ARTICLE I. M/WBE PROGRAM

Local Law No. 129 of 2005 added and Local Law 1 of 2013 amended Section 6-129 of the Administrative Code of the City of New York (hereinafter "Section 6-129"). Section 6-129 establishes the program for participation in City procurement ("M/WBE Program") by minority- owned business enterprises ("MBEs") and women-owned business enterprises ("WBEs"), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6-129, the intent of the program is to address the impact of discrimination on the City's procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "M/WBE Utilization Plan"), and are detailed below. The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129. Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts. Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A

PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS

1. The **MBE and/or WBE Participation Goals** established for this Contract or Task Orders issued pursuant to this Contract, ("**Participation Goals**"), as applicable, are set forth on Schedule B, Part I to this Contract (see Page 1, line 1 Total Participation Goals) or will be set forth on Schedule B, Part I to Task Orders issued pursuant to this Contract, as applicable.

The **Participation Goals** represent a percentage of the total dollar value of the Contract or Task Order, as applicable, that may be achieved by awarding subcontracts to firms certified with New York City Department of Small Business Services as MBEs and/or WBEs, and/or by crediting the participation of prime contractors and/or qualified joint ventures as provided in Section 3 below, unless the goals have been waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation Goals**, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

3. If **Participation Goals** have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant **Participation Goal**, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant **Participation Goal**. In accordance with Section 6-129, the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

4. A. If **Participation Goals** have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals**, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre- award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.

B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE **Participation Goals**, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part II (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified **Participation Goals** by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals** that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed nonresponsive.

(ii) **Participation Goals** on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If **Participation Goals** have been established on a Task Order, a contractor shall be required to submit a Schedule B – M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. The contractor must engage in good faith efforts to meet the **Participation Goals** as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.

C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART II). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS (SEE SECTION V OF PART II) WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART III). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multiyear contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below $3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work**. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.

6. MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the

firms' commencement of work. A list of MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).

7. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to,: the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's **M/WBE** Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its **M/WBE** Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.

9. Where an **M/WBE** Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or $500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the **Participation Goals** should be modified.

10. Pre-award waiver of the **Participation Goals**. (a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the **Participation Goals** in accordance with Section 6-129, which requests that Agency change one or more **Participation Goals** on the grounds that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.

(b) To apply for a full or partial waiver of the **Participation Goals**, a bidder, proposer, or contractor, as applicable, must complete Part III (Page 5) of Schedule B and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at poped@ddc.nyc.gov or via facsimile at (718) 391-1886. Bidders, proposers, or contractors, as applicable, who have submitted requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an Agency response will be provided by close-of-business on the business day before such weekend or holiday date.

(c) If the Agency determines that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

(d) Agency may grant a full or partial waiver of the **Participation Goals** to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of subcontracting in its **M/WBE** Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the **Participation Goals**. In making such determination, Agency may consider whether the **M/WBE** Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.

11. Modification of **M/WBE** Utilization Plan. (a) A Contractor may request a modification of its **M/WBE** Utilization Plan after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below $3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission**. The Agency may grant a request for Modification of a Contractor's **M/WBE** Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the **Participation Goals.** In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

(i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;
(ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
(iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;
(iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the M/WBE Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
(v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;
(vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;
(vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;
(viii) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's M/WBE officer shall provide written notice to the Contractor of the determination.

(b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its **M/WBE** Utilization Plan would be awarded to subcontractors.

12. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an **M/WBE** Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Participation Goals**, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

13. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its M/WBE Utilization Plan, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

14. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

PART B: MISCELLANEOUS

1. The Contractor shall take notice that, if this solicitation requires the establishment of an **M/WBE** Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the **M/WBE** Utilization Plan.

2. Pursuant to DSBS rules, construction contracts that include a requirement for an **M/WBE** Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.

3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.

4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).

5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required **Participation Goals**.

ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.

2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any **M/WBE** Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.

3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any **M/WBE** Utilization Plan, Agency may determine that one of the following actions should be taken:

(a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;
(b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;
(c) making a finding that the Contractor is in default of the Contract;
(d) terminating the Contract;
(e) declaring the Contractor to be in breach of Contract;
(f) withholding payment or reimbursement;
(g) determining not to renew the Contract;
(h) assessing actual and consequential damages;
(i) assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;
(j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or
(k) taking any other appropriate remedy.

4. If an **M/WBE** Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its **Participation Goals** contained in its **M/WBE** Utilization Plan or the **Participation Goals** as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the **Participation Goals** and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the **Participation Goals**, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6- 129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its **M/WBE** Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an **M/WBE** Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in VENDEX as caution data.

IN WITNESS WHEREOF, the Commissioner, on behalf of the City of New York, and the Contractor, have executed this agreement in quadruplicate, two parts of which are to remain with the Commissioner, another to be filed with the Comptroller of the City, and the fourth to be delivered to the Contractor.

THE CITY OF NEW YORK

By:_____
Commissioner

CONTRACTOR:

By:_____
(Member of Firm or Officer of Corporation)

Title:_____

(Where Contractor is a Corporation, add):
Attest:

_____
Secretary

(Seal)

_____

DocuSign Envelope ID: 87EBC275-B8C1-47D0-A88A-6F457ED4F495

CONTRACT SIGNATURE PAGE

This Contract is entered by and between the City of New York ("City"), acting by and through the **DEPARTMENT OF DESIGN AND CONSTRUCTION**, and **LO SARDO GENERAL CONTRACTORS INC** ("Contractor").

This Contract consists of this contract signature page as well as the following documents ("Contract Documents") which are located in the Documents tab of the PASSPort record titled **85021B0135-S136-383N**.

1. **(Bid) - BID FORM- SUB.pdf - Feb 23 2022 2:54PM**
2. **(Question answer) - QUALIFICATION FORM.pdf - Feb 23 2022 2:54PM**
3. **Bidder #1 - Lo Sardo General Contractors, Inc. - S136-383N Revised Bid Breakdown - Feb 23 2022 3:10PM**
4. **Broker's Certificate - Mar 1 2022 7:27PM**
5. **COVID-19 Bid Opening Procedures - Feb 23 2022 2:54PM**
6. **Disability Insurance - Mar 1 2022 7:10PM**
7. **Insurance Certificate - Mar 1 2022 7:32PM**
8. **Lo Sardo General Contractors, Inc. - S136-383N Bid Bond - Feb 23 2022 3:09PM**
9. **Lo Sardo General Contractors, Inc. - S136-383N Cured Schedule B - Feb 23 2022 3:12PM**
10. **Lo Sardo General Contractors, Inc. - S136-383N PLA Letter of Assent - Feb 23 2022 3:14PM**
11. **Proposal/Bid - Feb 23 2022 2:54PM**
12. **RFx Document - Feb 23 2022 2:54PM**
13. **S136-383N Addendum 1 - Feb 23 2022 2:54PM**
14. **S136-383N Addendum 2 - Feb 23 2022 2:54PM**
15. **S136-383N Addendum 3 - Feb 23 2022 2:54PM**
16. **S136-383N Addendum 4 - Feb 23 2022 2:54PM**
17. **S136-383N Addendum 5 - Feb 23 2022 2:54PM**
18. **S136-383N Addendum 6 - Feb 23 2022 2:54PM**
19. **S136-383N Addendum 7 - Feb 23 2022 2:54PM**
20. **S136-383N Addendum 8 - Feb 23 2022 2:54PM**
21. **S136-383N Contract Drawings 1/2 [Addendum 6] - Feb 23 2022 2:54PM**
22. **S136-383N Contract Drawings 2/2 [Addendum 6] - Feb 23 2022 2:54PM**
23. **S136-383N Pre-Bid Site Walk Through Location - Feb 23 2022 2:54PM**
24. **S136-383N Vendors List - Feb 23 2022 2:54PM**
25. **S136-383N Volume 2 - Feb 23 2022 2:54PM**
26. **S136-383N Volume 3 - Addendum 6 - Feb 23 2022 2:54PM**
27. **Security / Bond - Mar 1 2022 7:18PM**
28. **Volume 1 - Feb 23 2022 2:54PM**
29. **Worker's Compensation - Mar 1 2022 7:15PM**

The above order does not represent an order of precedence. The Contract shall be governed by the order of precedence, if any, in the Contract Documents or by ordinary contract principles if no such order of precedence exists.

Each party is signing this Contract electronically on the date stated in that party's electronic signature.

The City of New York
By: **DEPARTMENT OF DESIGN AND CONSTRUCTION**

DocuSigned by:
Thomas Foley
FE0ABB939FF24B0...

(Signature)

DocuSign Envelope ID: 87EBC275-B8C1-47D0-A88A-6F457ED4F495

Name: Thomas Foley

Title: Commissioner

Date: 3/10/2022 | 07:26:51 PST

Contractor

By: **LO SARDO GENERAL CONTRACTORS INC**

DocuSigned by:
Silvio Lo Sardo
CDB16ADF523C429...

(Signature)

Name: Silvio Lo Sardo

Title: President

Date: 3/7/2022 | 10:40:09 PST

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally came _____ to me known who, being by me duly sworn did depose and say that he resides at _____ _____ that he is the _____ of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

_____
Notary Public or Commissioner of Deeds

ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally appeared _____ to me known, and known to me to be one of the members of the firm of _____ _____ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

_____
Notary Public or Commissioner of Deeds

ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

_____
Notary Public or Commissioner of Deeds

ACKNOWLEDGEMENT BY COMMISSIONER

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally came _____ to me known, and known to be the Deputy Commissioner of the Department of Design and Construction of The City of New York, the person described as such in and who as such executed the foregoing instrument and acknowledged to me that he executed the same as Deputy Commissioner for the purposes therein mentioned.

_____
Notary Public or Commissioner of Deeds

A U T H O R I T Y

MAYOR'S CERTIFICATE NO. CBX DATED
BUDGET DIRECTOR'S CERTIFICATE NO. DATED

APPROPRIATION
COMMISSIONER'S CERTIFICATE

In conformity with the provisions of Section 6-101 of the Administrative Code of the City of New York, it is hereby certified that the estimated cost of the work, materials and supplies required by the within Contract, amounting to

_____

_____

Dollars ($ _____)

is chargeable to the fund of the Department of Design and Construction entitled Code

_____

_____

_____
Department of Design and Construction

I hereby certify that the specifications contained herein comply with the terms and conditions of the BUDGET.

_____
Commissioner

COMPTROLLER'S CERTIFICATE

The City of New York_____

Pursuant to the provisions of Section 6-101 of the Administrative Code of the City of New York, I hereby certify that there remains unapplied and unexpended a balance of the above mentioned fund applicable to this Contract sufficient to pay the estimated expense of executing the same viz:

$_____

_____
Comptroller

MAYOR'S CERTIFICATE OR CERTIFICATE OF THE DIRECTOR OF THE BUDGET

<u>Performance Bond #1 (Pages 100 to 103)</u>: Use if the total contract price is $5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.

PERFORMANCE BOND #1

KNOW ALL PERSONS BY THESE PRESENTS:,
That we, _____

_____

_____

hereinafter referred to as the "Principal,"
and, _____

_____

_____

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns in the penal sum
of _____

_____

_____

($_____) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

_____

_____

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making

<u>Performance Bond #1 (Pages 100 to 103)</u>: Use if the total contract price is $5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.

good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to (1) pay the City the cost to complete the contract as determined by the City in excess of the balance of the Contract held by the City, plus any damages or costs to which the City is entitled, up to the full amount of the above penal sum, (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof, or (3) tender a completion Contractor that is acceptable to the City. The Surety (Sureties) further agrees, at its option, either to notify the City that it elects to pay the city the cost of completion plus any applicable damages and costs under option (1) above, or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and, if the Surety elects to fully perform and complete the Work, then to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. If the Surety elects to tender payment pursuant to (1) above, then the Surety shall tender such amount within fifteen (15) business days notification from the City of the cost of completion. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and complete all Work as provided herein, or to tender a completion contractor.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, and waivers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to subcontractors shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal. Notwithstanding the above, if the City makes payments to the Principal before the time required by the contract that in the aggregate exceed $100,000 or 10% of the Contract price, whichever is less, and that have not become earned prior to the Principal being found to be in default, then all payments made to the Principal before the time required by the Contract shall be added to the remaining contract value available to be paid for the completion of the Contract as if such sums had not been paid to the Principal, but shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and to complete all Work as provided herein, or to tender a completion contractor.

<u>Performance Bond #1 (Pages 100 to 103)</u>: Use if the total contract price is $5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

_____ day of _____, 20_____.

(Seal)

_____(L.S.)
Principal

By:_____.

(Seal)
Surety

By:_____.
_____.

(Seal) Surety

By:_____.
_____.

(Seal) Surety

By:_____.
_____.

(Seal) Surety

By:_____.
_____.

(Seal) Surety

By:_____.

Bond Premium Rate _____.

Bond Premium Cost _____.

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

Performance Bond #1 (Pages 100 to 103): Use if the total contract price is $5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.m.

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of _____ County of _____ ss:

On this _____ day of _____, 20_____ before me personally came _____,
to me known, who, being by me duly sworn did depose and say that he/she resides at _____
_____; that he/she is the _____
of the corporation described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

_____
Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, 20 _____ before me personally came _____,
to me known, who, being by me duly sworn did dispose and say that he/she resides at _____
_____; that he/she is _____ partner of _____, a limited/general partnership existing under the laws of the State of _____, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

_____
Notary Public or Commissioner of Deeds.

ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, 20_____ before me personally came _____,
to me known, who,.being by me duly sworn did depose and say that he/she resides at _____
_____, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

_____
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * * * * *

Affix Acknowledgments and Justification of Sureties.

Performance Bond #2 (Pages 104 to 107): Use if the total contract price is more than $5 Million.

PERFORMANCE BOND #2

KNOW ALL PERSONS BY THESE PRESENTS:,
That we, LoSardo General Contractors Inc

35 Crescent Street, Brooklyn, NY 11208

hereinafter referred to as the "Principal,"
and, United Fire & Casualty Company

118 2nd Ave SE, Cedar Rapids, IA 52401

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns in the penal sum
of

Twenty Five Million Six Hundred Fifty Four Thousand Dollars and 00/100----------

($ 25,654,000.00) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

DSNY Brooklyn 17 & 18 Garage Roof and HVAC Upgrades

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making

good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

Performance Bond #2 (Pages 104 to 107): Use if the total contract price is more than $5 Million.

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

25 day of February 2022.

(Seal)

LoSardo General Contractors Inc (L.S.)
Principal

By: Silvio C. LoSardo, Pres.

(Seal)

Surety
United Fire & Casualty Company

By: Tara Laverdiere, Attorney-in-Fact

(Seal)

Surety

By: .

(Seal)

Surety

By: .

(Seal)

Surety

By: .

(Seal)

Surety

By: .

Bond Premium Rate 16.56/16.56/10.01/7.94/7.25/6.62.

Bond Premium Cost $197,642.00.

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

Performance Bond #2 (Pages 104 to 107): Use if the total contract price is more than $5 Million.

ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION

State of New York County of Kings ss:

On this 25th day of February, 20 22 before me personally came Silvio C. La Sardo,
to me known, who, being by me duly sworn did depose and say that he resides
at 254 Links Drive West, Oceanside, NY 11572; that he/~~she~~ is the President
of the corporation described in and which executed the foregoing instrument; that he/she signed his/her name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

Lucy Romano
Notary Public or Commissioner of Deeds.

LUCY ROMANO
Notary Public, State of New York
No. 01RO5016372
Qualified in Queens County
Commission Expires Aug 9, 2025

ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, 20 _____ before me personally came _____,
to me known, who, being by me duly sworn did depose and say that he/she resides
at_____

_____; that he/she is _____ partner of _____, a limited/general partnership existing under the laws of the State of _____, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

_____
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, 20_____ before me personally came _____,
to me known, who, being by me duly sworn did depose and say that he/she resides
at_____
_____, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

_____
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * * * * *

Affix Acknowledgments and Justification of Sureties.

Surety Acknowledgment

State of **New York**

County of **Nassau**

On the 25 day of February **2022** personally came Tara Laverdiere to me known , who being by me duly sworn did depose and say that he/she is an Attorney-in-Fact, of United Fire & Casualty Company which executed the above Instrument know(s) the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he/she/they signed the said instrument and affixed the said seal as Attorney-in-fact by authority of the Board of Directors of said corporation and by authority of this office under the standing resolution thereof.

My commission expires _____

Notary Public

DENESE THOMPSON
NOTARY PUBLIC-STATE OF NEW YORK
No. 01TH4623317
Qualified in Nassau County
My Commission Expires 02-28-2023

UNITED FIRE & CASUALTY COMPANY, CEDAR RAPIDS, IA
UNITED FIRE & INDEMNITY COMPANY, WEBSTER, TX
FINANCIAL PACIFIC INSURANCE COMPANY, LOS ANGELES, CA
CERTIFIED COPY OF POWER OF ATTORNEY
(original on file at Home Office of Company – See Certification)

Inquiries: Surety Department
118 Second Ave SE
Cedar Rapids, IA 52401

KNOW ALL PERSONS BY THESE PRESENTS, That United Fire & Casualty Company, a corporation duly organized and existing under the laws of the State of Iowa; United Fire & Indemnity Company, a corporation duly organized and existing under the laws of the State of Texas; and Financial Pacific Insurance Company, a corporation duly organized and existing under the laws of the State of California (herein collectively called the Companies), and having their corporate headquarters in Cedar Rapids, State of Iowa, does make, constitute and appoint

DENESE THOMPSON, WILLIAM HAAS, THERESA LANFRANCO, LOUIS SPINA, BENEDICT TOCKARSHEWSKY, JR., TARA LAVERDIERE, EACH INDIVIDUALLY

their true and lawful Attorney(s)-in-Fact with power and authority hereby conferred to sign, seal and execute in its behalf all lawful bonds, undertakings and other obligatory instruments of similar nature provided that no single obligation shall exceed $50,000,000.00 and to bind the Companies thereby as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Companies and all of the acts of said Attorney, pursuant to the authority hereby given and hereby ratified and confirmed.

The Authority hereby granted shall expire the9th day of April, 2023 unless sooner revoked by United Fire & Casualty Company, United Fire & Indemnity Company, and Financial Pacific Insurance Company.

This Power of Attorney is made and executed pursuant to and by authority of the following bylaw duly adopted by the Boards of Directors of United Fire & Casualty Company, United Fire & Indemnity Company, and Financial Pacific Insurance Company.

"Article VI – Surety Bonds and Undertakings"

Section 2, Appointment of Attorney-in-Fact. "The President or any Vice President, or any other officer of the Companies may, from time to time, appoint by written certificates attorneys-in-fact to act in behalf of the Companies in the execution of policies of insurance, bonds, undertakings and other obligatory instruments of like nature. The signature of any officer authorized hereby, and the Corporate seal, may be affixed by facsimile to any power of attorney or special power of attorney or certification of either authorized hereby; such signature and seal, when so used, being adopted by the Companies as the original signature of such officer and the original seal of the Companies, to be valid and binding upon the Companies with the same force and effect as though manually affixed. Such attorneys-in-fact, subject to the limitations set of forth in their respective certificates of authority shall have full power to bind the Companies by their signature and execution of any such instruments and to attach the seal the Companies thereto. The President or any Vice President, the Board of Directors or any other officer of the Companies may at any time revoke all power and authority previously given to any attorney-in-fact.

IN WITNESS WHEREOF, the COMPANIES have each caused these presents to be signed by its vice president and its corporate seal to be hereto affixed this 9th day of April, 2021

UNITED FIRE & CASUALTY COMPANY
UNITED FIRE & INDEMNITY COMPANY
FINANCIAL PACIFIC INSURANCE COMPANY

By: Dennis J. Richmann
Vice President

State of Iowa, County of Linn, ss:

On 9th day of April, 2021, before me personally came Dennis J. Richmann to me known, who being by me duly sworn, did depose and say; that he resides in Cedar Rapids, State of Iowa; that he is a Vice President of United Fire & Casualty Company, a Vice President of United Fire & Indemnity Company, and a Vice President of Financial Pacific Insurance Company the corporations described in and which executed the above instrument; that he knows the seal of said corporations; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporations and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporations.

Patti Waddell
Iowa Notarial Seal
Commission number 713274
My Commission Expires 10/26/2022

Patti Waddell
Notary Public
My commission expires: 10/26/2022

I, Mary A. Bertsch, Assistant Secretary of United Fire & Casualty Company and Assistant Secretary of United Fire & Indemnity Company, and Assistant Secretary of Financial Pacific Insurance Company, do hereby certify that I have compared the foregoing copy of the Power of Attorney and affidavit, and the copy of the Section of the bylaws and resolutions of said Corporations as set forth in said Power of Attorney, with the ORIGINALS ON FILE IN THE HOME OFFICE OF SAID CORPORATIONS, and that the same are correct transcripts thereof, and of the whole of the said originals, and that the said Power of Attorney has not been revoked and is now in full force and effect.

In testimony whereof I have hereunto subscribed my name and affixed the corporate seal of the said Corporations this 25 day of February, 2022.

By: Mary A Bertsch
Assistant Secretary,
UF&C & UF&I & FPIC

BPOA0045 122017

This paper has a colored background and void pantograph.

UNITED FIRE AND CASUALTY COMPANY

P.O Box 73909, Cedar Rapids, IA. 52407

Statement of Financial Condition
As Of December 31, 2020

ASSETS

Bonds	$802,039,910
Stocks	479,001,640
Real Estate and Equipment	42,759,356
Cash in Banks and Offices and Short Term Investments	161,593,676
Premiums in Course of Collection (less than 90 days old)	337,918,023
Reinsurance and Other Accounts Receivable	53,809,652
Deposits and Other Non Invested Assets	138,436,096
Total Admitted Assets	**$2,015,558,353**

LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Unearned Premiums		$289,369,670
Reserve for Claims and Claim Expense		992,102,435
Reserve for Taxes and Expense		62,486,927
Total Liabilities		**$1,343,959,032**
Capital Stock and Paid In Capital	$214,332,965	
Surplus Notes	50,000,000	
Surplus	407,266,356	
Surplus as regards Stockholders		671,599,321
Total		**$2,015,558,353**

Securities carried at $7,367,791 in the above statement are deposited as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2020 market quotations for all bonds and stocks owned, the Company's total admitted assets would be $2,015,558,353 and surplus as regards shareholders $671,599,321.

I, Janice A. Martin, Treasurer of United Fire and Casualty Company, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2020

Treasurer

State of Iowa
City of Cedar Rapids } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Iowa in the City of Cedar Rapids, this 4th day of March, 2021

Notary Public

SHERI FENTON
Commission Number 722421
My Commission Expires

Payment Bond (Pages 108 to 111): Use for any contract for which a Payment Bond is required.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we,

LoSardo General Contractors Inc

35 Crescent Street, Brooklyn, NY 11208

hereinafter referred to as the "Principal", and

United Fire & Casualty Company

118 2nd Ave SE, Cedar Rapids, IA 52401

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

Twenty Five Million Six Hundred Fifty Four Thousand Dollars and 00/100----------

($25,654,000.00) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

DSNY Brooklyn 17 & 18 Garage Roof and HVAC Upgrades

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns and other Subcontractors to whom Work under this Contract is sublet and his or their successors and assigns shall promptly pay or cause to be paid all lawful claims for

(a) Wages and compensation for labor performed and services rendered by all persons engaged in the prosecution of the Work under said Contract, and any amendment or extension thereof or addition thereto, whether such persons be agents servants or employees of the Principal or any such Subcontractor, including all persons so engaged who perform the work of laborers or mechanics at or in the vicinity of the site

of the Project regardless of any contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the project; and

(b) Materials and supplies (whether incorporated in the permanent structure or not), as well as teams, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any subcontractor at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto; then this obligation shall be void, otherwise to remain in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.

(c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.

(e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be place in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.

Payment Bond (Pages 108 to 111): Use for any contract for which a Payment Bond is required.

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this 25 day of February, 2022.

(Seal)

LoSardo General Contractors Inc (L.S.)
Principal

By: Silvio J. LoSardo, Pres

(Seal)

United Fire & Casualty Company
Surety

By: Tara Laverdiere, Attorney-in-Fact

(Seal)

Surety

By:

(Seal)

Surety

By:

(Seal)

Surety

By:

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

Payment Bond (Pages 108 to 111): Use for any contract for which a Payment Bond is required.

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Kings ss:

On this 25 day of February, 2022, before me personally came Silvio C. Lo Sardo to me known, who, being by me duly sworn did depose and say that he resides at 254 Links Drive West, Oceanside, NY 11572 that he is the President of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

LUCY ROMANO
Notary Public, State of New York
No. 01RO5016372
Qualified in Queens County
Commission Expires Aug 9, 2025

Lucy Romano
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally appeared _____ to me known, and known to me to be one of the members of the firm of _____ _____ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

_____
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____ County of _____ ss:

On this _____ day of _____, _____, before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

_____
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

* * * * * * * *

Affix Acknowledgments and Justification of Sureties.

Surety Acknowledgment

State of **New York**

County of **Nassau**

On the 25 day of February **2022** personally came Tara Laverdiere to me known , who being by me duly sworn did depose and say that he/she is an Attorney-in-Fact, of United Fire & Casualty Company which executed the above Instrument know(s) the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he/she/they signed the said instrument and affixed the said seal as Attorney-in-fact by authority of the Board of Directors of said corporation and by authority of this office under the standing resolution thereof.

My commission expires _____

Notary Public

DENISE THOMPSON
NOTARY PUBLIC-STATE OF NEW YORK
No. 01TH4823317
Qualified in Nassau County
My Commission Expires 02-28-2023

UNITED FIRE & CASUALTY COMPANY, CEDAR RAPIDS, IA
UNITED FIRE & INDEMNITY COMPANY, WEBSTER, TX
FINANCIAL PACIFIC INSURANCE COMPANY, LOS ANGELES, CA
CERTIFIED COPY OF POWER OF ATTORNEY
(original on file at Home Office of Company – See Certification)

Inquiries: Surety Department
118 Second Ave SE
Cedar Rapids, IA 52401

KNOW ALL PERSONS BY THESE PRESENTS, That United Fire & Casualty Company, a corporation duly organized and existing under the laws of the State of Iowa; United Fire & Indemnity Company, a corporation duly organized and existing under the laws of the State of Texas; and Financial Pacific Insurance Company, a corporation duly organized and existing under the laws of the State of California (herein collectively called the Companies), and having their corporate headquarters in Cedar Rapids, State of Iowa, does make, constitute and appoint

DENESE THOMPSON, WILLIAM HAAS, THERESA LANFRANCO, LOUIS SPINA, BENEDICT TOCKARSHEWSKY, JR., TARA LAVERDIERE, EACH INDIVIDUALLY

their true and lawful Attorney(s)-in-Fact with power and authority hereby conferred to sign, seal and execute in its behalf all lawful bonds, undertakings and other obligatory instruments of similar nature provided that no single obligation shall exceed $50,000,000.00 and to bind the Companies thereby as fully and to the same extent as if such instruments were signed by the duly authorized officers of the Companies and all of the acts of said Attorney, pursuant to the authority hereby given and hereby ratified and confirmed.

The Authority hereby granted shall expire the9th day of April, 2023 unless sooner revoked by United Fire & Casualty Company, United Fire & Indemnity Company, and Financial Pacific Insurance Company.

This Power of Attorney is made and executed pursuant to and by authority of the following bylaw duly adopted by the Boards of Directors of United Fire & Casualty Company, United Fire & Indemnity Company, and Financial Pacific Insurance Company.

"Article VI – Surety Bonds and Undertakings"

Section 2, Appointment of Attorney-in-Fact. "The President or any Vice President, or any other officer of the Companies may, from time to time, appoint by written certificates attorneys-in-fact to act in behalf of the Companies in the execution of policies of insurance, bonds, undertakings and other obligatory instruments of like nature. The signature of any officer authorized hereby, and the Corporate seal, may be affixed by facsimile to any power of attorney or special power of attorney or certification of either authorized hereby; such signature and seal, when so used, being adopted by the Companies as the original signature of such officer and the original seal of the Companies, to be valid and binding upon the Companies with the same force and effect as though manually affixed. Such attorneys-in-fact, subject to the limitations set of forth in their respective certificates of authority shall have full power to bind the Companies by their signature and execution of any such instruments and to attach the seal the Companies thereto. The President or any Vice President, the Board of Directors or any other officer of the Companies may at any time revoke all power and authority previously given to any attorney-in-fact.

IN WITNESS WHEREOF, the COMPANIES have each caused these presents to be signed by its vice president and its corporate seal to be hereto affixed this 9th day of April, 2021

UNITED FIRE & CASUALTY COMPANY
UNITED FIRE & INDEMNITY COMPANY
FINANCIAL PACIFIC INSURANCE COMPANY

By: Dennis J. Richmann
Vice President

State of Iowa, County of Linn, ss:

On 9th day of April, 2021, before me personally came Dennis J. Richmann to me known, who being by me duly sworn, did depose and say; that he resides in Cedar Rapids, State of Iowa; that he is a Vice President of United Fire & Casualty Company, a Vice President of United Fire & Indemnity Company, and a Vice President of Financial Pacific Insurance Company the corporations described in and which executed the above instrument; that he knows the seal of said corporations; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporations and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporations.

Patti Waddell
Iowa Notarial Seal
Commission number 713274
My Commission Expires 10/26/2022

Patti Waddell
Notary Public
My commission expires: 10/26/2022

I, Mary A. Bertsch, Assistant Secretary of United Fire & Casualty Company and Assistant Secretary of United Fire & Indemnity Company, and Assistant Secretary of Financial Pacific Insurance Company, do hereby certify that I have compared the foregoing copy of the Power of Attorney and affidavit, and the copy of the Section of the bylaws and resolutions of said Corporations as set forth in said Power of Attorney, with the ORIGINALS ON FILE IN THE HOME OFFICE OF SAID CORPORATIONS, and that the same are correct transcripts thereof, and of the whole of the said originals, and that the said Power of Attorney has not been revoked and is now in full force and effect.

In testimony whereof I have hereunto subscribed my name and affixed the corporate seal of the said Corporations this 25 day of February, 2022.

By: Mary A Bertsch
Assistant Secretary,
UF&C & UF&I & FPIC

This paper has a colored background and void pantograph.

UNITED FIRE AND CASUALTY COMPANY

P.O Box 73909, Cedar Rapids, IA. 52407

Statement of Financial Condition
As Of December 31, 2020

ASSETS

Bonds		$802,039,910
Stocks		479,001,640
Real Estate and Equipment		42,759,356
Cash in Banks and Offices and Short Term Investments		161,593,676
Premiums in Course of Collection (less than 90 days old)		337,918,023
Reinsurance and Other Accounts Receivable		53,809,652
Deposits and Other Non Invested Assets		138,436,096
Total Admitted Assets		**$2,015,558,353**

LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Unearned Premiums		$289,369,670
Reserve for Claims and Claim Expense		992,102,435
Reserve for Taxes and Expense		62,486,927
Total Liabilities		**$1,343,959,032**
Capital Stock and Paid In Capital	$214,332,965	
Surplus Notes	50,000,000	
Surplus	407,266,356	
Surplus as regards Stockholders		671,599,321
Total		**$2,015,558,353**

Securities carried at $7,367,791 in the above statement are deposited as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2020 market quotations for all bonds and stocks owned, the Company's total admitted assets would be $2,015,558,353 and surplus as regards shareholders $671,599,321.

I, Janice A. Martin, Treasurer of United Fire and Casualty Company, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2020

Treasurer

State of Iowa
City of Cedar Rapids } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Iowa in the City of Cedar Rapids, this 4th day of March, 2021

Notary Public

SHERI FENTON
Commission Number 222521
My Commission Expires

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 02/25/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

Monteleone Associates, LLC
490 Wheeler Road, Suite 185
Hauppauge, NY 11788

CONTACT NAME: Joseph Monteleone
PHONE (A/C, No, Ext): (631)544-4000 FAX (A/C, No): (631)544-4121
E-MAIL ADDRESS: jmonteleone@monteleoneassociates.com

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A :	American Empire Surplus Lines Ins Co	35351
INSURER B :	Travelers Casualty Insurance Company of America	19046
INSURER C :	General Star Indemnity Co	37362
INSURER D :	The Hanover Insurance Group	22292
INSURER E :		
INSURER F :		

INSURED

Lo Sardo General Contractors, Inc.
35 Crescent Street
Brooklyn, NY 11208

COVERAGES CERTIFICATE NUMBER: 00000111-2480580 REVISION NUMBER: 29

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS		
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:			PL2665832 02	09/27/2021	09/27/2022	EACH OCCURRENCE	$	2,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$	50,000
							MED EXP (Any one person)	$	Excl
							PERSONAL & ADV INJURY	$	2,000,000
							GENERAL AGGREGATE	$	5,000,000
							PRODUCTS - COMP/OP AGG	$	4,000,000
								$	
B	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY			BA-9M676220-20-42-G	05/11/2021	05/11/2022	COMBINED SINGLE LIMIT (Ea accident)	$	1,000,000
							BODILY INJURY (Per person)	$	
							BODILY INJURY (Per accident)	$	
							PROPERTY DAMAGE (Per accident)	$	
								$	
C	[ ] UMBRELLA LIAB [X] OCCUR [X] EXCESS LIAB [ ] CLAIMS-MADE DED RETENTION $			IXG670372A	09/27/2021	09/27/2022	EACH OCCURRENCE	$	4,000,000
							AGGREGATE	$	4,000,000
								$	
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) [ ] Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					PER STATUTE / OTH-ER		
							E.L. EACH ACCIDENT	$	
							E.L. DISEASE - EA EMPLOYEE	$	
							E.L. DISEASE - POLICY LIMIT	$	
D	INLAND MARINE			RHY D353063 05	09/27/2021	09/27/2022			912,451

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

FMS ID:S136-383NL PIN: 8502020TR002C
Project: DSNY 17/18 Brooklyn Garage Roof Replacement and HVAC Upgrade + Solar
Location: New York City Sanitation Department, 17-18 Avenue D, Brooklyn, New York 11236. The following are included as Additional Insureds as pertains General Liability per written contract: New York City Sanitation Department (DSNY), including its officials and employees; City of New York, including its officials and employees, with coverage as broad as ISO forms CG 20 10 and CG 20 37 and allperson(s) or organization(s) if any, that Article 22.1 1(b) of the Contract requires
(continued on ACORD 101 Additional Remarks Schedule)

CERTIFICATE HOLDER

New York City
Department of Design and Construction
30-30 Thomson Avenue
Long Island City, NY 11101

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Joseph Monteleone (JCM)

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AGENCY CUSTOMER ID: 00000111

LOC #:

ADDITIONAL REMARKS SCHEDULE

AGENCY	NAMED INSURED
Monteleone Associates, LLC	Lo Sardo General Contractors, Inc.
POLICY NUMBER: N/A	
CARRIER: Multiple Carriers / NAIC CODE:	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: 25 FORM TITLE: Certificate of Liability Insurance

(continued from Description of Operations)
to be named as Additional Insured(s) with coverage at least as broad as ISO form CG 20 36.

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IL 70 02 (Ed. 10/07)

Policy No. PL2665832-02

Effective Date of Change 09/27/2021

POLICY CHANGES

NAMED INSURED Lo Sardo General Contractors, Inc.
Leviathan Mechanical Corp.
AND ADDRESS: 35 Crescent Street
Brooklyn, NY 11208

THIS ENDORSEMENT CHANGES THE POLICY.

PLEASE READ IT CAREFULLY.

POLICY ALTERNATE MAILING ADDRESS:

AGENT'S NAME AND ADDRESS:
CRC Insurance Services, Inc.
175 Froehlich Farm Blvd
Woodbury, NY 11797-2920

Insurance is afforded by the Company named below, a Capital Stock Corporation:
American Empire Surplus Lines Insurance Company

POLICY PERIOD: From 09/27/2021 To 09/27/2022
12:01 A.M. Standard Time at the address of the Named Insured

Endorsement # 2

The following forms are added:

ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS - SCHEDULED PERSON OR ORGANIZATION - form # CG2010

ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS - COMPLETED OPERATIONS - form # CG2037

All remaining terms and conditions of this policy are unchanged.

FORMS AND ENDORSEMENTS hereby added :

CG2010, CG2037

FORMS AND ENDORSEMENTS hereby amended:

FORMS AND ENDORSEMENTS hereby deleted :

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS - SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) Of Covered Operations
The City of New York, including its officials and employees	All locations as per NYCDOT permits
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II - Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or

2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and

2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or

2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

© Insurance Services Office, Inc., 2018

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance:**

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or

2. Available under the applicable limits of insurance;

whichever is less.

This endorsement shall not increase the applicable limits of insurance.

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CG 20 37 (Ed. 12/19)

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location And Description Of Completed Operations:
The City of New York, including its officials and employees	All locations as per NYCDOT permits
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II - Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and

2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to **Section III - Limits Of Insurance**:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or

2. Available under the applicable limits of insurance;

whichever is less.

This endorsement shall not increase the applicable limits of insurance.

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SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

Monteleone Associates, LLC

[Name of broker or agent (typewritten)]

490 Wheeler Rd., Suite 185, Hauppauge, NY 11788

[Address of broker or agent (typewritten)]

jmonteleone@monteleoneassociates.com

[Email address of broker or agent (typewritten)]

631-544-4000 / 631-544-4121

[Phone number/Fax number of broker or agent (typewritten)]

[Signature of authorized official or broker or agent]

Joseph Monteleone

[Name and title of authorized official, broker or agent (typewritten)]

State of New York)
County of Suffolk) ss:

Sworn to before me this
25th day of Feb, 2022

GINGER BELESI
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN SUFFOLK COUNTY
NO. 01BE6235008
COMMISSION EXPIRES JAN. 31, 2023

NOTARY PUBLIC FOR THE STATE OF New York

NYSIF
New York State Insurance Fund

PO Box 66699, Albany, NY 12206
| nysif.com

CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

^ ^ ^ ^ ^ ^ 112250515
LO SARDO GENERAL CONTRACTORS INC
35 CRESCENT STREET
BROOKLYN NY 11208

SCAN TO VALIDATE
AND SUBSCRIBE

POLICYHOLDER	CERTIFICATE HOLDER
LO SARDO GENERAL CONTRACTORS INC 35 CRESCENT STREET BROOKLYN NY 11208	NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION 30-30 THOMSON AVENUE LONG ISLAND CITY NY 11101

POLICY NUMBER	CERTIFICATE NUMBER	POLICY PERIOD	DATE
G 712 563-6	511798	06/29/2021 TO 06/29/2022	3/1/2022

THIS IS TO CERTIFY THAT THE POLICYHOLDER NAMED ABOVE IS INSURED WITH THE NEW YORK STATE INSURANCE FUND UNDER POLICY NO. 712 563-6, COVERING THE ENTIRE OBLIGATION OF THIS POLICYHOLDER FOR WORKERS' COMPENSATION UNDER THE NEW YORK WORKERS' COMPENSATION LAW WITH RESPECT TO ALL OPERATIONS IN THE STATE OF NEW YORK, EXCEPT AS INDICATED BELOW, AND, WITH RESPECT TO OPERATIONS OUTSIDE OF NEW YORK, TO THE POLICYHOLDER'S REGULAR NEW YORK STATE EMPLOYEES ONLY.

IF YOU WISH TO RECEIVE NOTIFICATIONS REGARDING SAID POLICY, INCLUDING ANY NOTIFICATION OF CANCELLATIONS, OR TO VALIDATE THIS CERTIFICATE, VISIT OUR WEBSITE AT HTTPS://WWW.NYSIF.COM/CERT/CERTVAL.ASP. THE NEW YORK STATE INSURANCE FUND IS NOT LIABLE IN THE EVENT OF FAILURE TO GIVE SUCH NOTIFICATIONS.

THIS CERTIFICATE DOES NOT APPLY TO THOSE JOB SITES WHICH ARE COVERED BY OTHER INSURANCE AND ARE SPECIFICALLY EXCLUDED BY ENDORSEMENT.

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS NOR INSURANCE COVERAGE UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICY.

NEW YORK STATE INSURANCE FUND

DIRECTOR,INSURANCE FUND UNDERWRITING

VALIDATION NUMBER: 754770006

U-26.3

NEW YORK STATE | Workers' Compensation Board

CERTIFICATE OF INSURANCE COVERAGE
NYS DISABILITY AND PAID FAMILY LEAVE BENEFITS LAW

PART 1. To be completed by NYS disability and Paid Family Leave benefits carrier or licensed insurance agent of that carrier

1a. Legal Name & Address of Insured (use street address only)

LO SARDO GENERAL CONTRACTORS, INC.
35 Crescent Street
Brooklyn, NY 11208

Work Location of Insured *(Only required if coverage is specifically limited to certain locations in New York State, i.e., Wrap-Up Policy)*

1b. Business Telephone Number of Insured

(718)-647-4924

1c. Federal Employer Identification Number of Insured or Social Security Number

112250515

2. Name and Address of Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)

New York City Department of Design and Construction
30-30 Thomson Ave, Long Island City, NY 11101

3a. Name of Insurance Carrier

The Guardian Life Insurance Company of America

3b. Policy Number of Entity Listed in Box 1a

00966209

3c. Policy Effective Period

7/1/2021 to 7/1/2022

4. Policy provides the following benefits:

- [x] A. Both disability and Paid Family Leave benefits.
- [ ] B. Disability benefits only.
- [ ] C. Paid Family Leave benefits only.

5. Policy covers:

- [x] A. All of the employer's employees eligible under the NYS Disability and Paid Family Leave Benefits Law.
- [ ] B. Only the following class or classes of employer's employees:

Under penalty of perjury, I certify that I am an authorized representative or licensed agent of the insurance carrier referenced above and that the named insured has NYS disability and/or Paid Family Leave benefits insurance coverage as described above.

Date Signed 3/1/2022 By _____

(Signature of insurance carrier's authorized representative or NYS licensed insurance agent of that insurance carrier)

Telephone Number 1-888-278-4542 Name and Title Michael Prestileo, Head of Group Benefits Strategy, Product & Underwriting

IMPORTANT: If Boxes 4A and 5A are checked, and this form is signed by the insurance carrier's authorized representative or NYS Licensed Insurance Agent of that carrier, this certificate is COMPLETE. Mail it directly to the certificate holder.

If Box 4B, 4C or 5B is checked, this certificate is NOT COMPLETE for purposes of Section 220, Subd. 8 of the NYS Disability and Paid Family Leave Benefits Law. It must be emailed to PAU@wcb.ny.gov or it can be mailed for completion to the Workers' Compensation Board, Plans Acceptance Unit, PO Box 5200, Binghamton, NY 13902-5200.

PART 2. To be completed by the NYS Workers' Compensation Board (Only if Box 4B, 4C or 5B have been checked)

State of New York
Workers' Compensation Board

According to information maintained by the NYS Workers' Compensation Board, the above-named employer has complied with the NYS Disability and Paid Family Leave Benefits Law(Article 9 of the Workers' Compensation Law) with respect to all of their employees.

Date Signed _____ By _____

(Signature of Authorized NYS Workers' Compensation Board Employee)

Telephone Number _____ Name and Title _____

Please Note: *Only insurance carriers licensed to write NYS disability and Paid Family Leave benefits insurance policies and NYS licensed insurance agents of those insurance carriers are authorized to issue Form DB-120.1.* ***Insurance brokers are NOT authorized to issue this form.***

Additional Instructions for Form DB-120.1

By signing this form, the insurance carrier identified in Box 3 on this form is certifying that it is insuring the business referenced in Box 1a for disability and/or Paid Family Leave benefits under the NYS Disability and Paid Family Leave Benefits Law. The insurance carrier or its licensed agent will send this Certificate of Insurance Coverage (Certificate) to the entity listed as the certificate holder in Box 2.

The insurance carrier must notify the above certificate holder and the Workers' Compensation Board within 10 days IF a policy is cancelled due to nonpayment of premiums or within 30 days IF there are reasons other than nonpayment of premiums that cancel the policy or eliminate the insured from coverage indicated on this Certificate. (These notices may be sent by regular mail.) Otherwise, this Certificate is valid for one year after this form is approved by the insurance carrier or its licensed agent, or until the policy expiration date listed in Box 3c, whichever is earlier.

This Certificate is issued as a matter of information only and confers no rights upon the certificate holder. This Certificate does not amend, extend or alter the coverage afforded by the policy listed, nor does it confer any rights or responsibilities beyond those contained in the referenced policy.

This Certificate may be used as evidence of a NYS disability and/or Paid Family Leave benefits contract of insurance only while the underlying policy is in effect.

Please Note: Upon the cancellation of the disability and/or Paid Family Leave benefits policy indicated on this form, if the business continues to be named on a permit, license or contract issued by a certificate holder, the business must provide that certificate holder with a new Certificate of Insurance Coverage for NYS disability and/or Paid Family Leave Benefits or other authorized proof that the business is complying with the mandatory coverage requirements of the NYS Disability and Paid Family Leave Benefits Law.

NYS DISABILITY AND PAID FAMILY LEAVE BENEFITS LAW

§220. Subd. 8

(a) The head of a state or municipal department, board, commission or office authorized or required by law to issue any permit for or in connection with any work involving the employment of employees in employment as defined in this article, and not withstanding any general or special statute requiring or authorizing the issue of such permits, shall not issue such permit unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that the payment of disability benefits and after January first, two thousand and twenty-one, the payment of family leave benefits for all employees has been secured as provided by this article. Nothing herein, however, shall be construed as creating any liability on the part of such state or municipal department, board, commission or office to pay any disability benefits to any such employee if so employed.

(b) The head of a state or municipal department, board, commission or office authorized or required by law to enter into any contract for or in connection with any work involving the employment of employees in employment as defined in this article and notwithstanding any general or special statute requiring or authorizing any such contract, shall not enter into any such contract unless proof duly subscribed by an insurance carrier is produced in a form satisfactory to the chair, that the payment of disability benefits and after January first, two thousand eighteen, the payment of family leave benefits for all employees has been secured as provided by this article.

(NO TEXT ON THIS PAGE)

OFFICE OF THE COMPTROLLER

CITY OF NEW YORK

CONSTRUCTION APPRENTICE PREVAILING WAGE SCHEDULE

Pursuant to Labor Law § 220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant and registered with the New York State Department of Labor, may be paid at the apprentice rates in this schedule. Apprentices who are not so registered must be paid as journey persons in accordance with the trade classification of the work they actually performed.

Apprentice ratios are established to ensure the proper safety, training and supervision of apprentices. A ratio establishes the number of journey workers required for each apprentice in a program and on a job site. Ratios are interpreted as follows: in the case of a 1:1, 1:4 ratio, there must be one journey worker for the first apprentice, and four additional journey workers for each subsequent apprentice.

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BOILERMAKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Boilermaker (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $33.12

Boilermaker (Second Year: 1st Six Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $35.05

Boilermaker (Second Year: 2nd Six Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $37.01

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $38.92

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $40.87

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $42.82

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $44.74

(Local #5)

BRICKLAYER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Bricklayer (First 750 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.95

Bricklayer (Second 750 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.95

Bricklayer (Third 750 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.95

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.95

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.95

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $22.95

(Bricklayer District Council)

CARPENTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Carpenter (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour For Building Apprentice: $19.55
Supplemental Benefit Rate Per Hour For Building Apprentice: $16.35

Wage Rate Per Hour For Heavy Apprentice: $23.37
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $35.49

Carpenter (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour For Building Apprentice: $22.55
Supplemental Benefit Rate Per Hour For Building Apprentice: $17.85

Wage Rate Per Hour For Heavy Apprentice: $28.97
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $35.49

Carpenter (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour For Building Apprentice: $26.80
Supplemental Benefit Rate Per Hour For Building Apprentice: $21.45

Wage Rate Per Hour For Heavy Apprentice: $37.35
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $35.49

Carpenter (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour For Building Apprentice: $34.68
Supplemental Benefit Rate Per Hour For Building Apprentice: $23.45

Wage Rate Per Hour For Heavy Apprentice: $45.74
Supplemental Benefit Rate Per Hour For Heavy Apprentice: $35.49

(Carpenters District Council)

CARPENTER - HIGH RISE CONCRETE FORMS
(Ratio of Apprentice to Journeyperson: 1 to 1, 2 to 5)

Carpenter - High Rise (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $18.27
Supplemental Benefit Rate per Hour: $16.55

Carpenter - High Rise (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.70
Supplemental Benefit Rate per Hour: $16.73

Carpenter - High Rise (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $31.28
Supplemental Benefit Rate per Hour: $16.95

Carpenter - High Rise (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $38.90
Supplemental Benefit Rate per Hour: $17.20

(Carpenters District Council)

CEMENT MASON
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Cement Mason (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $19.57
Supplemental Benefit Rate per Hour: $15.61

Cement Mason (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.40
Supplemental Benefit Rate per Hour: $15.91

Cement Mason (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $29.68
Supplemental Benefit Rate per Hour: $16.02

(Local #780)

CEMENT AND CONCRETE WORKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Cement & Concrete Worker (First 1333 hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 53% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.79

Cement & Concrete Worker (Second 1333 hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 69% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $19.72

Cement & Concrete Worker (Last 1334 hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 85% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $21.30

(Cement Concrete Workers District Council)

DERRICKPERSON & RIGGER (STONE)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Derrickperson & Rigger (stone) - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 50% of Journeyperson's rate

Derrickperson & Rigger (stone) - Second Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

Derrickperson & Rigger (stone) - Second Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

Derrickperson & Rigger (stone) - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyperson's rate

(Local #197)

DOCKBUILDER/PILE DRIVER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Dockbuilder/Pile Driver (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $23.37
Supplemental Benefit Rate Per Hour: $35.49

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $28.97
Supplemental Benefit Rate Per Hour: $35.49

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $37.35
Supplemental Benefit Rate Per Hour: $35.49

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $45.74

Supplemental Benefit Rate Per Hour: $35.49

(Carpenters District Council)

ELECTRICIAN
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Electrician (First Term: 0-6 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.25
Supplemental Benefit Rate per Hour: $14.93
Overtime Supplemental Rate Per Hour: $16.07

Electrician (First Term: 7-12 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.75
Supplemental Benefit Rate per Hour: $15.19
Overtime Supplemental Rate Per Hour: $16.36

Electrician (Second Term: 0-6 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $18.75
Supplemental Benefit Rate per Hour: $15.70
Overtime Supplemental Rate Per Hour: $16.95

Electrician (Second Term: 7-12 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $19.75
Supplemental Benefit Rate per Hour: $16.22
Overtime Supplemental Rate Per Hour: $17.53

Electrician (Third Term: 0-6 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.75
Supplemental Benefit Rate per Hour: $16.74
Overtime Supplemental Rate Per Hour: $18.11

Electrician (Third Term: 7-12 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $21.75
Supplemental Benefit Rate per Hour: $17.26
Overtime Supplemental Rate Per Hour: $18.70

Electrician (Fourth Term: 0-6 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $22.75
Supplemental Benefit Rate per Hour: $17.77
Overtime Supplemental Rate Per Hour: $19.28

Electrician (Fourth Term: 7-12 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.75
Supplemental Benefit Rate per Hour: $18.81
Overtime Supplemental Rate Per Hour: $20.45

Electrician (Fifth Term: 0-12 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.00
Supplemental Benefit Rate per Hour: $22.06
Overtime Supplemental Rate Per Hour: $23.70

Electrician (Fifth Term: 13-18 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $30.50
Supplemental Benefit Rate per Hour: $24.45
Overtime Supplemental Rate Per Hour: $26.38

Overtime Description
Overtime Wage paid at time and one half the regular rate

(Local #3)

ELEVATOR CONSTRUCTOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Elevator (Constructor) - First Year

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $32.76

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $33.38

Elevator (Constructor) - Second Year

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $33.31

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $33.96

Elevator (Constructor) - Third Year

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $34.42

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $35.10

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $35.52

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $36.24

(Local #1)

ELEVATOR REPAIR & MAINTENANCE
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Per Hour: $32.71

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Per Hour: $33.33

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Benefit Per Hour: $33.26

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Benefit Per Hour: $33.90

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Per Hour: $34.35

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Per Hour: $35.03

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Per Hour: $35.45

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Per Hour: $36.17

(Local #1)

ENGINEER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Engineer - First Year

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate per Hour: $25.38
Supplemental Benefit Rate per Hour: $28.51

Engineer - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $31.72
Supplemental Benefit Rate per Hour: $28.51

Engineer - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $34.89
Supplemental Benefit Rate per Hour: $28.51

Engineer - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $38.06
Supplemental Benefit Rate per Hour: $28.51

(Local #15)

ENGINEER - OPERATING
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Operating Engineer - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 40% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: $24.05

Operating Engineer - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 50% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: $24.05

Operating Engineer - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 60% of Operating Engineer - Road & Heavy Construction V's Rate
Supplemental Benefit Per Hour: $24.05

(Local #14)

FLOOR COVERER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Floor Coverer (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.55
Supplemental Benefit Rate per Hour: $16.35

Floor Coverer (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $27.55
Supplemental Benefit Rate per Hour: $17.85

Floor Coverer (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $31.80
Supplemental Benefit Rate per Hour: $21.45

Floor Coverer (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $39.68
Supplemental Benefit Rate per Hour: $23.45

(Carpenters District Council)

GLAZIER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Glazier (First Year)

Effective Period: 7/1/2021 - 6/30/2022

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Glazier (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Glazier (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Glazier (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #1281)

HAZARDOUS MATERIAL HANDLER
(Ratio of Apprentice Journeyperson: 1 to 1, 1 to 3)

Handler (First 1000 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 78% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.25

Handler (Second 1000 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.25

Handler (Third 1000 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 83% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.25

Handler (Fourth 1000 Hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 89% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $14.25

(Local #78)

HEAT & FROST INSULATOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

(Local #12)

HOUSE WRECKER
(TOTAL DEMOLITION)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

House Wrecker - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.20
Supplemental Benefit Rate per Hour: $10.07

House Wrecker - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $22.15
Supplemental Benefit Rate per Hour: $10.07

House Wrecker - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $23.65
Supplemental Benefit Rate per Hour: $10.07

House Wrecker - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.15
Supplemental Benefit Rate per Hour: $10.07

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Iron Worker (Ornamental) - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.63
Supplemental Benefit Rate per Hour: $17.61

Iron Worker (Ornamental) - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.22
Supplemental Benefit Rate per Hour: $18.86

Iron Worker (Ornamental) - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $27.80
Supplemental Benefit Rate per Hour: $20.12

Iron Worker (Ornamental) - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $31.38
Supplemental Benefit Rate per Hour: $21.38

(Local #580)

IRON WORKER - STRUCTURAL
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $28.21
Supplemental Benefit Rate per Hour: $57.12

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $28.81
Supplemental Benefit Rate per Hour: $57.12

Iron Worker (Structural) - 19 - 36 months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $29.42
Supplemental Benefit Rate per Hour: $57.12

(Local #40 and #361)

LABORER (FOUNDATION, CONCRETE, EXCAVATING, STREET PIPE LAYER & COMMON)
(Ratio Apprentice to Journeyperson: 1 to 1, 1 to 3)

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - First 1000 hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $48.63

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Second 1000 hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $48.63

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Third 1000 hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $48.63

Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Fourth 1000 hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Rate Per Hour: $48.63

(Local #731)

MARBLE MECHANICS
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 45% of Journeyperson's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Cutters & Setters - Seventh 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Cutters & Setters - Eighth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Ninth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Tenth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 900 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Polishers & Finishers - Second 900 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

Polishers & Finishers - Third 900 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

(Local #7)

MASON TENDER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Mason Tender - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.20
Supplemental Benefit Rate per Hour: $10.07

Mason Tender - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $22.15
Supplemental Benefit Rate per Hour: $10.07

Mason Tender - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $23.65
Supplemental Benefit Rate per Hour: $10.07

Mason Tender - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.15
Supplemental Benefit Rate per Hour: $10.07

(Local #79)

METALLIC LATHER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Metallic Lather (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $21.00
Supplemental Benefit Rate per Hour: $17.87

Metallic Lather (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $22.00
Supplemental Benefit Rate per Hour: $16.87

Metallic Lather (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $33.10
Supplemental Benefit Rate per Hour: $21.32

Metallic Lather (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $35.60
Supplemental Benefit Rate per Hour: $21.82

(Local #46)

MILLWRIGHT
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Millwright (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $30.74
Supplemental Benefit Rate per Hour: $35.19

Millwright (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $36.19
Supplemental Benefit Rate per Hour: $38.89

Millwright (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $41.64
Supplemental Benefit Rate per Hour: $43.24

Millwright (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $52.54
Supplemental Benefit Rate per Hour: $50.00

(Local #740)

PAINTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Painter - Brush & Roller - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.20
Supplemental Benefit Rate per Hour: $16.67

Painter - Brush & Roller - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $21.50
Supplemental Benefit Rate per Hour: $21.44

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $25.80
Supplemental Benefit Rate per Hour: $25.27

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $34.40
Supplemental Benefit Rate per Hour: $32.51

(District Council of Painters)

PAINTER - METAL POLISHER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Metal Polisher (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $16.00
Supplemental Benefit Rate per Hour: $7.36
New Construction - Wage Rate Per Hour: $16.39
Scaffold Over 34 Feet - Wage Rate Per Hour: $18.50

Metal Polisher (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.00
Supplemental Benefit Rate per Hour: $7.36
New Construction - Wage Rate Per Hour: $17.44
Scaffold Over 34 Feet - Wage Rate Per Hour: $19.50

Metal Polisher (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $18.00
Supplemental Benefit Rate per Hour: $7.36
New Construction - Wage Rate Per Hour: $18.54
Scaffold Over 34 Feet - Wage Rate Per Hour: $20.50

(Local 8A-28)

PAINTER - STRUCTURAL STEEL
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Painters - Structural Steel (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #806)

PAVER AND ROADBUILDER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Paver and Roadbuilder - First Year (Minimum 1000 hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $29.86
Supplemental Benefit Rate per Hour: $23.55

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $31.50
Supplemental Benefit Rate per Hour: $23.55

(Local #1010)

PLASTERER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)
(Each Term is 800 Hours.)

Plasterer - First Term

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $17.48

Plasterer - Second Term

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $18.63

Plasterer - Third Term

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $20.93

Plasterer - Fourth Term

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $22.10

(Local #262)

PLASTERER - TENDER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Plasterer Tender - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.20
Supplemental Benefit Rate per Hour: $10.07

Plasterer Tender - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $22.15
Supplemental Benefit Rate per Hour: $10.07

Plasterer Tender - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $23.65
Supplemental Benefit Rate per Hour: $10.07

Plasterer Tender - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate per Hour: **$26.15**
Supplemental Benefit Rate per Hour: **$10.07**

(Local #79)

PLUMBER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Plumber - First Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$16.78**
Supplemental Benefit Rate per Hour: **$5.43**

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$19.78**
Supplemental Benefit Rate per Hour: **$6.43**

Plumber - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$28.36**
Supplemental Benefit Rate per Hour: **$21.19**

Plumber - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$30.46**
Supplemental Benefit Rate per Hour: **$21.19**

Plumber - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$33.31**
Supplemental Benefit Rate per Hour: **$21.19**

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$34.71**

Supplemental Benefit Rate per Hour: $21.19

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.78
Supplemental Benefit Rate per Hour: $21.19

(Plumbers Local #1)

POINTER, WATERPROOFER, CAULKER, SANDBLASTER, STEAMBLASTER
(Exterior Building Renovation)
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $28.92
Supplemental Benefit Rate per Hour: $14.81

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $32.58
Supplemental Benefit Rate per Hour: $19.86

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $37.63
Supplemental Benefit Rate per Hour: $23.61

Pointer, Waterproofer, Caulker, Sandblaster, Steamblaster - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $45.44
Supplemental Benefit Rate per Hour: $24.61

(Bricklayer District Council)

ROOFER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Roofer - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $3.51

Roofer - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $17.54

Roofer - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $20.99

Roofer - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: $26.18

(Local #8)

SHEET METAL WORKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Sheet Metal Worker (0-6 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 25% of Journeyperson's rate
Supplemental Rate Per Hour: $6.76

Sheet Metal Worker (7-18 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Rate Per Hour: $19.55

Sheet Metal Worker (19-30 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $26.65

Sheet Metal Worker (31-36 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $31.50

Sheet Metal Worker (37-42 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $31.50

Sheet Metal Worker (43-48 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $38.78

Sheet Metal Worker (49-54 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $38.78

Sheet Metal Worker (55-60 Months)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $43.65

(Local #28)

SIGN ERECTOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 35% of Journeyperson's rate
Supplemental Rate Per Hour: $16.51

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Rate Per Hour: $18.74

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 45% of Journeyperson's rate
Supplemental Rate Per Hour: $20.96

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: $23.21

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 55% of Journeyperson's rate
Supplemental Rate Per Hour: $31.44

Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: $34.20

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: $37.76

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: $40.62

Sign Erector - Fifth Year

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: $43.44

Sign Erector - Sixth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: $46.27

(Local #137)

STEAMFITTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Steamfitter - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate and Supplemental Rate per Hour: 65% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate and Supplemental Rate Per Hour: 85% of Journeyperson's rate.

(Local #638)

STEAMFITTER - REFRIGERATION & AIR CONDITIONER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Refrigeration & Air Conditioner (First Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.75
Supplemental Benefit Rate per Hour: $12.99

Refrigeration & Air Conditioner (Second Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $25.04
Supplemental Benefit Rate per Hour: $14.23

Refrigeration & Air Conditioner (Third Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $29.17
Supplemental Benefit Rate per Hour: $15.53

Refrigeration & Air Conditioner (Fourth Year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $35.22
Supplemental Benefit Rate per Hour: $17.29

(Local #638-B)

STONE MASON - SETTER
(Ratio Apprentice of Journeyperson: 1 to 1, 1 to 2)

Stone Mason - Setters - First 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Third 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Fourth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Fifth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

Stone Mason - Setters - Sixth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: 100% of Journeyperson's rate
Supplemental Rate Per Hour: 50% of Journeyperson's rate

(Bricklayers District Council)

TAPER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Drywall Taper - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.97
Supplemental Benefit Rate per Hour: $13.55

Drywall Taper - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.24
Supplemental Benefit Rate per Hour: $20.31

Drywall Taper - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $29.08
Supplemental Benefit Rate per Hour: $22.06

Drywall Taper - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $38.78
Supplemental Benefit Rate per Hour: $25.56

(Local #1974)

TILE LAYER - SETTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour:35% of Journeyperson's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour 40% of Journeyperson's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Seventh 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Tile Layer - Setter - Eighth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Ninth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour:80% of Journeyperson's rate

Tile Layer - Setter - Tenth 750 Hours

Effective Period: 7/1/2021 - 6/30/2022
Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

(Local #7)

TIMBERPERSON
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Timberperson - First Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $21.42
Supplemental Rate Per Hour: $35.22

Timberperson - Second Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $26.53
Supplemental Rate Per Hour: $35.22

Timberperson - Third Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $34.18

Supplemental Rate Per Hour: $35.22

Timberperson - Fourth Year

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate Per Hour: $41.84
Supplemental Rate Per Hour: $35.22

(Local #1536)

LABOR LAW ARTICLE 8 - NYC PUBLIC WORKS

Workers, Laborers and Mechanics employed on a public work project must receive not less than the prevailing rate of wage and benefits for the classification of work performed by each upon such public work. Pursuant to New York Labor Law Article 8 the Comptroller of the City of New York has promulgated this schedule solely for Workers, Laborers and Mechanics engaged by private contractors on New York City public work projects. Prevailing rates are required to be annexed to and form part of the public work contract pursuant to Labor Law section 220 (3).

This schedule is a compilation of separate determinations of the prevailing rate of wage and supplements made by the Comptroller for each trade classification listed herein pursuant to Labor Law section 220 (5). The source of the wage and supplement rates, whether a collective bargaining agreement, survey data or other, is listed at the end of each classification.

Agency Chief Contracting Officers should contact the Bureau of Labor Law's Classification Unit with any questions concerning trade classifications, prevailing rates or prevailing practices with respect to procurement on New York City public work contracts. Contractors are advised to review the Comptroller's Prevailing Wage Schedule before bidding on public work contracts. Contractors with questions concerning trade classifications, prevailing rates or prevailing practices with respect to public work contracts in the procurement stage must contact the contracting agency responsible for the procurement.

Any error as to compensation under the prevailing wage law or other information as to trade classification, made by the contracting agency in the contract documents or in any other communication, will not preclude a finding against the contractor of prevailing wage violation.

Any questions concerning trade classifications, prevailing rates or prevailing practices on New York City public work contracts that have already been awarded may be directed to the Bureau of Labor Law's Classification Unit by calling (212) 669-4443. All callers must have the agency name and contract registration number available when calling with questions on public work contracts. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 651, New York, N.Y. 10007; Fax (212) 669-4002.

Pursuant to Labor Law § 220 (3-a) (a), the appropriate schedule of prevailing wages and benefits must be posted in a prominent and accessible place at all public work sites along with the Construction Poster provided on our web site at comptroller.nyc.gov/wages. In addition, covered employees must be given the appropriate schedule of prevailing wages and benefits along with the Worker Notice provided on our web site at the time the public work project begins, and with the first paycheck to each such employee after July first of each year.

This schedule is applicable to work performed during the effective period, unless otherwise noted. Changes to this schedule are published on our web site comptroller.nyc.gov/wages. Contractors must pay the wages and supplements in effect when the worker, laborer, mechanic performs the work. Preliminary schedules for future one-year periods appear in the City Record on or about June 1 each succeeding year. Final schedules appear on or about July 1 in the City Record and on our web site comptroller.nyc.gov/wages.

Prevailing rates and ratios for apprentices are published in the Construction Apprentice Prevailing Wage Schedule. Pursuant to Labor Law § 220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant, registered with the

New York State Department of Labor, may be paid at the apprentice rates. Apprentices who are not so registered must be paid as journey persons.

New York City public work projects awarded pursuant to a Project Labor Agreement ("PLA") in accordance with Labor Law section 222 may have different labor standards for shift, premium and overtime work. Please refer to the PLA's pre-negotiated labor agreements for wage and benefit rates applicable to work performed outside of the regular workday. More information is available at the Mayor's Office of Contract Services (MOCS) web page at:

https://www1.nyc.gov/site/mocs/legal-forms/project-labor-agreements.page

All the provisions of Labor Law Article 8 remain applicable to PLA work including, but not limited to, the enforcement of prevailing wage requirements by the Comptroller in accordance with the trade classifications in this schedule; however, we will enforce shift, premium, overtime and other non-standard rates as they appear in a project's pre-negotiated labor agreement.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

1) **Provide bona fide fringe benefits which cost the employer no less than the prevailing supplemental benefits rate; or**
2) **Supplement the employee's hourly wage by an amount no less than the prevailing supplemental benefits rate; or**
3) **Provide a combination of bona fide fringe benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.**

Although prevailing wage laws do not require employers to provide bona fide fringe benefits (as opposed to wage supplements) to their employees, other laws may. For example, the Employee Retirement Income Security Act, 29 U.S.C. § 1001 et seq., the Patient Protection and Affordable Care Act, 42 U.S.C. § 18001 et seq., and the New York City Paid Sick Leave Law, N.Y.C. Admin. Code § 20-911 et seq., require certain employers to provide certain benefits to their employees. Labor agreements to which employers are a party may also require certain benefits. The Comptroller's Office does not enforce these laws or agreements.

Employers must provide prevailing supplemental benefits at the straight time rate for each hour worked unless otherwise noted in the classification.

Paid Holidays, Vacation and Sick Leave when listed must be paid or provided in addition to the prevailing hourly supplemental benefit rate.

For more information, please refer to the Comptroller's Prevailing Wage Law Regulations in Title 44 of the Rules of the City of New York, Chapter 2, available at comptroller.nyc.gov/wages.

Wasyl Kinach, P.E.
Director of Classifications
Bureau of Labor Law

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BLASTER

Blaster

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.71
Supplemental Benefit Rate per Hour: $48.63

Blaster - Hydraulic Trac Drill

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $50.85
Supplemental Benefit Rate per Hour: $48.63

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $50.02
Supplemental Benefit Rate per Hour: $48.63

Blaster - Journeyperson

(Laborer, Chipper/Jackhammer including Walk Behind Self Propelled Hydraulic Asphalt and Concrete Breakers and Hydro (Water) Demolition, Powder Carrier, Hydraulic Chuck Tender, Chuck Tender and Nipper)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.50
Supplemental Benefit Rate per Hour: $48.63

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $21.75
Supplemental Benefit Rate per Hour: $48.63

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays
Labor Day
Thanksgiving Day

Shift Rates
When two shifts are employed, single time rate shall be paid for each shift. When three shifts are found necessary, each shift shall work seven and one half hours (7 ½), but shall be paid for eight (8) hours of labor, and be permitted one half hour for lunch.

(Local #731)

BOILERMAKER

Boilermaker

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $63.38
Supplemental Benefit Rate per Hour: $46.67
Supplemental Note: For time and one half overtime - $69.56 For double overtime - $92.44

Overtime Description
For Repair and Maintenance work:
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
For New Construction work:
Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day

Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

Quadruple time the regular rate for work on the following holiday(s).
Labor Day

Paid Holidays
Good Friday
Day after Thanksgiving
Day before Christmas
Day before New Year's Day

Shift Rates
On jobs requiring two (2) or three (3) shifts, the first shift shall work eight (8) hours at the regular straight-time hourly rate. The second shift shall work eight (8) hours and receive eight hours at the regular straight time hourly rate plus two dollars ($2.00) per hour. The third shift shall work eight (8) hours and receive eight hours at the regular straight time hourly rate plus two dollars and twenty-five cents ($2.25) per hour.

(Local #5)

BRICKLAYER

Bricklayer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $57.64
Supplemental Benefit Rate per Hour: $35.95

Overtime Description
Time and one half the regular rate after a 7 hour day. If working on a job that is predominately Pointer, Cleaner, Caulker work, then Time and one half the regular rate after an 8 hour day.

Overtime
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day

Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
The second shift wage rate shall be a 15% wage premium with no premium for supplemental benefits. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, eight hours will be paid at straight time rate for seven hours of work.

(Bricklayer District Council)

CARPENTER - BUILDING COMMERCIAL

Building Commercial

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $54.75
Supplemental Benefit Rate per Hour: $47.13

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates

The second shift will receive one hour at the double time rate of pay for the last hour of the shift; eight hours pay for seven hours of work, nine hours pay for eight hours of work. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

CARPENTER - HEAVY CONSTRUCTION WORK

(Construction of Engineered Structures and Building Foundations including all form work)

Heavy Construction Work

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.93
Supplemental Benefit Rate per Hour: $53.49

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate. When two (2) or more shifts of Carpenters are employed, single time will be paid for each shift.

(Carpenters District Council)

CARPENTER - HIGH RISE CONCRETE FORMS
(Excludes Engineered Structures and Building Foundations)

Carpenter High Rise A

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $50.78
Supplemental Benefit Rate per Hour: $44.44

Carpenter High Rise B

Carpenter High Rise B worker is excluded from high risk operations such as erection decking, perimeter debris netting, leading edge work, self-climbing form systems, and the installation of cocoon systems unless directly supervised by a Carpenter High Rise A worker.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $40.19
Supplemental Benefit Rate per Hour: $17.75

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates

The second shift wage rate shall be 113% of the straight time hourly wage rate. However, any shift beginning after 5:00 P.M. shall be paid at time and one half the regular hourly rate. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

CARPENTER - SIDEWALK SHED, SCAFFOLD AND HOIST

Carpenter - Hod Hoist

(Assisted by Mason Tender)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $52.00
Supplemental Benefit Rate per Hour: $47.40

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates
The second shift will receive 112% of the straight time hourly rate. Benefit fund contributions shall be paid at the straight time rate. There must be a first shift in order to work a second shift. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

CARPENTER - WOOD WATER STORAGE TANK

Tank Mechanic

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $35.69
Supplemental Benefit Rate per Hour: $22.24

Tank Helper

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $28.23
Supplemental Benefit Rate per Hour: $22.24

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Day after Thanksgiving
1/2 day on Christmas Eve if work is performed in the A.M.
Christmas Day
1/2 day on New Year's Eve if work is performed in the A.M.

Vacation
Employed for one (1) year.....one (1) week vacation (40 hours)
Employed for three (3) years.....two (2) weeks vacation (80 hours)
Employed for more than twenty (20) years.....three (3) weeks vacation (120 hours)

SICK LEAVE:
Two (2) sick days after being employed for twenty (20) years.

(Carpenters District Council)

CEMENT & CONCRETE WORKER

Cement & Concrete Worker

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $45.28
Supplemental Benefit Rate per Hour: $30.20
Supplemental Note: $34.20 on Saturdays; $38.20 on Sundays & Holidays

Cement & Concrete Worker - (Hired after 2/6/2016)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $34.80
Supplemental Benefit Rate per Hour: $22.20
Supplemental Note: $24.20 on Saturdays; $26.20 on Sundays & Holidays

Overtime Description
Time and one half the regular rate after 7 hour day (time and one half the regular rate after an 8 hour day when working with Dockbuilders on pile cap forms and for work below street level to the top of the foundation wall, not to exceed 2 feet or 3 feet above the sidewalk-brick shelf, when working on the foundation and structure.)

Overtime
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
1/2 day before Christmas Day
1/2 day before New Year's Day

Shift Rates
On shift work extending over a twenty-four hour period, all shifts are paid at straight time.

(Cement & Concrete Workers District Council 16)

CEMENT MASON

Cement Mason

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $45.77
Supplemental Benefit Rate per Hour: $41.01
Supplemental Note: Supplemental benefit time and one half rate: $71.97; Double time rate: double the base supplemental benefit rate.

Overtime Description
Time and one-half the regular rate after an 8 hour day, double time the regular rate after 10 hours. Time and one-half the regular rate on Saturday, double time the regular rate after 10 hours. Double time the regular rate on Sunday. Four Days a week at Ten (10) hours straight time is allowed.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

Shift Rates
For off shift work, (at times other than the regular 7:00 A.M. to 3:30 P.M. work day) a cement mason shall be paid at the regular hourly rate plus a 25% per hour differential.

(Local #780) (BCA)

CORE DRILLER

Core Driller

Effective Period: 7/1/2021 - 10/17/2021

Wage Rate per Hour: **$41.74**
Supplemental Benefit Rate per Hour: **$29.40**

Effective Period: 10/18/2021 - 6/30/2022
Wage Rate per Hour: **$42.27**
Supplemental Benefit Rate per Hour: **$30.60**

Core Driller Helper

Effective Period: 7/1/2021 - 10/17/2021
Wage Rate per Hour: **$32.92**
Supplemental Benefit Rate per Hour: **$29.40**

Effective Period: 10/18/2021 - 6/30/2022
Wage Rate per Hour: **$33.47**
Supplemental Benefit Rate per Hour: **$30.60**

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2021 - 10/17/2021
Wage Rate per Hour: **$29.63**
Supplemental Benefit Rate per Hour: **$29.40**

Effective Period: 10/18/2021 - 6/30/2022
Wage Rate per Hour: **$30.12**
Supplemental Benefit Rate per Hour: **$30.60**

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2021 - 10/17/2021
Wage Rate per Hour: **$26.34**
Supplemental Benefit Rate per Hour: **$29.40**

Effective Period: 10/18/2021 - 6/30/2022
Wage Rate per Hour: **$26.78**
Supplemental Benefit Rate per Hour: **$30.60**

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2021 - 10/17/2021
Wage Rate per Hour: **$23.04**
Supplemental Benefit Rate per Hour: **$29.40**

Effective Period: 10/18/2021 - 6/30/2022
Wage Rate per Hour: **$23.43**
Supplemental Benefit Rate per Hour: **$30.60**

Overtime Description

Time and one half the regular rate for work on a holiday plus Holiday pay when worked.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Time and one half the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Shift Rates
When two (2) or more shifts are employed, single time shall be paid for each shift, but those employees employed on a shift other than from 8:00 A.M. to 5:00 P.M. shall, in addition, receive two dollars ($2.00) per hour differential for each hour worked. When three (3) shifts are needed, each shift shall work seven and one-half (7 ½) hours paid for eight (8) hours of labor and be permitted one-half (½) hour for mealtime.

(Carpenters District Council)

DERRICKPERSON AND RIGGER

Derrick Person & Rigger

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $53.99
Supplemental Benefit Rate per Hour: $55.10
Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. $56.52 - For work performed in Staten Island.

Derrick Person & Rigger - Site Work

Assists the Stone Mason-Setter in the setting of stone and paving stone.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.86
Supplemental Benefit Rate per Hour: $43.37

Overtime Description
The first two hours of overtime on weekdays and the first seven hours of work on Saturdays are paid at time and one half for wages and supplemental benefits. All additional overtimes is paid at double time for wages and supplemental benefits. Deduct $1.42 from the Staten Island hourly benefits rate before computing overtime.

Overtime
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Washington's Birthday
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
1/2 day on Christmas Eve if work is performed in the A.M.

(Local #197)

DIVER

Diver (Marine)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $71.80
Supplemental Benefit Rate per Hour: $53.49

Diver Tender (Marine)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $51.34
Supplemental Benefit Rate per Hour: $53.49

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day

Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
When three shifts are utilized each shift shall work seven and one half-hours (7 1/2 hours) and paid for 8 hours, allowing for one half hour for lunch.

(Carpenters District Council)

DOCKBUILDER - PILE DRIVER

Dockbuilder - Pile Driver

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.93
Supplemental Benefit Rate per Hour: $53.49

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Dump Truck

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.83
Supplemental Benefit Rate per Hour: $51.55
Supplemental Note: Over 40 hours worked: at time and one half rate - $22.50; at double time rate - $30.00

Driver - Tractor Trailer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.12
Supplemental Benefit Rate per Hour: $51.50
Supplemental Note: Over 40 hours worked: at time and one half rate - $22.50; at double time rate - $30.00

Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.68
Supplemental Benefit Rate per Hour: $51.50
Supplemental Note: Over 40 hours worked: at time and one half rate - $22.50; at double time rate - $30.00

Overtime Description
For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay. For Thanksgiving week, the prorated share shall be 5 1/3 hours of holiday pay for each day worked in Thanksgiving week.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day

Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Off shift work commencing between 6:00 P.M. and 4:30 A.M. shall work eight and one half (8 1/2) hours allowing for one half hour for lunch and receive 9 hours pay for 8 hours of work.

Driver Redi-Mix (Sand & Gravel)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $40.89
Supplemental Benefit Rate per Hour: $47.01
Supplemental Note: Over 40 hours worked: time and one half rate $18.01; double time rate $24.01

Overtime Description

For Paid Holidays: Employees who do not work on a contractual holiday shall be compensated two (2) hours extra pay in straight time wages and benefits for every day on which the Employee does not pass up a day's work during the calendar week (Sunday through Saturday) of the holiday, up to a maximum of ten (10) hours in wages and eight (8) hours in benefit contributions for the holiday

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
President's Day
Columbus Day
Veteran's Day

Triple time the regular rate for work on the following holiday(s).
New Year's Day
Memorial Day
Independence Day

Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Christmas Day

(Local #282)

ELECTRICIAN

(Including installation of low voltage cabling carrying data, video and/or voice on building construction/alteration/renovation projects.)

Electrician "A" (Regular Day / Day Shift)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $58.00
Supplemental Benefit Rate per Hour: $54.86
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Regular Day Overtime after 7 hrs / Day Shift Overtime after 8 hrs)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $87.00
Supplemental Benefit Rate per Hour: $56.73
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Swing Shift)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $68.05
Supplemental Benefit Rate per Hour: $62.39
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Swing Shift Overtime after 7.5 hours)

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate per Hour: $102.08
Supplemental Benefit Rate per Hour: $64.58
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $76.23
Supplemental Benefit Rate per Hour: $68.74
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician "A" (Graveyard Shift Overtime after 7 hours)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $114.35
Supplemental Benefit Rate per Hour: $71.19
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

* Supplemental Benefit Rate per Hour Note

In addition to the Supplemental Benefit Rates per Hour listed above, the employer must provide an additional 6.2% of taxable gross pay earned on covered work only. This additional Supplemental Benefit Rate will terminate when the employee has contributed the maximum annual Social Security tax required by law, on all work performed.

Overtime

Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on a holiday.
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

Shift Rates

For multiple shifts of temporary light and/or power, the temporary light and/or power employee shall be paid for 8 hours at the straight time rate. For three or less workers performing 8 hours temporary light and/or power the supplemental benefit rate is $21.86 - See * Supplemental Benefit Rate per Hour Note above.

Electrician "M" (First 8 hours)

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $30.50
Supplemental Benefit Rate per Hour: $24.45
First and Second Year "M" Wage Rate Per Hour: $26.00
First and Second Year "M" Supplemental Rate: $22.06

Electrician "M" (Overtime After First 8 hours)

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $45.75
Supplemental Benefit Rate per Hour: $26.38
First and Second Year "M" Wage Rate Per Hour: $39.00
First and Second Year "M" Supplemental Rate: $23.70

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

(Local #3)

ELECTRICIAN - ALARM TECHNICIAN

(Scope of Work - Inspect, test, repair, and replace defective, malfunctioning, or broken devices, components and controls of Fire, Burglar and Security Systems)

Alarm Technician

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $33.90
Supplemental Benefit Rate per Hour: $18.43
Supplemental Note: $16.80 only after 8 hours worked in a day

Overtime Description

Time and one half the regular rate for work on the following holidays: Columbus Day, Veterans Day, Day after Thanksgiving.
Double time the regular rate for work on the following holidays: New Year's day, Martin Luther King Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day.

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Paid Holidays

New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Night Differential is based upon a ten percent (10%) differential between the hours of 4:00 P.M. and 12:30 A.M. and a fifteen percent (15%) differential for the hours 12:00 A.M. to 8:30 A.M.

Vacation

At least 1 year of employment.....ten (10) days
5 years or more of employment.....fifteen (15) days
10 years of employment.....twenty (20) days
Plus one Personal Day per year

Sick Days:
One day per Year. Up to 4 vacation days may be used as sick days.

(Local #3)

ELECTRICIAN-STREET LIGHTING WORKER

Electrician - Electro Pole Electrician

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $58.00
Supplemental Benefit Rate per Hour: $56.83
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician - Electro Pole Foundation Installer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.16
Supplemental Benefit Rate per Hour: $42.15
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

Electrician - Electro Pole Maintainer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $37.11
Supplemental Benefit Rate per Hour: $38.04
*** Supplemental Note: See Supplemental Benefit Rate per Hour Note below**

* Supplemental Benefit Rate per Hour Note

In addition to the Supplemental Benefit Rates per Hour listed above, the employer must provide an additional 6.2% of taxable gross pay earned on covered work only. This additional Supplemental Benefit Rate will terminate when the employee has contributed the maximum annual Social Security tax required by law, on all work performed.

Overtime Description

Electrician - Electro Pole Electrician: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week.
Electrician - Electro Pole Foundation Installer: Time and one half the regular rate after 8 hours within a 24 hour period and Saturday and Sunday.
Electrician - Electro Pole Maintainer: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week. Saturdays and Sundays may be used as a make-up day at straight time when a day is lost during the week to inclement weather.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day

President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

(Local #3)

ELEVATOR CONSTRUCTOR

Elevator Constructor

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate per Hour: $72.29
Supplemental Benefit Rate per Hour: $38.29

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate per Hour: $75.14
Supplemental Benefit Rate per Hour: $39.10

Overtime Description
For New Construction: work performed after an 8 hour day, Saturday, Sunday or between 4:30pm and 7:00am shall be paid at double time rate.

Existing buildings: work performed after an 8 hour day, Saturday, Sunday or between 5:30pm and 7:00 am shall be paid time and one half.

Overtime
Double time the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day

Day after Thanksgiving
Christmas Day

Vacation
Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

ELEVATOR REPAIR & MAINTENANCE

Elevator Service/Modernization Mechanic

Effective Period: 7/1/2021 - 3/16/2022
Wage Rate per Hour: $56.77
Supplemental Benefit Rate per Hour: $38.19

Effective Period: 3/17/2022 - 6/30/2022
Wage Rate per Hour: $59.09
Supplemental Benefit Rate per Hour: $39.00

Overtime Description
For Scheduled Service Work: Double time - work scheduled in advance by two or more workers performed on Sundays, Holidays, and between midnight and 7:00am.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.
Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Afternoon shift - regularly hourly rate plus a (15%) fifteen percent differential. Graveyard shift - time and one half the regular rate.

Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

ENGINEER

Engineer - Heavy Construction Operating Engineer I

Cherrypickers 20 tons and over and Loaders (rubber tired and/or tractor type with a manufacturer's minimum rated capacity of six cubic yards and over).

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $74.65
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $119.44

Engineer - Heavy Construction Operating Engineer II

Backhoes, Basin Machines, Groover, Mechanical Sweepers, Bobcat, Boom Truck, Barrier Transport (Barrier Mover) & machines of similar nature. Operation of Churn Drills and machines of a similar nature, Stetco Silent Hoist and machines of similar nature, Vac-Alls, Meyers Machines, John Beam and machines of a similar nature, Ross Carriers and Travel Lifts and machines of a similar nature, Bulldozers, Scrapers and Turn-a-Pulls: Tugger Hoists (Used exclusively for handling excavated material); Tractors with attachments, Hyster and Roustabout Cranes, Cherrypickers. Austin Western, Grove and machines of a similar nature, Scoopmobiles, Monorails, Conveyors, Trenchers: Loaders-Rubber Tired and Tractor: Barber Greene and Eimco Loaders and Eimco Backhoes; Mighty Midget and similar breakers and Tampers, Curb and Gutter Pavers and Motor Patrol, Motor Graders and all machines of a similar nature. Locomotives 10 Tons or under. Mini-Max, Break-Tech and machines of a similar nature; Milling machines, robotic and demolition machines and machines of a similar nature, shot blaster, skid steer machines and machines of a similar nature including bobcat, pile rig rubber-tired excavator (37,000 lbs. and under), 2 man auger.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $72.40
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $115.84

Engineer - Heavy Construction Operating Engineer III

Minor Equipment such as Tractors, Post Hole Diggers, Ditch Witch (Walk Behind), Road Finishing Machines, Rollers five tons and under, Tugger Hoists, Dual Purpose Trucks, Fork Lifts, and Dempsey Dumpers, Fireperson.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $68.62
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $109.79

Engineer - Heavy Construction Maintenance Engineer I

Installing, Repairing, Maintaining, Dismantling and Manning of all equipment including Steel Cutting, Bending and Heat Sealing Machines, Mechanical Heaters, Grout Pumps, Bentonite Pumps & Plants, Screening Machines, Fusion Coupling Machines, Tunnel Boring Machines Moles and Machines of a similar nature, Power Packs, Mechanical Hydraulic Jacks; all drill rigs including but not limited to Churn, Rotary Caisson, Raised Bore & Drills of a similar nature; Personnel, Inspection & Safety Boats or any boats used to perform functions of same, Mine Hoists, Whirlies, all Climbing Cranes, all Tower Cranes, including but not limited to Truck Mounted and Crawler Type and machines of similar nature; Maintaining Hydraulic Drills and machines of a similar nature; Well Point System-Installation and dismantling; Burning, Welding, all Pumps regardless of size and/or motor power, except River Cofferdam Pumps and Wells Point Pumps; Motorized Buggies (three or more); equipment used in the cleaning and televising of sewers, but not limited to jet-rodder/vacuum truck, vacall/vactor, closed circuit television inspection equipment; high powered water pumps, jet pumps; screed machines and concrete finishing machines of a similar nature; vermeers.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $72.05
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $115.28

Engineer - Heavy Construction Maintenance Engineer II

On Base Mounted Tower Cranes

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $95.02
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $152.03

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $47.10
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $75.36

Engineer - Heavy Construction Maintenance Engineer IV

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $48.35
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $77.36

Engineer - Heavy Construction Service Engineer

Gradalls: Concrete Pumps: Power Houses: Driving Truck Cranes: Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $64.82
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $103.71

Engineer - Heavy Construction Service Mechanic

Shovels: Cranes: Draglines: Backhoes: Keystones: Pavers: Trenching Machines: Gunite Machines: Compressors (three (3) or more in Battery): Crawler Cranes- having a straight lattice boom with no attachment or luffing boom, no jib and no auxiliary attachment.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.45
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $71.12

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $68.93
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $110.29

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $64.43
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $103.09

Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $48.72
Supplemental Benefit Rate per Hour: $42.06
Supplemental Note: $76.72 on overtime
Shift Wage Rate: $77.95

Overtime Description
On jobs of more than one shift, if the next shift employee fails to report for work through any cause over which the employer has no control, the employee on duty who works the next shift continues to work at the single time rate.

Overtime
Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

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Engineer - Building Work Maintenance Engineers I

Installing, repairing, maintaining, dismantling (of all equipment including: Steel Cutting and Bending Machines, Mechanical Heaters, Mine Hoists, Climbing Cranes, Tower Cranes, Linden Peine, Lorain, Liebherr, Mannes, or machines of a similar nature, Well Point Systems, Deep Well Pumps, Concrete Mixers with loading Device, Concrete Plants, Motor Generators when used for temporary power and lights), skid steer machines of a similar nature including bobcat.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $64.11
Supplemental Benefit Rate per Hour: $41.15
Supplemental Note: $74.90 on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $49.49
Supplemental Benefit Rate per Hour: $41.15
Supplemental Note: $74.90 on overtime

Engineer - Building Work Oilers I

All gasoline, electric, diesel or air operated Gradealls: Concrete Pumps, Overhead Cranes in Power Houses: Their duties shall be to assist the Engineer in oiling, greasing and repairing of all machines; Driving Truck Cranes: Driving and Operating Fuel and Grease Trucks, Cherrypickers (hydraulic cranes) over 70,000 GVW, and machines of a similar nature.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $60.89
Supplemental Benefit Rate per Hour: $41.15
Supplemental Note: $74.90 on overtime

Engineer - Building Work Oilers II

Oilers on Crawler Cranes, Backhoes, Trenching Machines, Gunite Machines, Compressors (three or more in Battery).

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.88
Supplemental Benefit Rate per Hour: $41.15
Supplemental Note: $74.90 on overtime

Overtime Description
On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

Overtime
Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Shift Rates
When two (2) or more shifts are employed, single time will be paid for each shift.

(Local #15)

ENGINEER - CITY SURVEYOR AND CONSULTANT

Party Chief

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $41.98
Supplemental Benefit Rate per Hour: $24.40
Supplemental Note: Overtime Benefit Rate - $29.35 per hour (time & one half) $34.30 per hour (double time).

Instrument Person

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $34.32
Supplemental Benefit Rate per Hour: $24.40
Supplemental Note: Overtime Benefit Rate - $29.35 per hour (time & one half) $34.30 per hour (double time).

Rodperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $29.49
Supplemental Benefit Rate per Hour: $24.40
Supplemental Note: Overtime Benefit Rate - $29.35 per hour (time & one half) $34.30 per hour (double time).

Overtime Description
Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays
New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (BUILDING CONSTRUCTION)
(Construction of Building Projects, Concrete Superstructures, etc.)

Field Engineer - BC Party Chief

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $66.42
Supplemental Benefit Rate per Hour: $37.16
Supplemental Note: Overtime Benefit Rate - $52.27 per hour (time & one half) $67.37 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $51.37
Supplemental Benefit Rate per Hour: $37.16
Supplemental Note: Overtime Benefit Rate - $52.27 per hour (time & one half) $67.37 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $32.84
Supplemental Benefit Rate per Hour: $37.16
Supplemental Note: Overtime Benefit Rate - $52.27 per hour (time & one half) $67.37 per hour (double time).

Overtime Description
Time and one half the regular rate after a 7 hour work and time and one half the regular rate for Saturday for the first seven hours worked, Double time the regular time rate for Saturday for work performed in excess of seven hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (HEAVY CONSTRUCTION)
(Construction of Roads, Tunnels, Bridges, Sewers, Building Foundations, Engineering Structures etc.)

Field Engineer - HC Party Chief

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $77.31
Supplemental Benefit Rate per Hour: $39.64
Supplemental Note: Overtime benefit rate - $55.86 per hour (time & one half), $72.08 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.50
Supplemental Benefit Rate per Hour: $39.64
Supplemental Note: Overtime benefit rate - $55.86 per hour (time & one half), $72.08 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $47.23
Supplemental Benefit Rate per Hour: $39.64
Supplemental Note: Overtime benefit rate - $55.86 per hour (time & one half), $72.08 per hour (double time).

Overtime Description
Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

Paid Holidays
New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - FIELD (STEEL ERECTION)

Field Engineer - Steel Erection Party Chief

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $71.98
Supplemental Benefit Rate per Hour: $39.14
Supplemental Note: Overtime benefit rate - $55.11 per hour (time & one half), $71.08 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $55.85
Supplemental Benefit Rate per Hour: $39.14
Supplemental Note: Overtime benefit rate - $55.11 per hour (time & one half), $71.08 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $36.99
Supplemental Benefit Rate per Hour: $39.14
Supplemental Note: Overtime benefit rate - $55.11 per hour (time & one half), $71.08 per hour (double time).

Overtime Description
Time and one half the regular rate for Saturday for the first eight hours worked.
Double time the regular rate for Saturday for work performed in excess of eight hours.

Overtime
Time and one half the regular rate after an 8 hour day.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

ENGINEER - OPERATING

Operating Engineer - Road & Heavy Construction I

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $86.05
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $137.68

Operating Engineer - Road & Heavy Construction II

Backhoes, Power Shovels, Hydraulic Clam Shells, Steel Erection, Moles and machines of a similar nature.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $89.05
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $142.48

Operating Engineer - Road & Heavy Construction III

Mine Hoists (Cranes, etc. when used as Mine Hoists)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $91.89
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $147.02

Operating Engineer - Road & Heavy Construction IV

Gradealls, Keystones, Cranes on land or water (with digging buckets), Bridge Cranes, Vermeer Cutter and machines of a similar nature, Trenching Machines.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $89.70
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Shift Wage Rate: $143.52

Operating Engineer - Road & Heavy Construction V

Pile Drivers & Rigs (working alongside Dock Builder foreperson): Derrick Boats, Tunnel Shovels.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $87.94
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $140.70

Operating Engineer - Road & Heavy Construction VI

Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power Houses (Low Air Pressure Units).

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $83.59
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $133.74

Operating Engineer - Road & Heavy Construction VII

Barrier Movers, Barrier Transport and Machines of a Similar Nature.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $67.71
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $108.34

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $52.77
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $66.26

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $79.56

Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $127.30

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $73.21
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $117.14

Operating Engineer - Road & Heavy Construction XI

Compressors (Portable 3 or more in battery), Driving of Truck Mounted Compressors, Well-point Pumps, Tugger Machines Well Point Pumps, Churn Drill.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $57.06
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $91.30

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $84.48
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $135.17

Operating Engineer - Road & Heavy Construction XIII

Concrete Pumps, Concrete Plant, Stone Crushers, Double Drum Hoist, Power Houses (other than above).

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $81.85
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $130.96

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate per Hour: $78.28
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $125.25

Operating Engineer - Road & Heavy Construction XV

Compressors (Portable Single or two in Battery, not over 100 feet apart), Pumps (River Cofferdam) and Welding Machines, Push Button Machines, All Engines Irrespective of Power (Power-Pac) used to drive auxiliary equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $53.11
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $84.98

Operating Engineer - Road & Heavy Construction XVI

Concrete Breaking Machines, Hoists (Single Drum), Load Masters, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $74.81
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $119.70

Operating Engineer - Road & Heavy Construction XVII

On-Site concrete plant engineer, On-site Asphalt Plant Engineer, and Vibratory console.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $75.36
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $120.58

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $107.75
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $172.40

Operating Engineer - Paving I

Asphalt Spreaders, Autogrades (C.M.I.), Roto/Mil

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $83.59
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $133.74

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $81.47
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $130.35

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $69.04
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $110.46

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $89.31
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $53.51
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Concrete III

Micro-traps (Negative Air Machines), Vac-All Remediation System.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $71.55
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $92.36
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $147.78

Operating Engineer - Steel Erection II

Cranes, 2 Drum Derricks, Hydraulic Cranes, Fork Lifts and Boom Trucks.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $88.77
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $142.03

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $53.07
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $84.91

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine. (Public Works Only)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $50.56
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
Shift Wage Rate: $80.90

Operating Engineer - Building Work I

Forklifts, Plaster (Platform machine), Plaster Bucket, Concrete Pump and all other equipment used for hoisting material.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $70.94
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Building Work II

Compressors, Welding Machines (Cutting Concrete-Tank Work), Paint Spraying, Sandblasting, Pumps (with the exclusion of Concrete Pumps), All Engines irrespective of Power (Power-Pac) used to drive Auxiliary Equipment, Air, Hydraulic, Jacking System, etc.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $53.12
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $84.16
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $89.10
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $78.81
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $77.98
Supplemental Benefit Rate per Hour: $34.55

Supplemental Note: $63.15 overtime hours

Operating Engineer - Building Work VII

Rack & Pinion and House Cars

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $62.01
Supplemental Benefit Rate per Hour: $34.55
Supplemental Note: $63.15 overtime hours
For New House Car projects Wage Rate per Hour $49.50
For New House Car projects: Supplemental Benefit overtime hours: $48.85

Overtime Description
On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

For House Cars and Rack & Pinion only: Overtime paid at time and one-half for all hours in excess of eight hours in a day, Saturday, Sunday and Holidays worked.

Overtime
Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.
Double time the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

Shift Rates
When two (2) or more shifts are employed, single time will be paid for each shift.
For Steel Erection Only: Shifts may be worked at the single time rate at other than the regular working hours (8:00 A.M. to 4:30 P.M.) on the following work ONLY: Heavy construction jobs on work below the street level, over railroad tracks and on building jobs.

(Operating Engineer Local #14)

FLOOR COVERER
(Interior vinyl composition tile, sheath vinyl linoleum and wood parquet tile including site preparation and synthetic turf not including site preparation)

Floor Coverer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $54.75
Supplemental Benefit Rate per Hour: $47.13

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Day after Thanksgiving
Day before Christmas
Christmas Day
Day before New Year's Day

Shift Rates
Two shifts may be utilized with the first shift working 8 a.m. to the end of the shift at straight time rate of pay. The wage rate for the second shift consisting of 7 hours shall be paid at 114.29% of straight time wage rate. The wage rate for the second shift consisting of 8 hours shall be paid 112.5% of the straight time wage rate. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Carpenters District Council)

GLAZIER
(New Construction, Remodeling, and Alteration)

Glazier

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.55
Supplemental Benefit Rate per Hour: $47.74
Supplemental Note: Supplemental Benefit Overtime Rate: $71.62

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates
Shifts shall be any 8 consecutive hours after the normal working day for which the Glazier shall receive 9 hours pay for 8 hours worked.

(Local #1281)

GLAZIER - REPAIR & MAINTENANCE
(For the Installation of Glass - All repair and maintenance work on a particular building.)

Craft Jurisdiction for repair, maintenance and fabrication

Plate glass replacement, Residential glass replacement, Residential mirrors and shower doors, Storm windows and storm doors, Residential replacement windows, Herculite door repairs, Door closer repairs, Retrofit apartment house (non-commercial buildings), Glass tinting.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.40
Supplemental Benefit Rate per Hour: $24.09

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Sunday.
Time and one half the regular rate for work on the following holiday(s).
Time and one half the regular hourly rate after 40 straight time hours in any work week.

Paid Holidays
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day
Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Local #1281)

HAZARDOUS MATERIAL HANDLER
(Removal, abatement, encapsulation or decontamination of asbestos, lead, mold, or other toxic or hazardous waste/materials)

Handler

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $38.05
Supplemental Benefit Rate per Hour: $17.75

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Sunday.
Time and one half the regular hourly rate after 40 straight time hours in any work week.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day
Easter

Paid Holidays
None

(Local #78 and Local #12A)

HEAT AND FROST INSULATOR

Heat & Frost Insulator

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $62.21
Supplemental Benefit Rate per Hour: $41.91

Overtime Description
Double time shall be paid for supplemental benefits during overtime work.
8th hour paid at time and one half.

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Triple time the regular rate for work on the following holiday(s).
Labor Day

Paid Holidays
None

Shift Rates
The first shift shall work seven hours at the regular straight time rate. The second and third shift shall work seven hours the regular straight time hourly rate plus a fourteen percent wage and benefit premium.There must be a first shift to work the second shift, and a second shift to work the third shift. Off-hour jobs in occupied

buildings may be worked on weekdays with an increment of one-dollar ($1.00) per hour and eight (8) hours pay for seven (7) hours worked.

(Local #12) (BCA)

HOUSE WRECKER
(TOTAL DEMOLITION)

House Wrecker - Tier A

On all work sites the first, second, eleventh and every third House Wrecker thereafter will be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). Other House Wreckers may be Tier B House Wreckers.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $37.63
Supplemental Benefit Rate per Hour: $30.37

House Wrecker - Tier B

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.86
Supplemental Benefit Rate per Hour: $22.78

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(Mason Tenders District Council)

IRON WORKER - ORNAMENTAL

Iron Worker - Ornamental

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.15
Supplemental Benefit Rate per Hour: $59.62
Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description
Time and one half the regular rate after a 7 hour day for a maximum of two hours on any regular work day (the 8th and 9th hour) and double time shall be paid for all work on a regular work day thereafter, time and one half the regular rate for Saturday for the first seven hours of work and double time shall be paid for all work on a Saturday thereafter.

Overtime
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
When two or three shifts are employed on a job, Monday through Friday, the second and third shift are paid eight and one half (8 ½) hours at the straight time rate for seven (7) hours of work, and ten (10) hours at the straight time rate for eight (8) hours of work. When it is not possible to conduct alteration or repair work during regular working hours in a building occupied by tenants, eight hours will be paid at straight time rate for seven hours of work, and all overtime shall be paid at time and one-half the regular straight time rates but on Sundays and Holidays, time and one-half the regular straight time rate shall be paid for all work up to seven (7) hours and double time shall be paid for all work thereafter.

(Local #580)

IRON WORKER - STRUCTURAL

Iron Worker - Structural

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $54.20
Supplemental Benefit Rate per Hour: $82.81
Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Overtime Description
Monday through Friday- the first eight hours are paid at straight time, the 9th and 10th hours are paid at time and one-half the regular rate, all additional weekday overtime is paid at double the regular rate. Saturdays- the first eight hours are paid at time and one-half the regular rate, double time thereafter. Sunday-all shifts are paid at double time. Four Days a week at Ten (10) hours straight time is allowed.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
1/2 day on Christmas Eve if work is performed in the A.M.
1/2 day on New Year's Eve if work is performed in the A.M.

Shift Rates
Monday through Friday - First Shift: First eight hours are paid at straight time, the 9th & 10th hours are paid at time and a half, double time paid thereafter. Second and third Shifts: First eight hours are paid at time and one-half, double time thereafter. Saturdays: All shifts, first eight hours paid at time and one-half, double time thereafter: Sunday all shifts are paid at double time.

Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday.

(Local #40 & #361)

LABORER
(Foundation, Concrete, Excavating, Street Pipe Layer and Common)

Laborer

Excavation and foundation work for buildings, heavy construction, engineering work, and hazardous waste removal in connection with the above work. Landscaping tasks in connection with heavy construction work, engineering work and building projects. Projects include, but are not limited to pollution plants, sewers, parks, subways, bridges, highways, etc.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.50
Supplemental Benefit Rate per Hour: $48.63

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays
Labor Day
Thanksgiving Day

Shift Rates
When two shifts are employed, single time rate shall be paid for each shift. When three shifts are found necessary, each shift shall work seven and one half hours (7 ½), but shall be paid for eight (8) hours of labor, and be permitted one half hour for lunch.

(Local #731)

LANDSCAPING
(Landscaping tasks, such as tree pruning, tree removing and spraying in connection with Green Infrastructure maintenance and the planting of street

trees and trees in City parks, but not when such activities are performed as part of construction or reconstruction projects.)

Landscaper (Year 6 and above)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $33.90
Supplemental Benefit Rate per Hour: $17.05

Landscaper (Year 3 - 5)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $32.81
Supplemental Benefit Rate per Hour: $17.05

Landscaper (up to 3 years)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $30.06
Supplemental Benefit Rate per Hour: $17.05

Groundperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $30.06
Supplemental Benefit Rate per Hour: $17.05

Tree Remover / Pruner

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $39.42
Supplemental Benefit Rate per Hour: $17.05

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $28.41
Supplemental Benefit Rate per Hour: $17.05

Watering - Plant Maintainer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $22.88
Supplemental Benefit Rate per Hour: $17.05

Overtime Description

For all overtime work performed, supplemental benefits shall include an additional seventy-five ($0.75) cents per hour.

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Time and one half the regular rate for work on a holiday plus the day's pay.

Paid Holidays

New Year's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Shift Rates

Work performed on a 4pm to 12am shift has a 15% differential. Work performed on a 12am to 8am shift has a 20% differential.

(Local #175)

MARBLE MECHANIC

Marble Setter

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.73
Supplemental Benefit Rate per Hour: $41.76

Marble Finisher

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.32
Supplemental Benefit Rate per Hour: $38.96

Marble Polisher

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $42.91
Supplemental Benefit Rate per Hour: $31.61

Marble Maintenance Finisher

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.73
Supplemental Benefit Rate per Hour: $13.59

Overtime Description
Supplemental Benefit contributions are to be made at the applicable overtime rates.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

(Local #7)

MASON TENDER

Mason Tender

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $39.20
Supplemental Benefit Rate per Hour: $31.24

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays

Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

Shift Rates

The employer may work two (2) shifts with the first shift at the straight time wage rate and the second shift receiving eight (8) hours paid for seven (7) hours work at the straight time wage rate. When it is not possible to conduct alteration work during regular working hours in a building occupied by tenants, the rule for the second shift will apply.

(Local #79)

MASON TENDER (INTERIOR DEMOLITION WORKER)

Mason Tender Tier A

Tier A Interior Demolition Worker performs all burning, chopping, and other technically skilled tasks related to interior demolition work.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $37.29
Supplemental Benefit Rate per Hour: $25.75

Mason Tender Tier B

Tier B Interior Demolition Worker performs manual work and work incidental to demolition work, such as loading and carting of debris from the work site to an area where it can be loaded in to bins/trucks for removal. Also performs clean-up of the site when demolition is completed.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $26.48
Supplemental Benefit Rate per Hour: $20.07

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(Local #79)

METALLIC LATHER

Metallic Lather

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.40
Supplemental Benefit Rate per Hour: $49.80
Supplemental Note: For time and one half overtime - $61.55 For double overtime - $77.10

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays
1/2 day on Christmas Eve if work is performed in the A.M.
1/2 day on New Year's Eve if work is performed in the A.M.

Shift Rates

Off-shift work outside of normal working hours shall receive straight time rate plus $12 per hour for the first eight (8) hours.

(Local #46)

MILLWRIGHT

Millwright

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $57.00
Supplemental Benefit Rate per Hour: $54.76

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

Paid Holidays
1/2 day on Christmas Eve if work is performed in the A.M.
1/2 day on New Year's Eve if work is performed in the A.M.

Shift Rates
Second and third shifts receives the straight time rate of pay plus fifteen (15%) percent allowing for one half hour for a meal. There must be a first shift to work a second and third shift. All additional hours worked shall be paid at the time and one-half rate of pay plus fifteen (15%) percent for weekday hours.

(Local #740)

MOSAIC MECHANIC

Mosaic Mechanic - Mosaic & Terrazzo Mechanic

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $51.66
Supplemental Benefit Rate per Hour: $43.67

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $50.06
Supplemental Benefit Rate per Hour: $43.67

Mosaic Mechanic - Machine Operator Grinder

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $50.06
Supplemental Benefit Rate per Hour: $43.67

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Washington's Birthday
Good Friday
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

(Local #7)

PAINTER

Painter - Brush & Roller

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.00
Supplemental Benefit Rate per Hour: $36.70
Supplemental Note: $43.79 on overtime

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.00
Supplemental Benefit Rate per Hour: $36.70
Supplemental Note: $43.79 on overtime

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(District Council of Painters #9)

PAINTER - LINE STRIPING (ROADWAY)

Striping - Machine Operator

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $37.00
Supplemental Benefit Rate per Hour: $14.37
Supplemental Note: Overtime Supplemental Benefit rate - $16.25

Lineperson (Thermoplastic)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $41.00
Supplemental Benefit Rate per Hour: $14.37
Supplemental Note: Overtime Supplemental Benefit rate - $16.25

Striping Assistant & Traffic Safety

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $36.75
Supplemental Benefit Rate per Hour: $14.37
Supplemental Note: Overtime Supplemental Benefit rate - $16.25

Overtime Description

Time and one half the regular rate for all work in excess of ten (10) straight time hours per day and in excess of forty (40) straight time hours per week.

For Paid Holidays: Employees will only receive Holiday Pay for holidays not worked if said employee worked both the regularly scheduled workday before and after the holiday.

Overtime

Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.
Time and one half the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Vacation

Employees with one to two years service shall accrue vacation based on hours worked: 250 hours worked - 1 day vacation; 500 hours worked - 2 days vacation; 750 hours worked - 3 days vacation; 900 hours worked - 4 days vacation; 1,000 hours worked - 5 days vacation. Employees with two to five years service receive two weeks vacation. Employees with five to twenty years service receive three weeks vacation. Employees with twenty to twenty-five years service receive four weeks vacation. Employees with 25 or more years service receive five weeks vacation.

(Local #1010)

PAINTER - METAL POLISHER

METAL POLISHER

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $31.88
Supplemental Benefit Rate per Hour: $10.29

METAL POLISHER - NEW CONSTRUCTION

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $32.83
Supplemental Benefit Rate per Hour: $10.29

METAL POLISHER - SCAFFOLD OVER 34 FEET

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $35.38
Supplemental Benefit Rate per Hour: $10.29

ASSISTANT METAL POLISHER

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $24.66
Supplemental Benefit Rate per Hour: $9.81

ASSISTANT METAL POLISHER - NEW CONSTRUCTION

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $25.41
Supplemental Benefit Rate per Hour: $9.81

ASSISTANT METAL POLISHER - SCAFFOLD OVER 34 FEET

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $27.16
Supplemental Benefit Rate per Hour: $9.81

Overtime Description

All work performed on Saturdays shall be paid at time-in-a half. The exception being; for suspended scaffold work and work deemed as a construction project; an eight (8) hour shift lost during the week due to circumstances beyond the control of the employer, up to a maximum of eight (8) hours per week, may be worked on Saturday at the straight time rate.

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.
Triple time the regular rate for work on the following holiday(s).

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates

Four Days a week at Ten (10) hours straight a day.

Local 8A-28A

PAINTER - SIGN

Sign Painter

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.32
Supplemental Benefit Rate per Hour: $21.70

Assistant Sign Painter

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $37.66
Supplemental Benefit Rate per Hour: $19.93

Overtime Description

If any employee is required to work on any of the paid holidays then the employee shall receive double time rate of wages as well as the holiday pay for that day.

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Vacation

At least 1 year of employment.....1 week
2 years or more of employment.....2 weeks
8 years or more of employment.....3 weeks

(Local #8A-28A)

PAINTER - STRUCTURAL STEEL

Painters on Structural Steel

Effective Period: 7/1/2021 - 9/30/2021
Wage Rate per Hour: $51.50
Supplemental Benefit Rate per Hour: $48.28

Effective Period: 10/1/2021 - 6/30/2022
Wage Rate per Hour: $53.00
Supplemental Benefit Rate per Hour: $49.83

Painter - Power Tool

Effective Period: 7/1/2021 - 9/30/2021
Wage Rate per Hour: $57.50
Supplemental Benefit Rate per Hour: $48.28
Overtime Wage Rate: $6.00 above the "Painters on Structural Steel" overtime rate.

Effective Period: 10/1/2021 - 6/30/2022
Wage Rate per Hour: $59.50
Supplemental Benefit Rate per Hour: $49.83
Overtime Wage Rate: $6.50 above the "Painters on Structural Steel" overtime rate.

Overtime Description

Supplemental Benefits shall be paid for each hour worked, up to forty (40) hours per week for the period of May 1st to November 15th or up to fifty (50) hours per week for the period of November 16th to April 30th.

Overtime

Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
Second shift is paid at regular hourly wage rates plus a ten percent (10%) differential. There must be a first shift in order to work a second shift.

(Local #806)

PAPERHANGER

Paperhanger

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $46.87
Supplemental Benefit Rate per Hour: $37.49
Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates
Evening shift - 4:30 P.M. to 12:00 Midnight (regular rate of pay); any work performed before 7:00 A.M. shall be at time and one half the regular base rate of pay.

(District Council of Painters #9)

PAVER AND ROADBUILDER

Paver & Roadbuilder - Formsetter

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $47.85
Supplemental Benefit Rate per Hour: $48.51
Supplemental Note: For time and one half overtime - $52.64 For double overtime - $56.76

Paver & Roadbuilder - Laborer

Paving and road construction work, regardless of material used, including but not limited to preparation of job sites, removal of old surfaces, asphalt and/or concrete, by whatever method, including but not limited to milling; laying of concrete; laying of asphalt for temporary, patchwork, and utility paving (but not production paving); site preparation and incidental work for installation of rubberized materials and similar surfaces; installation and repair of temporary construction fencing; slurry/seal coating, paving stones, maintenance of safety surfaces; play equipment installation, and other related work.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.98
Supplemental Benefit Rate per Hour: $48.51
Supplemental Note: For time and one half overtime - $52.64 For double overtime - $56.76

Production Paver & Roadbuilder - Screed Person

(Production paving is asphalt paving when using a paving machine or on a project where a paving machine is traditionally used)

Adjustment of paving machinery on production paving jobs.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $48.45
Supplemental Benefit Rate per Hour: $48.51
Supplemental Note: For time and one half overtime - $52.64 For double overtime - $56.76

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $47.85
Supplemental Benefit Rate per Hour: $48.51
Supplemental Note: For time and one half overtime - $52.64 For double overtime - $56.76

Production Paver & Roadbuilder - Shoveler

General laborer (except removal of surfaces - see Paver and Roadbuilder-Laborer) including but not limited to tamper, AC paint and liquid tar work.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.98
Supplemental Benefit Rate per Hour: $48.51
Supplemental Note: For time and one half overtime - $52.64 For double overtime - $56.76

Overtime Description
If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 25%.

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day

Paid Holidays
Memorial Day
Independence Day
Labor Day
Thanksgiving Day

Shift Rates
When two shifts are employed, the work period for each shift shall be a continuous eight (8) hours. When three shifts are employed, each shift will work seven and one half (7 ½) hours but will be paid for eight (8) hours at the straight time rate since only one half (1/2) hour is allowed for meal time.
When two or more shifts are employed, single time will be paid for each shift.

Night Work - On night work, the first eight (8) hours of work will be paid for at the single time rate, except that production paving work shall be paid at 10% over the single time rate for the screed person, rakers and shovelers directly involved only. This differential is to be paid when there is only one shift and the shift works at night. All other workers will be exempt. Hours worked over eight (8) hours during said shift shall be paid for at the time and one-half rate.

(Local #1010)

PLASTERER

Plasterer

Effective Period: 7/1/2021 - 7/31/2021
Wage Rate per Hour: $45.73
Supplemental Benefit Rate per Hour: $30.37

Effective Period: 8/1/2021 - 6/30/2022
Wage Rate per Hour: $46.00
Supplemental Benefit Rate per Hour: $28.20

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
When it is not possible to conduct work during regular working hours (between 6:30am and 4:30pm), a shift differential shall be paid at the regular hourly rate plus a twelve percent (12%) per hour differential. Workers on shift work shall be allowed a paid one-half hour meal break.

(Local #262)

PLASTERER - TENDER

Plasterer - Tender

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $39.20
Supplemental Benefit Rate per Hour: $31.24

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Washington's Birthday
Memorial Day
Independence Day
Labor Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
When work commences outside regular work hours, workers receive an hour additional (differential) wage and supplement payment. Eight hours pay for seven hours work or nine hours pay for eight hours work.

(Mason Tenders District Council)

PLUMBER

Plumber

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $71.25
Supplemental Benefit Rate per Hour: $39.95
Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Plumber - Temporary Services

Temporary Services - When there are no Plumbers on the job site, there may be three shifts designed to cover the entire twenty-four hour period, including weekends if necessary, at the following rate straight time.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $57.08
Supplemental Benefit Rate per Hour: $31.88

Overtime
Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates
30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

PLUMBER (MECHNICAL EQUIPMENT AND SERVICE)
(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Plumber

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.37
Supplemental Benefit Rate per Hour: $18.31

Overtime
Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

(Plumbers Local # 1)

PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME CONSTRUCTION)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $49.47
Supplemental Benefit Rate per Hour: $28.68

Overtime
Double time the regular rate after an 8 hour day.
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates

30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

PLUMBER: PUMP & TANK

Oil Trades (Installation and Maintenance)

Plumber - Pump & Tank

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $69.33
Supplemental Benefit Rate per Hour: $27.98

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

Shift Rates

All work outside the regular workday (8:00 A.M. to 3:30 P.M.) is to be paid at time and one half the regular hourly rate

(Plumbers Local #1)

POINTER, WATERPROOFER, CAULKER, SANDBLASTER, STEAMBLASTER
(Exterior Building Renovation)

Journeyperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.77
Supplemental Benefit Rate per Hour: $29.91

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:00 P.M.) is to be paid at time and one half the regular rate. However, the employer may establish one (1) or two (2) shifts starting at or after 4:00 P.M. to be paid at the regular hourly rate plus a 10% differential.

(Bricklayer District Council)

ROOFER

Roofer

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.25
Supplemental Benefit Rate per Hour: $34.81

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
Second shift - Regular hourly rate plus a 10% differential. Third shift - Regular hourly rate plus a 15% differential. There must be a first shift to work the second shift, and a second shift to work the third shift. All other work outside the regular work day (an eight hour workday between the hours of 5:00 A.M. and 4:00 P.M.) is to be paid at time and one half the regular rate.

(Local #8)

SHEET METAL WORKER

Sheet Metal Worker

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $51.36
Supplemental Benefit Rate per Hour: $53.34
Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Sheet Metal Worker - Fan Maintenance

(The temporary operation of fans or blowers in new or existing buildings for heating and/or ventilation, and/or air conditioning prior to the completion of the project.)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $41.09
Supplemental Benefit Rate per Hour: $53.34

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $18.49
Supplemental Benefit Rate per Hour: $11.94

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates
Work that can only be performed outside regular working hours (eight hours of work between 7:30 A.M. and 3:30 P.M.) - First shift (work between 3:30 P.M. and 11:30 P.M.) - 10% differential above the established hourly rate. Second shift (work between 11:30 P.M. and 7:30 A.M.) - 15% differential above the established hourly rate.

For Fan Maintenance: On all full shifts of fan maintenance work the straight time hourly rate of pay will be paid for each shift, including nights, Saturdays, Sundays, and holidays.

(Local #28)

SHEET METAL WORKER - SPECIALTY
(Decking & Siding)

Sheet Metal Specialty Worker

The first worker to perform this work must be paid at the rate of the Sheet Metal Worker. The second and third workers shall be paid the Specialty Worker Rate. The ratio of One Sheet Metal Worker, then Two Specialty Workers shall be utilized thereafter.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $48.18
Supplemental Benefit Rate per Hour: $26.87
Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

(Local #28)

SHIPYARD WORKER

Shipyard Mechanic - First Class

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $28.50
Supplemental Benefit Rate per Hour: $3.95

Shipyard Mechanic - Second Class

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $19.07
Supplemental Benefit Rate per Hour: $3.59

Shipyard Laborer - First Class

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $23.40
Supplemental Benefit Rate per Hour: $3.75

Shipyard Laborer - Second Class

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.38
Supplemental Benefit Rate per Hour: $3.52

Shipyard Dockhand - First Class

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $21.57
Supplemental Benefit Rate per Hour: $3.68

Shipyard Dockhand - Second Class

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.28
Supplemental Benefit Rate per Hour: $3.52

Overtime Description
Work performed on holiday is paid double time the regular hourly wage rate plus holiday pay.

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Time and one half the regular hourly rate after 40 straight time hours in any work week.

Paid Holidays
New Year's Day
Martin Luther King Jr. Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Based on Survey Data

SIGN ERECTOR
(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $52.29
Supplemental Benefit Rate per Hour: $57.49

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.
Time and one half the regular rate for work on the following holiday(s).

Paid Holidays
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates
Time and one half the regular hourly rate is to be paid for all hours worked outside the regular workday either (7:00 A.M. through 2:30 P.M.) or (8:00 A.M. through 3:30 P.M.)

(Local #137)

STEAMFITTER

Steamfitter

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $59.05
Supplemental Benefit Rate per Hour: $58.14
Supplemental Note: Overtime supplemental benefit rate: $115.54

Steamfitter -Temporary Services

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $44.88
Supplemental Benefit Rate per Hour: $47.31

Overtime Description
Double time after a 7 hour day except for Temporary Services.

Overtime
Double time the regular time rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates
May be performed outside of the regular workday except Saturday, Sunday and Holidays. When shift work is performed the wage rate for regular time worked is a 15% percent premium on wage and 15% percent premium on supplemental benefits.

Local 638

STEAMFITTER - REFRIGERATION AND AIR CONDITIONER
(Maintenance and Installation Service Person)

Refrigeration and Air Conditioner Mechanic

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $42.85
Supplemental Benefit Rate per Hour: $19.46

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Independence Day
Labor Day
Veteran's Day
Thanksgiving Day
Christmas Day

Double time and one half the regular rate for work on the following holiday(s).
Martin Luther King Jr. Day
President's Day
Memorial Day
Columbus Day

Paid Holidays
New Year's Day
Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

(Local #638-B)

STONE MASON - SETTER

Stone Mason - Setter

(Assisted by Derrickperson and Rigger)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.43
Supplemental Benefit Rate per Hour: $48.52

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
Washington's Birthday
Good Friday
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays
1/2 day on Christmas Eve if work is performed in the A.M.

Shift Rates
For all work outside the regular workday (8:00 A.M. to 3:30 P.M. Monday through Friday), the pay shall be straight time plus a ten percent (10%) differential.

(Bricklayers District Council)

TAPER

Drywall Taper

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $48.47
Supplemental Benefit Rate per Hour: $29.06

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays
Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Martin Luther King Jr. Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Paid Holidays

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

(Local #1974)

TELECOMMUNICATION WORKER

(Install/maintain/repair telecommunications cables carrying data, video, and/or voice except for installation on building construction/alteration/renovation projects.)

Telecommunication Worker

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $47.03
Supplemental Benefit Rate per Hour: $23.15
Supplemental Note: The above rate applies for Manhattan, Bronx, Brooklyn, Queens. $22.84 for Staten Island only.

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).
New Year's Day
Lincoln's Birthday
Washington's Birthday
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

Paid Holidays

New Year's Day
Lincoln's Birthday
Washington's Birthday
Memorial Day
Independence Day

Labor Day
Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day
Employees have the option of observing either Martin Luther King's Birthday or the day after Thanksgiving instead of Lincoln's Birthday

Shift Rates
For any workday that starts before 8A.M. or ends after 6P.M. there is a 10% differential for the applicable worker's hourly rate.

Vacation
After 6 months.....one week.
After 12 months but less than 7 years.....two weeks.
After 7 or more but less than 15 years.....three weeks.
After 15 years or more but less than 25 years.....four weeks.

(C.W.A.)

TILE FINISHER

Tile Finisher

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $43.71
Supplemental Benefit Rate per Hour: $35.10

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays
None

Shift Rates
Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

TILE LAYER - SETTER

Tile Layer - Setter

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.42
Supplemental Benefit Rate per Hour: $39.75

Overtime
Time and one half the regular rate after a 7 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Shift Rates
Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

TIMBERPERSON

Timberperson

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $52.50
Supplemental Benefit Rate per Hour: $52.94

Overtime
Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for Saturday.
Double time the regular rate for Sunday.
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Overtime Holidays
Double time the regular rate for work on the following holiday(s).
New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays
None

Shift Rates
Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate. Benefits for off-shift work shall be paid at the straight time rate.

(Local #1536)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $68.58
Supplemental Benefit Rate per Hour: $60.19

Tunnel Workers (Compressed Air Rates)

Includes shield driven liner plate portions or solidification portions work (8 hour shift) during excavation phase.

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $66.14
Supplemental Benefit Rate per Hour: $58.29

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $65.04
Supplemental Benefit Rate per Hour: $57.14

Outside Lock Tender, Outside Gauge Tender,Muck Lock Tender (Compressed Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $63.74
Supplemental Benefit Rate per Hour: $56.20

Bottom Bell & Top Bell Signal Person: Shaft Person (Compressed Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $63.74
Supplemental Benefit Rate per Hour: $56.20

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $56.04
Supplemental Benefit Rate per Hour: $52.83

Blasters (Free Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $65.41
Supplemental Benefit Rate per Hour: $57.80

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $62.58
Supplemental Benefit Rate per Hour: $55.38

All Others (Free Air Rates)

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate per Hour: **$57.84**
Supplemental Benefit Rate per Hour: **$51.26**

Microtunneling (Free Air Rates)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$50.06**
Supplemental Benefit Rate per Hour: **$44.30**

Overtime Description

For work performed during excavation and primary concrete tunnel lining phases - Double time the regular rate after an 8 hour day and Saturday, Sunday and on the following holiday(s) listed below.
For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, Saturday, Sunday and double time the regular rate for work on the following holiday(s) listed below.
For Small-Bore Micro Tunneling Machines - Time and one-half the regular rate shall be paid for all overtime.
For work not listed above - Time and one half the regular rate after an 8 hour day and Saturday and double time the regular rate on Sunday and on the following holiday(s) listed below.

Paid Holidays

New Year's Day
Lincoln's Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Election Day
Veteran's Day
Thanksgiving Day
Christmas Day

(Local #147)

UTILITY LOCATOR
(Locate & mark underground utilities for street excavation.)

Utility Locator (Year 7 and above)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: **$31.56**
Supplemental Benefit Rate per Hour: **$1.43**

Utility Locator (Year 5 - 6)

Effective Period: 7/1/2021 - 6/30/2022

Wage Rate per Hour: $22.85
Supplemental Benefit Rate per Hour: $1.43

Utility Locator (Year 4)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $21.54
Supplemental Benefit Rate per Hour: $1.43

Utility Locator (Year 3)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $20.30
Supplemental Benefit Rate per Hour: $1.43

Utility Locator (Year 2)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $19.13
Supplemental Benefit Rate per Hour: $1.43

Utility Locator (Year 1)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $18.04
Supplemental Benefit Rate per Hour: $1.43

Utility Locator (Up to 1 year)

Effective Period: 7/1/2021 - 6/30/2022
Wage Rate per Hour: $17.00
Supplemental Benefit Rate per Hour: $1.43
Supplemental Note: No benefits for the first 90 days of employment.

Overtime
Time and one half the regular rate for work on the following holiday(s).
Time and one half the regular hourly rate after 40 straight time hours in any work week.

Paid Holidays
New Year's Day
Memorial Day
Independence Day
Thanksgiving Day
Christmas Day

Shift Rates
10% shift differential to employees working any shift starting between noon and 5 AM.

Vacation

For up to 1 year 0 hours
For year 1 - 2 48 hours per year
For year 3 - 9 96 hours per year
For year 10 or more 144 hours per year

Sick Days:
For up to 1 year employee receives 40 hours paid sick leave.
For year 1 employee earns 2 hours of paid sick leave for every 100 overtime hours worked.
For year 2 - 9 years employee earns 4 hours of paid sick leave for every 100 overtime hours worked.
For year 10 or more employee earns 6 hours of paid sick leave for every 100 overtime hours worked.

(C.W.A.)

WELDER

TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE PERFORMING THE WORK.

Department of Design and Construction

Issue Date: March 15, 2020

DDC STANDARD GENERAL CONDITIONS

FOR SINGLE CONTRACT PROJECTS

Department of Design and Construction

Issue Date: March 15, 2020

(No Text on This Page)

DIVISION 01 – DDC STANDARD GENERAL CONDITIONS
SINGLE CONTRACT PROJECTS
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SECTION 01 10 00
SUMMARY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

B. Addendum to the General Conditions: These General Conditions include and are supplemented by the Addendum to the General Conditions (the "Addendum"). The Addendum includes the following: (1) schedules referred to in these General Conditions, (2) information regarding the applicability of various articles, and (3) amended articles, if any.

1.2 SUMMARY:

A. This section includes the following:

1. Scope and Intent
2. Provisions Referenced in the Contract
3. Performance of Work During Non-Regular Work Hours (Pursuant to a Change Order)
4. Interruption of Services at Existing Facilities

1.3 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: "Design Consultant" means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 SCOPE AND INTENT:

A. Description of Project: Refer to the Addendum for a description of the Project.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 B

B. LEED: The City of New York will seek U.S. Green Building Council (USGBC) LEED (Leadership in Energy and Environmental Design) certification for this Project as specified in Section 01 81 13.03 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS"; or Section 01 81 13.04 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS", and the Addendum to the General Conditions.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 C

C. COMMISSIONING: The Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS, and/ or Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE and the Addendum to the General Conditions. The Contractor must cooperate with the commissioning agent and provide whatever assistance is required.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.4 D

D. PROGRESS SCHEDULE: Refer to Section 01 32 16.1 PROGRESS SCHEDULES (METHOD A) or 01 32 16.2 PROGRESS SCHEDULES (METHOD B) or 01 32 16.3 PROGRESS SCHEDULES (METHOD C) and the Addendum to the General Conditions for requirements of the Project.

E. COMPLETION OF WORK: Work to be done under the Contract is comprised of the furnishing of all labor, materials, equipment and other appurtenances, and obtaining all regulatory agency approvals necessary and required to complete the construction work in accordance with the Contract.

F. OMISSION OF DETAILS: All work called for in the Specifications applicable to the Contract but not shown on the Contract Drawings in their present form, or vice versa, is required, and must be performed by the Contractor as though it were originally delineated or described. The cost of such work will be deemed included in the total Contract Price.

G. WORK NOT IN SPECIFICATIONS OR CONTRACT DRAWINGS: Work not particularly specified in the Specifications nor detailed on the Contract Drawings but involved in carrying out their intent or in the complete and proper execution of the Work, is required, and must be performed by the Contractor. The cost of such work will be deemed included in the total Contract Price.

H. SILENCE OF THE SPECIFICATIONS: The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, will be regarded as meaning that only the best practice is to prevail and that only the best material and workmanship is to be used and interpretation of the Specifications will be made upon that basis.

I. CONFLICT BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS: Should any conflict occur in or between the Drawings and Specifications, the Contractor will be deemed to have estimated the most expensive way of doing the Work unless the Contractor asked for and obtained a decision in writing from the Commissioner before the submission of the bid as to what must govern.

1.5 CONTRACT DRAWINGS AND SPECIFICATIONS:

A. SCHEDULE C - The Contract Drawings are listed in Schedule C, which is set forth in the Addendum. Such drawings referred to in the Contract, and in the applicable Specifications for the Contract, bear the general title:

City of New York
Department of Design and Construction
Division of Public Buildings

B. DOCUMENTS FURNISHED TO THE CONTRACTOR - After the award of the Contract, the Contractor will be furnished with five (5) complete sets of paper prints of all Contract Drawings mentioned in Paragraph A above, as well as a copy of the Specifications.

C. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.

D. SUPPLEMENTARY DRAWINGS - When, in the opinion of the Commissioner, it becomes necessary to more fully explain the work to be done, or to illustrate the work further, or to show any changes which may be required, drawings known as Supplementary Drawings will be prepared by the Commissioner.

E. COMPENSATION - Where Supplementary Drawings entail extra work, compensation therefore to the Contractor will be subject to the terms of the Contract. The Supplementary Drawings will be binding upon the Contractor with the same force as the Contract Drawings.

F. SUPPLEMENTARY DRAWING PRINTS - Three (3) copies of prints of these Supplementary Drawings will be furnished to the Contractor.

G. COPIES TO SUBCONTRACTORS - The Contractor must furnish each of its subcontractors and material suppliers such copies of Contract Drawings, Supplementary Drawings, or copies of the Specifications as may be required for its work.

1.6 COORDINATION:

A. COORDINATION AND COOPERATION - The Contractor must consult and study the requirements of the Contract Drawings and Specifications for all required work, including all work to be performed by trade subcontractors, so that the Contractor may become acquainted with the work of the Project as a whole in order to achieve the proper coordination and cooperation necessary for the efficient and timely performance of the work.

B. CONTRACTOR TO CHECK DRAWINGS: - The Contractor must verify all dimensions, quantities and details shown on the Contract Drawings, Schedules, or other data received from the Commissioner, and must notify the Commissioner of all errors, omissions, conflicts and discrepancies found therein. Notice of such errors will be given before the Contractor proceeds with any work. Figures must be used in preference to scale dimensions and large-scale drawings in preference to small-scale drawings.

1.7 SHOP DRAWINGS AND RECORD DRAWINGS:

A. Refer to Section 01 33 00 SUBMITTAL PROCEDURES and Section 01 78 39 PROJECT RECORD DRAWINGS for requirements applicable to shop drawings and record drawings.

1.8 TEMPORARY FACILITIES, SERVICES AND CONTROLS:

A. Refer to Section 01 50 00 TEMPORARY FACILITIES SERVICES AND CONTROLS for the responsibilities of the Contractor.

1.9 DUST CONTROL:

A. The Contractor must prepare, execute and manage a “Dust Control Plan” for the prevention of the emission of dust from construction related activities in compliance with 15 RCNY 13-01 et. seq.

1.10 PROVISIONS REFERENCED IN THE CONTRACT:

A. SCHEDULE A - Various Articles of the Contract refer to requirements set forth in Schedule A of the General Conditions. Schedule A, which is included in the Addendum, sets forth (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the Contract.

B. EXTENSION OF TIME - Applications for Extensions of Time, as indicated in Article 13 of the Contract, must be made in accordance with the Rules of the Procurement Policy Board.

C. PARTIAL PAYMENTS FOR MATERIALS IN ADVANCE OF THEIR INCORPORATION IN THE WORK PURSUANT TO ARTICLE 42 OF THE CONTRACT – In order to better ensure the availability of materials, fixtures and equipment when needed for the work, the Commissioner may authorize partial payment for certain materials, fixtures and equipment, prior to their incorporation in the work, but only in strict accordance with, and subject to, all the terms and conditions set forth in the Specifications, unless an alternate method of payment is elsewhere provided in the Specifications for specified materials, fixtures or equipment.

1. The Contractor must submit to the Commissioner a written request, in quadruplicate, for payment for materials purchased or to be purchased for which the Contractor needs to be paid prior to their actual incorporation in the work. The request must be accompanied by a schedule of the types and quantities of materials, and must state whether such materials are to be stored on or off the site.

2. Where the materials are to be stored off the site, they must be stored at a place other than the Contractor's premises (except with the written consent of the Commissioner) and under the conditions prescribed or approved by the Commissioner. The Contractor must set apart and separately store at the place or places of storage all materials and must clearly mark same "PROPERTY OF THE CITY OF NEW YORK", and further, must not at any time move any of said materials to another off-site place of storage without the prior written consent of the Commissioner. Materials may be removed from their place of storage off the site for incorporation in the work upon approval of the Resident Engineer.

3. Where the materials are to be stored at the site, they must be stored at such locations as will be designated by the Resident Engineer and only in such quantities as, in the opinion of the Resident Engineer, will not interfere with the proper performance of the Work by the Contractor or by other Contractors then engaged in performing work on the site. Such materials must not be removed from their place of storage on the site except for incorporation in the Work, without the approval of the Resident Engineer.

4. INSURANCE

   a. STORAGE OFF-SITE – Where the materials are stored off the site and until such time as they are incorporated in the Work, the Contractor must fully insure such materials against any and all risks of destruction, damage or loss including but not limited to fire, theft, and any other casualty or happening. The policy of insurance must be payable to the City of New York. It must be in such terms and amounts as must be approved by the Commissioner and must be placed with a company duly licensed to do business in the State of New York. The Contractor must deliver the original and one (1) copy of such policy or policies marked "Fully Paid" to the Commissioner.

   b. STORAGE ON THE SITE – Where the materials are stored at the site, the Contractor must furnish satisfactory evidence to the Commissioner that they are properly insured against loss, by endorsements or otherwise, under the policy or policies of insurance obtained by the Contractor to cover losses to materials owned or installed by the Contractor. The policy of insurance must cover fire and extended coverage against windstorm, hail, explosion and riot attending a strike, civil commotion, aircraft, vehicles and smoke.

5. All costs, charges and expenses arising out of the storage of such materials, must be paid by the Contractor and the City hereby reserves the right to retain out of any partial or final payment made under the Contract an amount sufficient to cover such costs, charges and expenses with the understanding that the City will have and may exercise any and all other remedies at law for the recovery of such cost, charges and expenses. There will be no increase in the Contract price for such costs, charges and expenses and the Contractor must not make any claim or demand for compensation therefore.

6. The Contractor must pay any and all costs of handling and delivery of materials, to the place of storage and from the place of storage to the site of the Work; and the City will have the right to retain from any partial or final payment an amount sufficient to cover the cost of such handling and delivery.

7. In the event that the whole or any part of these materials are lost, damaged, or destroyed in advance of their satisfactory incorporation in the work, the Contractor, at the Contractor's own cost, must replace such lost, damaged or destroyed materials of the same character and quality. The City will reimburse the Contractor for the cost of the replaced materials to the extent, and only to the extent, of the funds actually received by the City under the policies of insurance hereinbefore referred to. Until such time as the materials are replaced, the City will deduct from the value of the stored materials or from any other money due under the Contract, the amount paid to the Contractor for such lost, damaged or destroyed materials.

8. Should any of the materials paid for the City hereunder be subsequently rejected or incorporated in the work in a manner or by a method not in accordance with the Contract Documents, the Contractor must remove and replace, at Contractor's own cost, such defective or improperly incorporated material with materials complying with the Contract Documents. Until such materials are replaced, the City will deduct from the value of the stored materials or from any other money due the Contractor, the amount paid by the City for such rejected or improperly incorporated materials.

9. Payments for the cost of materials made hereunder will not be deemed to be an acceptance of such materials as being in accordance with the Contract Documents, and the Contractor always retains and must comply with the Contractor's duty to deliver to the site and properly incorporate in the work only materials which comply with the Contract Documents.

10. The Contractor must retain any and all risks in connection with the damage, destruction, or loss of the materials paid for hereunder to the time of delivery of the same to the site of the Work and their proper incorporation in the work in accordance with the Contract Documents.

11. The Contractor must comply with all laws and the regulations of any governmental body or agency pertaining to the priority purchase, allocation, and use of the materials.

12. When requesting payment for such materials, the Contractor must submit with the partial estimate duly authenticated documents of title, such as bills of sale, invoices or warehouse receipts, all in quadruplicate. The executed bills of sale must transfer title to the materials from the Contractor to the City. (In the event that the invoices state that the material has been purchased by a subcontractor, bills of sale in quadruplicate will also be required transferring title to the materials from subcontractor to the Contractor).

13. Where the Contractor, with the approval of the Commissioner, has purchased unusually large quantities of materials in order to assure their availability for the work, the Commissioner, at the Commissioner's option, may waive the requirements of Paragraph 12 provided the Contractor furnishes evidence in the form of an affidavit from the Contractor in quadruplicate, and such other proof as the Commissioner may require, that the Contractor is the sole owner of such materials and has purchased them free and clear of all liens and other encumbrances. In such event, the Contractor will pay for such materials and submit proof thereof, in the same manner as provided in Paragraph 12 hereof, within seven (7) days after receipt of payment therefore from the Comptroller. Failure on the part of the Contractor to submit satisfactory evidence that all such materials have been paid for in full, will preclude the Contractor from payments under the Contract.

14. The Contractor must include in each succeeding partial estimate requisition a summary of materials stored which must set forth the quantity and value of materials in storage, on or off the site, at the end of each preceding estimate period; the amount removed for incorporation in the

Work; the quantity and value of materials delivered during the current period and the total value of materials on hand for which payment thereof will be included in the current payment estimate.

15. Upon proof to the satisfaction of the Commissioner of the actual cost of such materials and upon submission of proper proof of title as required under Paragraph 12 or Paragraph 13 hereof, payment will be made therefore to the extent of 85%, provided however, that the cost so verified, established and approved must not exceed the estimated cost of such materials included in the approved detailed breakdown estimate submitted in accordance with Article 41 of the Contract; if it does, the City will pay only 85% approved estimated cost.

16. Upon the incorporation in the Work of any such materials, which have been paid for in advance of such incorporation in accordance with the foregoing provisions, payment will be made for such materials incorporated in the Work pursuant to Article 42 of the Contract, less any sums paid pursuant to Paragraph 15 herein.

D. MOBILIZATION PAYMENT – A line item for mobilization must be allowed on the Contractor's Detailed Bid Breakdown submitted in accordance with Article 41 of the Contract. The Mobilization Payment is intended to include the cost of required bonds, insurance coverage, and/or any other expenses required for the initiation of the Contract Work. All costs for mobilization will be deemed included in the total Contract Price. The Detailed Bid Breakdown must reflect, and the Mobilization Payment will be made, in accordance with the following schedule:

Contract Amount	**Mobilization Amount**
Less than $50,000	$0 (No Mobilization Payment)
$50,001 to $100,000	Fixed Amount = $6,000
$100,001 to $500,000	6% of Contract Amount
$500,001 to $ 2,500,000	5% of Contract Amount
Over $2,500,000	Lesser of 4% of Contract Amount or $300,000

The Contractor may requisition for the Mobilization Payment upon satisfactory completion of the following:

1. Installation of any required field office(s);
2. Submission of all required insurance certificates and bond;
3. Approval of the Site Safety Plan per the Safety Requirements Section of the Information for Bidders;
4. Approval of the Progress Schedule;
5. Approval of the Schedule Submittal; and,
6. Submission of the Pre-Construction Photographs.

E. ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING: The Contractor must submit reports to the Commissioner regarding the use of Ultra Low Sulfur Diesel Fuel in Non-Road Vehicles, and the implementation of Best Available Technology (BAT), as set forth in Article 5.4 of the Contract. Such reports must be submitted in accordance with the schedule, format, directions, and procedures established by the Commissioner.

1.11 PERFORMANCE OF WORK DURING NON-REGULAR WORK HOURS:

A. NON-REGULAR WORK HOURS: The Commissioner may issue a change order in accordance with Article 25 of the Contract which, (1) directs the Contractor to perform the Work, or specific components thereof, during other than regular work hours (i.e., evenings, weekends and holidays), and (2) provides compensation to the Contractor for costs in connection with the performance of Work during other than regular work hours. The Commissioner may issue a change order if a delay has occurred and such delay is not the fault of the Contractor, or if the Work is of such an important nature that delay in completing such work would result in serious disadvantage to the public.

B. PROCEDURE: The Contractor must: (1) obtain whatever permits may be required for performance of the Work during other than regular business hours, and (2) pay all necessary fees in connection with such permits. In addition, if directed by the Commissioner, the Contractor must make immediate application to the Commissioner of the Department of Labor, State of New York, for dispensation in accordance with Subdivision 2 of Section 220 of the Labor Law.

1.12 INTERRUPTION OF SERVICES AT EXISTING FACILITIES:

A. EVENING AND WEEKEND WORK - Where performance of the Work requires the temporary shutdown(s) of services, such shutdown(s) must be made at night or on weekends or at such times that will cause no interference with the established routines and operations of the facility in question.

1 Where weekend or evening work is required due to unavoidable service shutdowns, such work will be performed at no extra cost to the City. Components of the Work that must be performed during other than regular work hours are indicated in the Drawings and/or the Specifications.

B. INTERRUPTION OF EXISTING FACILITIES:

1 The Contractor must not interrupt any of the services of the facility nor interfere with such services in any way without the permission of the Commissioner. Such interruption or interferences must be made as brief as possible, and only at such time stated.

2 Under no circumstances will the Contractor, its subcontractors, or its workers, be permitted to use any part of the project as a shop, without the permission of the Commissioner.

3 Unnecessary noise must be avoided at all times and necessary noise must be reduced to a minimum.

4 Toilet facilities, water, and electricity must be operational at all times (i.e. 24/7). No services of the facility can be interrupted in any way without the permission of the Commissioner. Careful coordination of all Work with the Resident Engineer must be done to maintain the operational level of the Project personnel at the facility.

5 The Contractor must schedule the Work to avoid noise interference that will affect the normal functions of the facility. In particular, construction operations producing noises that are objectionable to the functions of the facility must be scheduled at times of day or night, day of the week, or weekend, which will not interfere with personnel at the facility. Any additional cost resulting from this scheduling will be borne by the Contractor.

6 The Contractor must arrange to work continuously, including evening and weekend hours, if required, to assure that services will be shut down only during the time actually required to make the necessary connections to the existing facility.

7 The Contractor must give ample written notice in advance to the Commissioner and personnel at the facility of any required shutdown.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

B. LEED: Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.

C. COMMISSIONING: Refer to the Addendum to identify whether this Project will be commissioned by an independent third party under separate contract with the City of New York (City). Commissioning will be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS, and/ or Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE COMMISSIONING. The Contractor must cooperate with the commissioning agent and provide whatever assistance is required.

1.2 SUMMARY:

A. This Section includes administrative provisions for coordinating construction operations on the Project, including:

1. Coordination Drawings
2. Administrative and supervisory personnel
3. Project meetings
4. Requests for Interpretation (RFIs)

B. This Section includes the following:

1. Definitions
2. Coordination
3. Submittals
4. Administrative and Supervisory Personnel
5. Project Meetings
6. Requests for Interpretation (RFI’s)
7. Correspondence
8. Contractor’s Daily Reports
9. Alternate and Substitute Equipment

C. RELATED SECTIONS:

1. Section 01 10 00 SUMMARY
2. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
3. Section 01 33 00 SUBMITTALS
4. Section 01 35 26 SAFETY REQUIREMENTS
5. Section 01 73 00 EXECUTION REQUIREMENTS
6. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

7. Section 01 77 00 CLOSEOUT PROCEDURES

1.3 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: “Design Consultant” must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 COORDINATION:

A. Coordination: The Contractor must coordinate its construction operations, including those of its subcontractors, with other entities to ensure the efficient and orderly installation of each part of the Work. The Contractor must coordinate the various operations required by different Sections of the Specifications that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence in order to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum access for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and access for required maintenance, service, and repair of all components, including mechanical and electrical.

B. The Contractor must prepare memoranda for distribution to its subcontractors and other involved entities, outlining special procedures required for coordination. Such memoranda must include required notices, reports, and meeting minutes as applicable.

C. Administrative Procedures: The Contractor must coordinate scheduling and timing of required administrative procedures with other construction activities and activities of its subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include without limitation the following:

1. Preparation of Contractor's Construction Schedule.
2. Installation and removal of temporary facilities and controls.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Pre-installation conferences.
6. Startup and adjustment of systems.
7. Project closeout activities.

D. Conservation: The Contractor must coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

E. Salvaged Items, Material and/or Equipment: The Specifications may identify certain items, materials or equipment which must be salvaged by the Contractor and handled or disposed of as directed. The

Contractor must comply with all directions in the Specifications regarding the salvaging and handling of identified items, material or equipment.

1.5 SUBMITTALS:

A. Submit shop drawings, product data, samples etc., in compliance with Section 01 33 00 SUBMITTAL PROCEDURES.

B. Coordination Drawings: The Contractor must prepare applicable Coordination Drawings in compliance with the requirements for Coordination Drawings in Section 01 33 00 SUBMITTAL PROCEDURES.

C. Safety Plan in compliance with Section 01 35 26 SAFETY REQUIREMENTS PROCEDURES.

D. Waste Management Plan in compliance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

E. Key Personnel Names: Within fifteen (15) Days after the Notice to Proceed (NTP), the Contractor must submit a list of key personnel assignments of the Contractor and its subcontractors, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in case of the absence of individuals assigned to Project.

1. Post copies of the list in Project meeting room, in temporary field office, and by each temporary telephone. Keep the list current at all times.

2. In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work. Include special personnel required for coordinating all operations by its subcontractors.

1.6 PROJECT MEETINGS:

A. General: The Resident Engineer will hold regularly scheduled construction progress meetings at the site, at which time the Contractor and appropriate subcontractors must have their representatives present to discuss all details relative to the execution of the work. The Resident Engineer will preside over these meetings.

1. Agenda: Prior to each meeting, the Resident Engineer will consult with the Contractor and will prepare an agenda of items to be discussed. In general, after informal discussion of any item on the agenda, the Resident Engineer will summarize the discussion in a brief written statement, and the Contractor will then dictate a brief statement for the record.

2. Coordination: In addition to construction progress meetings called by the Resident Engineer, the Contractor must hold regularly scheduled meetings for the purpose of coordinating, expediting and scheduling the work in accordance with the master coordinated Job Progress Chart. The Contractor and its subcontractors, material suppliers or vendors whose presence is necessary, are required to attend. These meetings may, at the discretion of the Contractor, be held at the same place and immediately following the Project meetings held by the Resident Engineer. Minutes of these meetings must be recorded, typed and printed by the Contractor and distributed to all parties concerned.

B. PRECONSTRUCTION KICK-OFF MEETING:

1. The Resident Engineer will schedule a preconstruction kick-off meeting either at DDC's main office or at the Project site to review responsibilities and personnel assignments and clarify the role of each participant. Unless otherwise directed, the Design Consultant will record and distribute meeting minutes.

2. Attendees: Authorized representative of the Sponsor Agency; Design Consultant; the Contractor and its superintendents, subcontractor(s) and their superintendent(s); LEED sub-consultant and Commissioning Authority /Agent (CxA) as applicable and other concerned parties. All participants at the meeting must be familiar with the Project and authorized to conclude matters relating to the Contract Work.
3. Agenda: Includes without limitation the following as applicable:
   a. Establishing construction schedule;
   b. Schedule for regular construction meetings;
   c. Phasing;
   d. Critical Work sequencing and long-lead items;
   e. Designation of key personnel and their duties;
   f. Reviewing application for payment and change order procedures;
   g. Procedures for RFIs;
   h. Review permits and approval requirements;
   i. Review all recent administrative code reporting requirements relating to the Project, (i.e. LL 77, LL86 etc.);
   j. Procedures for testing and inspecting;
   k. Reviewing special conditions at the Project site;
   l. Distribution of the Contract Documents;
   m. Submittal procedures;
   n. Safety procedures;
   o. LEED requirements;
   p. Commissioning requirements;
   q. Preparation of record documents;
   r. Historic Treatment requirements;
   s. Use of the premises;
   t. Work restrictions;
   u. Sponsor Agency occupancy requirements;
   v. Responsibility for temporary facilities, services, and controls;
   w. Construction Waste Management and Disposal;
   x. Indoor Air Quality Management Plan;
   y. Dust Mitigation Plan;
   z. Office, work, and storage areas;
   aa. Equipment deliveries and priorities;
   bb. Security;
   cc. Progress cleaning; and,
   dd. Working hours;

C. CONSTRUCTION PROGRESS MEETINGS:

1. The Resident Engineer will schedule and conduct construction progress meetings at bi-weekly intervals or as otherwise determined. All participants at the meeting must be familiar with the Project and authorized to conclude matters relating to the Work. Unless otherwise directed, the Design Consultant will record and distribute meeting minutes.

2. Attendees:
   a. Design Consultant and applicable sub-consultants;
   b. Sponsor Agency Representative;
   c. Representatives from the Contractor, sub-contractor(s), suppliers or other entities involved in the current progress, planning, coordination or future activities of the Work; and,
   d. Other appropriate DDC personnel, DDC consultants and concerned parties.
3. Agenda: Includes without limitation the following:
   a. Review the Construction Schedule and progress of the Work. Determine if the Work is on time, ahead of schedule or behind schedule. Determine actions to be taken to maintain or accelerate the schedule;
   b. Review and approve prior meeting minutes and follow up open issues;
   c. Coordinate work between each subcontractor;
   d. Sequence of Operations;
   e. Status of submittals, deliveries, and off-site fabrication;
   f. Status of inspections and approvals by governing agencies;
   g. Temporary facilities and controls;
   h. Review Site Safety;
   i. Quality and work standards;
   j. Field observations;
   k. Status of correction of deficient items;
   l. RFI's;
   m. Pending changes;
   n. Status of outstanding payments and change orders;
   o. LEED requirements including Construction Waste Management, Indoor Air Quality Plan, Dust Mitigation and Commissioning; and,
   p. Status of Administrative Code reporting requirements related to the Project.

1.7 REQUESTS FOR INFORMATION (RFI):

A. Procedure: Immediately on discovery of the need for information or interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, the Contractor must prepare and submit an RFI in the form specified by the Resident Engineer.

1. RFI must originate with the Contractor. RFIs submitted by entities other than Contractor will be returned with no response.

2. Coordinate and submit RFI in a prompt manner to the Resident Engineer so as to avoid delays in Contractor's Work or Work of its subcontractors.

3. RFI Log: The Contractor must prepare, maintain, and submit a tabular log of RFIs organized by the RFI number monthly to the Resident Engineer, or more frequently if directed by the Resident Engineer.

4. On receipt of responses and action to the RFI, the Contractor must update the RFI log and immediately distribute the RFI response to affected parties. Review response(s) and notify the Resident Engineer immediately if the Contractor disagrees with response(s).

1.8 CORRESPONDENCE:

A. Copies of all correspondence to DDC must be sent directly to the Resident Engineer at the job site.

1.9 CONTRACTOR'S DAILY REPORTS:

A. The Contractor must prepare and submit Daily Construction Progress Reports as outlined in Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required Work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for establishing an effective base line schedule for the Project and documenting the progress of construction during performance of the Work by developing and revising as necessary, various documents including but not limited to the following:
   1. Submittals schedule
   2. Daily construction reports
   3. Material location reports
   4. Field condition reports
   5. Special reports

B. RELATED SECTIONS: :

1.	Section 01 10 00	SUMMARY
2.	Section 01 32 22	PHOTOGRAPHIC DOCUMENTATION
3.	Section 01 32 16.10	PROJECT SCHEDULES (METHOD A)
4.	Section 01 32 16.20	PROJECT SCHEDULES (METHOD B)
5.	Section 01 32 16.30	PROJECT SCHEDULES (METHOD C)
6.	Section 01 33 00	SUBMITTAL PROCEDURES
7.	Section 01 40 00	QUALITY REQUIREMENTS

1.3 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: “Design Consultant” must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

PART II – PRODUCTS

2.1 SUBMITTALS SCHEDULE:

A. Preparation: The Contractor must submit a schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates. The Submittals Schedule must show all of the following types of submittals:

1. Shop and Coordination Drawings
2. Material Samples
3. Catalog Cuts
4. Test and Evaluation Reports
5. Field Test Reports
6. Sample Warranties
7. Certificates
8. Qualification Data
9. Closeout Submittals

B. Submittals: At the kick-off meeting, the Contractor must have a preliminary Submittals Schedule, and must review this Schedule with the Resident Engineer and the Design Consultant. Within ten (10) Days after the kick-off meeting, the Contractor must complete the Submittals Schedule, including all submission dates, required delivery dates, and fabrication times. The Contractor must include an updated Submittals Schedule with all Progress Payment applications.

C. Review: The Resident Engineer will review the Submittals Schedule submitted by Contractor. Upon acceptance, the Resident Engineer will date and sign the schedule as approved and transmit it to the Design Consultant, Contractor, and others within DDC as the Resident Engineer deems appropriate. If so directed by the Commissioner, the Contractor must revise the Submittals Schedule to indicate a submission date for specified shop drawings and/or material samples within sixty (60) Days after the kick-off meeting. The Contractor must resubmit the Submittals Schedule as necessary to include all review comments.

2.2 REPORTS:

A. Daily Construction Reports: The Contractor must submit to the Resident Engineer written Daily Construction Reports at the end of each day that work was performed, recording basic information such as the date, day, weather conditions, and contract days passed, remaining contract duration/days and the following information concerning the Project.

Information: The reports must be prepared by the Contractor's Superintendent and must bear the Contractor's Superintendents signature. Each report must contain the following information:

1. List name of Contractor, subcontractors, their work force in each category, and details of activities performed;
2. The type of materials and/or major equipment being installed by the Contractor and/or by each subcontractor;
3. The major construction equipment being used by the Contractor and/or subcontractors;
4. Material and Equipment deliveries;
5. High and low temperatures and general weather conditions;
6. Accidents;
7. Meetings and significant decisions;
8. Unusual events;
9. Stoppages, delays, shortages, and losses;
10. Meter readings and similar recordings;

11. Emergency procedures;
12. Orders and/or requests of authorities having jurisdiction;
13. Approved Change Orders received and implemented;
14. Field Orders and Directives received and implemented;
15. Services connected and disconnected;
16. Equipment or system tests and startups;
17. Partial Completion(s) and occupancies; and,
18. Substantial Completion(s) authorized;

NOTE: If there is NO ACTIVITY at site, a daily report indicating so and the reason for no activity at the site must be submitted.

B. Material Location Reports: The Contractor must submit a Material Location Report at weekly OR monthly intervals as determined and established by the Resident Engineer. Such report must include a comprehensive list of materials delivered to and stored at Project site. List must be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit a Request For Information (RFI) form with a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.3 SPECIAL REPORTS:

A. Accident report, incident report, special condition report for the conditions out of control of any party involved with the Project effecting Project progress, explaining impact on the Project schedule and cost if any.

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 00

(No Text on This Page)

SECTION 01 32 16.10
PROJECT SCHEDULES (METHOD A)

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 16.10

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes the following:

1. Methods
2. Definitions
3. Preliminary, Baseline, and Project Schedule Preparation Timeline
4. Preliminary Project Schedule Development
5. Project Schedule
6. Activity and Calendar Coding Structure
7. Work Breakdown Structure (WBS)
8. Major Milestones
9. Short (Three-Week) Interval/Two-Week Look-Ahead
10. Submittals
11. Project Schedule Updating
12. Time Impact Analysis

1.3 METHODS:

A. The Contractor must comply with Project schedule development and updating requirements as specified herein.

1. The Contractor must employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the City. Upon request, the Contractor must provide the City with details of qualifications and experience of the proposed scheduling staff member(s).

2. The Contractor must prepare, update, and maintain a detailed Project Schedule using a version of scheduling software that is compatible with the City's Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM). All schedule submittals must be developed using Oracle's Primavera P6 EPPM software. Schedules must be developed using accepted CPM techniques using the precedence diagramming method (PDM). The Project Schedule must be developed following Defense Contract Management Agency (DCMA) and American Association of Cost Engineering International (AACE International) guidance. The Contractor will be required to use the Contractor's

own P6 license (whether single-user or Enterprise license), unless otherwise directed by the Commissioner. If directed by the Commissioner prior to the Notice to Proceed (NTP), the Contractor must use the Department's P6 Enterprise license and develop the Progress Schedule within the Department's Enterprise environment.

3. Once the Baseline Schedule is accepted by the City, progress updates to the Project Schedule must be submitted monthly, unless otherwise directed by the City, until Substantial Completion. The Data Date for the schedule updates must use the last Friday of the month, or as directed by the City.

4. The Contractor will be responsible for providing the monthly schedule updates once the Baseline Schedule is approved. Each monthly schedule update must be accompanied with a schedule narrative that explains the following:

    a. The progress of work during that particular period of performance,
    b. Any changes in schedule Logic,
    c. The physical conditions that were used to update every Activities Percent Complete,
    d. Any change in actual Start and Finish Dates,
    e. Any Duration changes,
    f. Any added and deleted Activities, and
    g. Any added Extra Work (e.g. change orders).

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	**Definition**
Activity	A representation of a discrete portion of the overall scope of Work or an event through Duration and description in a CPM schedule.
Baseline Schedule	The planned and detailed CPM schedule of Activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work. The Baseline Schedule must be accepted by the City.
Critical Path	The longest sequence of Activities in a network which establishes the minimum length of time for accomplishment of the end event of the Project.
Critical Path Method (CPM)	A management technique used to plan and control a Project which combines all relevant information into a single plan defining the sequence and Duration of operations and depicting the interrelationship of the Work elements required to complete the Project.
Current Schedule	The most recently updated schedule that captures progress to date and forecasts the dates for each Activity.
Data Date	The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.
Duration	The amount of time, in workdays, an Activity will take to perform.

Term	Definition
Finish Date	The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Free Float	The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship. (See Finish Date and Late Finish).
Fragnet	Fragmentary network: a portion of a schedule detailing impacts of an event on specific Activities in the broader schedule.
Inclement Weather	Any weather condition, the duration of which varies in excess of the 3-year average published by the National Oceanic and Atmospheric Administration (NOAA) information for the local area.
Integrated Project Schedule	The Commissioner's overall schedule covering design, procurement and construction. The Commissioner will use the Contractor's Project Schedule to update the Integrated Project Schedule.
Late Finish	An estimate of the latest plausible date an Activity's completion can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Late Start	An estimate of the latest plausible date an Activity's start can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Logic	A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity.
Milestone	A key or critical point in time for reference or measurement.
Network Diagram	A graphic diagram of a network schedule, showing Activities and Activity relationships.
Original Duration	The estimated amount of time, in Work Days, an Activity is expected to take to complete at the beginning of a Project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Schedule.
Percent Complete	The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated as physical percent complete for payment purposes.
Project Schedule	The Contractor's schedule used to manage the orderly and expeditious completion of the Work. The Project Schedule is initially the accepted Baseline Schedule, and is updated throughout the Project.
Remaining Duration	The amount of time, in Work Days, the remaining scope of Work represented by an Activity is expected to take to complete, measured from the current Data Date.

Term	Definition
Resource and Cost Loading	Values assigned for estimated dollars, manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
Recovery Schedule	A Recovery Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the Project within the stipulated contract Duration, plus authorized time extensions. In such case, special attention must be given to minimize delays as much as possible and must establish the nature of efforts; for instance, resources and equipment required, extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties to recover the schedule.
Revised and/or Updated Schedule	A Baseline Schedule, Progress Project Schedule, or Recovery Schedule for the Project that shows the actual Duration of all the completed Activities, including Duration of and the reasons for delays, if any has occurred, AND revisions to all remaining Activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined Activities. Any such revisions should be shown on the row just below the approved schedule of the respective Activity so that revisions can be compared. The Revised and/or updated Schedule must be reviewed and approved by the City.
Start Date	The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Time Impact Analysis	A forward looking (prospective) schedule analysis used to forecast the impact to the Critical Path and to Milestone Finish Dates caused by a single event or series of events. Time Impact Analysis is not a retrospective (forensic) schedule analysis or a what-if schedule analysis of a potential event.
Total Float	The amount of time the start or finish of an Activity can be delayed without affecting the Project completion date.
Work Breakdown Structure (WBS)	WBS is a deliverable-oriented decomposition of a Project into smaller components. A WBS provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
Work Days (WD)	Work Days are every consecutive day in the calendar, excluding weekends (Saturday and Sunday) and holidays.

1.5 PRELIMINARY, BASELINE, AND PROJECT SCHEDULE PREPARATION TIMELINE:

A. Upon receipt of the NTP, the Contractor must promptly prepare a preliminary Project Schedule and subsequently a Baseline Schedule and must submit for the City's acceptance as follows:

1. The preliminary Project Schedule must be submitted no later than fifteen (15) Days after NTP.
2. The initial submittal of the Baseline Schedule must be provided to the City for review no later than thirty (30) Days after NTP.

3. The Contractor must incorporate all corrections and revisions required by the City and provide an updated version of the Baseline Schedule for review and acceptance no later than sixty (60) Days after NTP to ensure that the Baseline Schedule is accepted. The sixty (60) Days must include fourteen (14) Days review times for each submittal of the Baseline Schedule.
4. Once accepted, the Baseline Schedule will be the basis of Project Schedule updates.

1.6 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT:

A. The preliminary Project Schedule must be a detailed plan (division level per Construction Specifications Institute (CSI) MasterFormat) of all operations, including submittals, permitting, testing, and construction Activities, for either the first ninety (90) Days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (section level per CSI MasterFormat) schedule of the major Activities for the remainder of the Work.

1. All Activities for Contractor mobilization, procurement, and construction Activities within the first sixty (60) Days, including permits and submittals. All remaining work forecasted after the first sixty (60) Days must be summarized through the Contract's completion date.
2. All submittal and procurement Activities for long lead items.
3. The Project's Critical Path.
4. An electronic copy of the schedule in either MS Project (.MPP) or Primavera P6 Professional Format (.XER).

B. The preliminary Project Schedule will be reviewed by the City and returned with comments, as necessary, within fourteen (14) Days of submittal receipt. Information from the preliminary Project Schedule will be the general foundation for development of the Baseline Schedule.

1.7 PROJECT SCHEDULE:

A. The Baseline Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

B. After the Baseline Schedule is approved, the Project Schedule must be the Contractor's working schedule and must be used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete the Work.

C. The Project Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

D. The Project Schedule must be the Contractor's working schedule used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.

E. All delay claims must be based on the current approved updates of the Project Schedule.

F. The Contractor must confirm in writing that all subcontractors performing any portion of the Work are in agreement with the accepted Baseline Schedule and the monthly updates.

G. The amount of detail represented in the Baseline and Project Schedule and supporting documents submitted must, at a minimum, include the following items:

1. Contract Milestones must be identified and included in the Baseline and Project Schedule.
2. All submittal, owner review & approval, purchase, manufacture, and delivery Activities for all major materials and equipment.
3. Deliveries of owner-furnished equipment and/or materials.
4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
6. Performance of tests, submission of test reports, and approval of test results.
7. Commissioning Activities for all commissioned systems and equipment is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion. Such Activities must include, at a minimum, Pre-Functional testing and check sheets; Testing, Adjusting, and Balancing (TAB) verification; Functional Testing, including testing of all controls; and Owner's demonstration and orientation.
8. Completion dates of all items required for phased completion (if applicable).
9. Completion dates of all items required for Substantial Completion.
10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).
11. Completion dates for close-out of regulatory and punch list items prior to Final Acceptance and transfer of the Project.
12. Any additional detail requested by the Commissioner.

H. Activities identified in the Baseline and Project Schedule must have the Duration in units of whole Work Days. Construction Activity Durations must not exceed twenty (20) Work Days unless specifically approved by the City. This is to ensure that Activities are not generalized and that each Activity and sub-Activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction Activities such as procurement of materials, delivery of equipment, concrete curing, etc., may exceed twenty (20) Work Days without prior approval; however, these are still subject to review by the City. Durations must be based on the available resources required for performing each Activity and must be the result of definitive labor hours using established production rates, and with consideration of on-site working conditions. If requested by the City, the Contractor must justify the reasonableness of a planned Duration.

I. Activity descriptions must use plain language that clearly and uniquely defines each Activity. Each description must include a verb or work function (e.g. submit, form, pour, etc.), an object (e.g. slab, foundation, etc.) and, for any construction Activities, a specific location. The Work related to each Activity must be limited to one responsibility and one trade.

J. Activity relationships must be assigned to clearly establish predecessor and successor relationships to each Activity. Open-ended Activities are not permitted with the exception of the first and last Activity in the network, the first Activity being NTP and the last being Final Acceptance. The use of relationship lag times is discouraged and only permitted with prior approval by the City. The use of negative lag is never permitted.

K. Activity constraint dates are only to be used to reflect contractual constraints unless specifically authorized by the City.

L. Float or slack, in any schedule, must not be for the exclusive use or benefit of either the City or the Contractor, but must be available for use by both the City and the Contractor.

M. Each resubmittal after the Project Schedule is delivered for acceptance must comply with all requirements of this section. Review and response by the City will be given within fourteen (14) Days after resubmission. The Contractor's receipt of the comments within the time specified must not, in any way, affect the Contractor's responsibility to complete the Project within the time fixed in Schedule A.

N. Failure by the City to return comments or indicate acceptance status will in no way relieve the Contractor's obligation to submit monthly schedule updates.

O. At the request of the City, the Contractor must be required to make a presentation to explain or clarify the intended logical sequence of construction Activities depicted in the detailed Project Schedule. The Contractor and designated scheduler must discuss anticipated challenges and outline construction methodology and flow of work to show how and when major Milestones will be achieved. In addition, the Contractor may, at no cost to the City, be required to participate in additional Project meetings necessary to obtain acceptance of the above-noted submittals.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

A. The Baseline and Project Schedules must contain a sufficient number of Activities to represent adequate planning and execution of the Work so that it shows an accurate flow of work and demonstrates an understanding of the Project by the Contractor.

B. Activity ID and Calendar Coding

1. The Contractor's proposed Activity and calendar coding and must be submitted with the preliminary Project Schedule. A meeting may be requested by the City to discuss the scheme and other schedule information prior to the submittal of the Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Project Schedule.

C. Activity ID Coding

1. All Activities/ Resources/ Calendars (Baseline and Project Schedules) must be coded inside the P6 Project Environment / Project Level (NOT the Global Environment/ Enterprise Level) to facilitate selection, sorting and preparation of reports.

2. Activity coding must consist of the Project ID followed by a dash, followed by Activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be created at the Project level and must utilize the coding scheme outlined in the table below:

Activity Code	Meaning
RESP	Responsibility: Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	Phase: Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	Location: Breakdown by floor or elevation.
AREA	Area: Breakdown by room, area, block or wing. May be used as a subdivision of PHAS to include Milestones, permits, subcontractor approvals, submittals, fabrication and delivery, and subdivision of the Site and buildings into Logical modules, such as by blocks, wings, etc.
TRAD	Trade: Breakdown by CSI Code or section number in the Specifications.

a. Description of schedule Activities must include terminology that represents the scope of work associated with that particular Activity. Terminology used to describe similar actions must be consistent across all segments of work.

b. Naming convention for schedule Activities must be descriptive and indicate the associated work covered by the Activity. Activities must use a verb, noun, and location of the work in the Activity name.

3. Project Calendar Coding

   a. All calendars created and assigned to Activities must be Project-level calendars. The Calendar Name must consist of the Project ID number followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME).

1.9 WORK BREAKDOWN STRUCTURE:

A. Structure must be submitted with the preliminary Project Schedule. The levels (nodes) must include, but not be limited to:

   1. LEVEL 01 – The Project Level.

   2. LEVEL 02 – Contains a minimum of four (4) nodes: Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout.

   3. LEVEL 03 – Decomposition of each of the four (4) nodes in Level 02 into its constituent parts. This level must target specific, tangible, deliverable scopes of Project Work.

B. The Contractor's proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS Structure must be incorporated into the Baseline and Project Schedule.

1.10 MAJOR MILESTONES:

A. The schedule must include both contractual and non-contractual Milestones that are provided by the City. These Milestones must be properly associated with the related Work and maintained to represent the progress of the Project.

1.11 SHORT (THREE-WEEK) INTERVAL / TWO-WEEK LOOK-AHEAD:

A. On a bi-weekly basis, the Contractor must provide a three (3) week short interval schedule in a format satisfactory to the City. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead Activities and add any additional Activities planned for the next two (2) weeks. Electronic files and hard copies must be provided to the City on the first day of each work week with the prior week's actual progress included.

B. Each task listed on the short interval schedule must be representative of the most current Project Schedule Update and include a reference to an Activity shown on the current update.

1.12 SUBMITTALS:

A. General

   1. Development of the Baseline Schedule and updating of the Project Schedule must follow the DCMA and AACE International guidelines.

   2. Each electronic submission of the Project Schedule must be assigned a unique file name consisting of the Project ID (as noted on the NTP followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals must be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.

   3. The Contractor must provide all submittals in electronic format and two hard copies.

B. Preliminary Project Schedule

1. For acceptance of the preliminary Project Schedule, the Contractor must submit the following:

   a. Two (2) 11" x 17" hard copies of the proposed preliminary Project Schedule, as well as the native electronic schedule data file, in .XER file format, per the direction of the City.

   b. A Schedule Narrative Report detailing the Contractor's initial plan for executing the Contract work within the allotted Contract Duration, and include the following explanation of their provided preliminary schedule:

      i. The proposed WBS;
      ii. All proposed Project Calendars;
      iii. All proposed Activity Codes, clearly defined;
      iv. The proposed Activity ID format; and
      v. Schedule basis narrative, which must memorialize assumptions made in the development of the schedule.

C. Baseline Schedule

1. The City will normally return comments within ten (10) Work Days after receipt of the initial Project Schedule Submission. If any of the required submissions are returned to the Contractor for corrections or revisions, they must be resubmitted within five (5) Work Days from receipt of comments. Each resubmittal must comply with the requirements enumerated above. Review and response by the City will be given within ten (10) Work Days after resubmission.

2. At the request of the City, the Contractor will be required to participate in Project meetings necessary to obtain an acceptance of the above noted submittals.

3. Baseline Schedule submittal must contain a Narrative Report. It must include the following, or as directed by the City:

   a. A description of the Project scope and how the Work is represented in the schedule Activities;

   b. A description of the overall sequence of major components of Work;

   c. Planned work week for each definable feature of work;

   d. Description of the Critical Path and near Critical Paths;

   e. How weather will be accommodated in the schedule, including a description of the weather calendar and the Activities it is applied to, and the NOAA Inclement Weather data that defined the number of non-work days;

   f. How regulatory, operational or third-party constraints are accommodated in the schedule;

   g. Description of key Project coordination points or events;

   h. Discussion of long lead items and basis of time frames for submittals; and

   i. Potential opportunities and risks, including quantification of the schedule reduction or expansion.

D. Project Schedule Updates

1. Every schedule submittal must be provided with a corresponding narrative. These schedule submittals and narratives are to be submitted in hard copy, as well as in the native electronic format, as attachments to emails or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files (P6 (.XER) for Primavera and MS Word and/or Adobe Acrobat for Narrative and supporting document submittals).

2. For each submittal of the updated Project Schedule, the following layouts, reports, and graphics are required in the specified formats, unless otherwise directed by the City:

   a. The Contractor must furnish two (2) 11" x 17" color hard copies of the complete progress schedule with each initial schedule update and final update incorporating comments furnished by the City. Additionally, the Contractor must provide the native electronic schedule data file, in .XER file format with the initial and final schedule update submission.

   b. An Activity bar chart Layout grouped by Activity Code and then sorted by Start Date, Finish Date, and then Total Float.

   c. Each Activity line must display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start Date (ES), Finish Date (EF), and Total Float (TF), Baseline Original Duration (BL OD) Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF).

   d. An Activities progress bar must show both current progress update ES and EF, and baseline ES and EF. The top line of the bar chart area must contain the updated ES and EF; the second line below must depict the accepted baseline ES and EF dates.

3. The City may request additional standard P6 reports from time to time at no additional cost.

4. The Monthly Update submittal must contain a Narrative Report. It must include the following, or as directed by the City:

   a. Any changes to the schedule basis narrative;

   b. Overall health of the Project;

   c. Actual Activity Start Dates;

   d. Actual Activity Finish Dates;

   e. The physical conditions that were used to update Activities percent complete;

   f. Percent of Work reported in place;

   g. A description of the overall sequence of major components of Work;

   h. Description of the Critical Path and near Critical Paths;

   i. Description of key Project coordination points or events;

   j. Discussion of long lead items and basis of time frames for submittals;

   k. Potential opportunities and risks, including quantification of the schedule reduction or expansion;

   l. Assumptions/exclusions made in the schedule;

   m. Contract and Milestone completion date status:

      i. Number of Days ahead or behind schedule and; and

      ii. Days lost/gained compared with the previous update.

   n. Lookahead report listing each Activity in the CPM schedule that is scheduled to be performed during the next reporting period;

   o. Changes in Activity description, Logic, or Duration must be submitted as a separate Proposed Schedule and approved by the City prior to being submitted as an official update. Once allowed, said changes must be grouped and organized in the report in a manner that communicates in detail the rationale associated with each change and

the impact upon construction sequence, relationships and the Critical Path. A standard Digger Report is not sufficient to meet this requirement;

p. Added/deleted Activities and the rationale associated with each action;

q. Pending issues and status of other items;

r. Permits;

s. Contract modifications; and

t. Extra Work, including change orders.

1.13 PROJECT SCHEDULE UPDATING:

A. The initial updating must take place immediately after the City accepts the Contractor's Baseline Schedule. The Data Date for the first update must not exceed seven (7) Days from the date of receipt of the accepted Baseline Schedule, or as directed by the City.

B. Subsequent updates of the Project Schedule must be submitted monthly until Substantial Completion. The schedule Data Date must be the last Work Day of the period unless otherwise directed by the City. Updates must be provided to the City no later than seven (7) Days after the 'schedule Data Date'.

C. Updates must reflect actual or reasonably anticipated progress as of the last Work Day of the period.

D. The City may request meetings with the Contractor to review the Project Schedule and narrative and jointly verify Project health and information.

E. In addition, the City may request meetings with the Contractor's scheduling representative to:

1. Resolve out-of-sequence Logic.

2. Should out-of-sequence progress occur where Activities have reported progress without predecessor Activities being completed, the Contractor must obtain the City's approval in a Proposed Schedule before revising the Logic ties to reflect the way the Work is actually being performed. Use of progress override by default mechanisms that may be included in CPM scheduling software systems will not be allowed except on a case-by-case basis with the approval of the City. A written explanation for each instance must be included in the monthly submittal narrative.

3. Assess the impact, if any, of any pending change orders.

4. Incorporate accepted time extensions.

5. Review revised Logic (as-built and projected) and changes in Activity Duration, cost, and labor hours assigned.

F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in rejection of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the City.

G. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the Critical Path have occurred due to action or inaction of the Contractor, and as a result the date for Substantial Completion will not be met, the Contractor must promptly take some or all of the following actions at no additional cost to the City, unless otherwise directed by the City:

1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

2. Increase the number of working hours per shift, shifts per day, or Work Days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.

3. Reschedule Activities to achieve maximum practical concurrence of accomplishment of Activities and comply with the revised schedule.

4. Submit to the City for review a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule.

5. Add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical or non-critical Activities fall behind the Contractor's Baseline Schedule at any time during the construction period.

H. The City may, at any time during the Project and at no additional cost to the City, require the Contractor to develop a more detailed schedule/ Fragnet than depicted in the Baseline Schedule to provide a clearer understanding of the effort needed to complete an Activity or group of Activities.

I. If the City determines that either the Critical Path is in the negative by four (4) weeks, or that the Project's date for completion may be affected, the Contractor may be required, at no additional cost to the City, to prepare a Recovery Schedule. Such Recovery Schedule is subject to review and acceptance by the City. The Recovery Schedule must propose alternative methods, overtime, and other means available to the Contractor to recover the delays incurred to date.

J. The Contractor must submit an "As-Built Schedule", as the last schedule update showing all Activities, with the exception of punch list and closeout tasks, at Substantial Completion. This schedule must reflect the exact manner in which the Project was actually constructed.

1.14 TIME IMPACT ANALYSIS:

A. In addition to the requirements of the Standard Construction Contract Article 11, the Contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.

B. The Time Impact Analysis must include a written narrative and supporting impact schedule Fragnet detailing the Project delays resulting from the alleged delay. The impact schedule Fragnet, separate and distinct from the Progress Schedule update, must demonstrate that the changes or anticipated delays affect Activities of the current accepted Progress Schedule. The impact schedule will be incorporated into the Progress Schedule only after it is accepted by the Commissioner and a time extension is approved. The Fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these changes or delays on the date for Substantial Completion.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 16.10

SECTION 01 32 16.20
PROJECT SCHEDULES (METHOD B)

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 16.20

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes the following:

1. Methods
2. Definitions
3. Preliminary, Baseline, and Project Schedule Preparation Timeline
4. Preliminary Project Schedule Development
5. Project Schedule
6. Activity and Calendar Coding Structure
7. Work Breakdown Structure (WBS)
8. Major Milestones
9. Short (Three-Week) Interval/Two-Week Look-Ahead
10. Submittals
11. Project Schedule Updating
12. Time Impact Analysis

1.3 METHODS:

A. The Contractor must comply with Project schedule development and updating requirements as specified herein.

1. The Contractor must employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the City. Upon request, the Contractor must provide the City with qualifications and experience of the proposed scheduling staff member(s).

2. The Contractor must prepare, update, and maintain a detailed Project Schedule using a version of scheduling software that is compatible with the City's Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM). All schedule submittals must be developed using Oracle's Primavera P6 EPPM software. Schedules must be developed using accepted CPM techniques using the Precedence Diagramming Method (PDM). The Project Schedule must be developed following Defense Contract Management Agency (DCMA) and American Association of Cost Engineering International (AACE International) guidance. The Contractor will be required to use

the Contractor's own P6 license (whether single-user or Enterprise license), unless otherwise directed by the Commissioner. If directed by the Commissioner prior to the Notice to Proceed (NTP), the Contractor must use the Department's P6 Enterprise license and develop the Progress Schedule within the Department's Enterprise environment.

3. Once the Baseline Schedule is accepted by the City, progress updates to the Project Schedule must be submitted monthly, unless otherwise directed by the City, until Substantial Completion. The Data Date for the schedule updates must use the last Friday of the month, or as directed by the City.

4. The Contractor will be responsible for providing the monthly schedule updates once the Baseline Schedule is approved. Each monthly schedule update must be accompanied with a schedule narrative that explains the following:

   a) The progress of work during that particular period of performance;
   b) Any changes in schedule Logic;
   c) The physical conditions that were used to update every Activities Percent Complete;
   d) Any change in actual Start and Finish Dates;
   e) Any Duration changes;
   f) Any added and deleted Activities; and,
   g) Any added Extra Work (e.g., change orders).

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	**Definition**
Activity	A representation of a discrete portion of the overall scope of Work or an event through Duration and description in a CPM schedule.
Baseline Schedule	The planned and detailed CPM schedule of Activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work. The Baseline Schedule must be accepted by the City.
Critical Path	The longest sequence of Activities in a network which establishes the minimum length of time for accomplishment of the end event of the Project.
Critical Path Method (CPM)	A management technique used to plan and control a Project which combines all relevant information into a single plan defining the sequence and Duration of operations and depicting the interrelationship of the Work elements required to complete the Project.
Current Schedule	The most recently updated schedule that captures progress to date and forecasts the dates for each Activity.
Data Date	The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.
Duration	The amount of time, in workdays, an Activity will take to perform.

Term	**Definition**
Finish Date	The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Free Float	The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship. (See Finish Date and Late Finish).
Fragnet	Fragmentary network: a portion of a schedule detailing impacts of an event on specific Activities in the broader schedule.
Inclement Weather	Any weather condition, the duration of which varies in excess of the 3-year average published by the National Oceanic and Atmospheric Administration (NOAA) information for the local area.
Integrated Project Schedule	The Commissioner's overall schedule covering design, procurement, and construction. The Commissioner will use the Contractor's Project Schedule to update the Integrated Project Schedule.
Late Finish	An estimate of the latest plausible date an Activity's completion can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Late Start	An estimate of the latest plausible date an Activity's start can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Logic	A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity.
Milestone	A key or critical point in time for reference or measurement.
Network Diagram	A graphic diagram of a network schedule, showing Activities and Activity relationships.
Original Duration	The estimated amount of time, in Work Days, an Activity is expected to take to complete at the beginning of a Project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Schedule.
Percent Complete	The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated as physical percent complete for payment purposes.
Project Schedule	The Contractor's schedule used to manage the orderly and expeditious completion of the Work. The Project Schedule is initially the accepted Baseline Schedule, and is updated throughout the Project.

Term	Definition
Remaining Duration	The amount of time, in Work Days, the remaining scope of Work represented by an Activity is expected to take to complete, measured from the current Data Date.
Resource and Cost Loading	Values assigned for estimated dollars, manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
Recovery Schedule	A Recovery Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the Project within the stipulated contract Duration, plus authorized time extensions. In such case, special attention must be given to minimize delays as much as possible and must establish the nature of efforts; for instance, resources and equipment required, extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties to recover the schedule.
Revised and/or Updated Schedule	A Baseline Schedule, Project Schedule, or Recovery Schedule for the Project that shows the actual Duration of all the completed Activities, including Duration of and the reasons for delays, if any have occurred, AND revisions to all remaining Activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined Activities. Any such revisions should be shown on the row just below the approved schedule of the respective Activity so that revisions can be compared. The Revised and/or updated Schedule must be reviewed and approved by the City.
Start Date	The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Time Impact Analysis	A forward looking (prospective) schedule analysis used to forecast the impact to the Critical Path and to Milestone Finish Dates caused by a single event or series of events. Time Impact Analysis is not a retrospective (forensic) schedule analysis or a what-if schedule analysis of a potential event.
Total Float	The amount of time the start or finish of an Activity can be delayed without affecting the Project completion date.
Work Breakdown Structure (WBS)	WBS is a deliverable-oriented decomposition of a Project into smaller components. A WBS provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
Work Days (WD)	Work Days are every consecutive day on the calendar, excluding weekends (Saturday and Sunday) and holidays.

1.5 PRELIMINARY, BASELINE, AND PROJECT SCHEDULE PREPARATION TIMELINE:

A. Upon receipt of the NTP, the Contractor must promptly prepare a preliminary Project Schedule and subsequently a Baseline Schedule and must submit for the City's acceptance as follows:

1. Submit the Contractor's CPM Scheduler's qualifications to the City for approval within seven (7) Days after NTP. The City will respond to the submittal within seven (7) Days of the submittal receipt.
2. The preliminary Project Schedule must be submitted no later than twenty-one (21) Days after NTP.
3. The initial submittal of the Baseline Schedule must be provided to the City for review no later than forty-five (45) Days after NTP.
4. The Contractor must incorporate all corrections and revisions required by the City and provide an updated version of the Baseline Schedule for review and acceptance no later than seventy-five (75) Days after NTP to ensure that the Baseline Schedule is accepted no later than ninety (90) Days after the NTP. The ninety (90) Days must include fourteen (14) Days review time by the City for each submittal of the Baseline Schedule.
5. Once accepted, the Baseline Schedule will be the basis of Project Schedule updates.

B. Remedies

1. Preliminary Project Schedule: The City will take a credit of three thousand dollars ($3,000) if the preliminary Project Schedule is not submitted within twenty-one (21) Days of the NTP.
2. Acceptable Baseline Schedule: The City will take a credit of five thousand dollars ($5,000) if an acceptable Baseline Schedule is not submitted within ninety (90) Days of the NTP.
3. Monthly Progress Schedule updates: The City will take a credit of two thousand dollars ($2,000) for each schedule update not submitted within the period it was due.
4. Scheduling Firm Services: If an acceptable Baseline Schedule is not provided by the Contractor within ninety (90) Days of the NTP or three (3) updates are not provided by the Contractor during the period they are due, the City may engage the services of a scheduling firm to develop a Project schedule or update an existing schedule. The total cost of such services will be deducted from the monies due to the Contractor.
    a. Any schedules and updates developed by such scheduling firm are for the City's sole use and do not, in any way, represent an acceptance of responsibility by the City to schedule the Work or relieve the Contractor of the obligation to complete the Work within the Durations specified by the Contract.
5. The City will only accept the submitted information after all corrections have been made and all issues have been resolved. The City may find the Contractor in default if items required by this Section are incomplete.

1.6 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT:

A. The preliminary Project Schedule must be a detailed plan (division level per Construction Specifications Institute (CSI) MasterFormat) of all operations, including submittals, permitting, testing, and construction Activities, for either the first ninety (90) Days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (section level per CSI MasterFormat) schedule of the major Activities for the remainder of the Work.

B. The preliminary Project Schedule will be reviewed by the City and returned with comments, as necessary, within fourteen (14) Days of submittal receipt. Information from the preliminary Project Schedule will be the general foundation for development of the Baseline Schedule.

1.7 PROJECT SCHEDULE:

A. The Baseline Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

B. After the Baseline Schedule is approved, the Project Schedule must be the Contractor's working schedule and must be used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all of the Work.

C. The Project Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

D. The Project Schedule must be the Contractor's working schedule used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.

E. All delay claims must be based on the current approved updates of the Project Schedule.

F. The Contractor must confirm in writing that all subcontractors performing any portion of the Work are in agreement with the accepted Baseline Schedule and the monthly updates.

G. The amount of detail represented in the Baseline and Project Schedule and supporting documents submitted must, at a minimum, include the following items :

1. Contract Milestones must be identified and included in the Baseline and Project Schedule.
2. All submittal, owner review & approval, purchase, manufacture, and delivery Activities for all major materials and equipment.
3. Deliveries of owner-furnished equipment and/or materials.
4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
6. Performance of tests, submission of test reports, and approval of test results.
7. Commissioning Activities for all commissioned systems and equipment is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion. Such Activities must include, at a minimum, Pre-Functional testing and check sheets; Testing, Adjusting, and Balancing (TAB) verification; Functional Testing, including testing of all controls; and Owner's demonstration and orientation.
8. Completion dates of all items required for phased completion (if applicable).
9. Completion dates of all items required for Substantial Completion.
10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).
11. Completion dates for close-out of regulatory and punch list items prior to Final Acceptance and transfer of the Project.
12. Any additional detail requested by the Commissioner.

H. Activities identified in the Baseline and Project Schedule must have the Duration in units of whole Work Days. Construction Activity Durations must not exceed twenty (20) work days unless specifically approved by the City. This is to ensure that Activities are not generalized and that each Activity and sub-Activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction Activities such as procurement of materials, delivery of equipment, concrete curing, etc., may exceed twenty (20) work days without prior approval; however, these are still subject to review by the City. Durations must be based on the available resources required for performing each Activity and must be the result of definitive labor hours using established production rates, and with consideration of on-site working conditions. If requested by the City, the Contractor must justify the reasonableness of a planned Duration.

I. Activity descriptions must use plain language that clearly and uniquely define each Activity. Each description must include a verb or work function (e.g. submit, form, pour etc.) an object (e.g. slab, foundation, etc.) and, for any construction Activities, a specific location. The Work related to each Activity must be limited to one responsibility and one trade.

J. Activity relationships must be assigned to clearly establish predecessor and successor relationships to each Activity. Open-ended Activities are not permitted with the exception of the first and last Activities in the network, the first Activity being NTP and the last being Final Acceptance. The use of relationship lag times is discouraged and only permitted with prior approval by the City. The use of negative lag is never permitted.

K. Activity constraint dates are only to be used to reflect contractual constraints unless specifically authorized by the City.

L. Float or slack in any schedule must not be for the exclusive use or benefit of either the City or the Contractor, but must be available for use by both the City and the Contractor.

M. Each resubmittal after the Project Schedule is delivered for acceptance must comply with all requirements of this section. Review and response by the City will be given within fourteen (14) Days after resubmission. The Contractor's receipt of the comments within the time specified must not in any way affect the Contractor's responsibility to complete the Project within the time fixed in Schedule A.

N. Failure by the City to return comments or indicate acceptance status will in no way relieve the Contractor's obligation to submit monthly schedule updates.

O. At the request of the City, the Contractor must be required to make a presentation to explain or clarify the intended logical sequence of construction Activities depicted in the detailed Project Schedule. The Contractor and designated scheduler must discuss anticipated challenges and outline construction methodology and flow of work to show how and when major Milestones will be achieved. In addition, the Contractor may, at no cost to the City, be required to participate in additional Project meetings necessary to obtain acceptance of the above noted submittals.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

A. The Baseline and Project Schedules must contain a sufficient number of Activities to represent adequate planning and execution of the Work so that it shows an accurate flow of work and demonstrates an understanding of the Project by the Contractor.

B. Activity ID and Calendar Coding

1. The Contractor's proposed Activity and calendar coding and must be submitted with the preliminary Project Schedule. A meeting may be requested by the City to discuss the scheme and other schedule information prior to the submittal of the Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Project Schedule.

C. Activity ID Coding

1. All Activities/Resources/Calendars (Baseline and Project Schedules) must be coded inside the P6 Project Environment / Project Level (NOT the Global Environment/Enterprise Level) to facilitate selection, sorting and preparation of reports.

2. Activity coding must consist of the Project ID followed by a dash, followed by Activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be created at the Project level and must utilize the coding scheme outlined in the table below:

Activity Code	Meaning
RESP	Responsibility: Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	Phase: Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	Location: Breakdown by floor or elevation.
AREA	Area: Breakdown by room, area, block or wing. May be used as a subdivision of PHAS to include Milestones, permits, subcontractor approvals, submittals, fabrication and delivery, and subdivision of the Site and buildings into Logical modules, such as by blocks, wings, etc.
TRAD	Trade: Breakdown by CSI Code or section number in the Specifications.

a. Description of schedule Activities must include terminology that represents the scope of work associated with that particular Activity. Terminology used to describe similar actions must be consistent across all segments of work.

b. Naming convention for schedule Activities must be descriptive and indicate the associated work covered by the Activity. Activities must use a verb, noun, and location of the work in the Activity name.

3. Project Calendar Coding

a. All calendars created and assigned to Activities must be Project-level calendars. The Calendar Name must consist of the Project ID number followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME).

1.9 WORK BREAKDOWN STRUCTURE:

A. A multi-level hierarchal WBS must be incorporated in all P6 schedules. An initial, proposed WBS must be submitted with the preliminary Project Schedule. The levels (nodes) must include, but not be limited to:

1. LEVEL 01 – The Project Level.
2. LEVEL 02 – Contains a minimum of four (4) nodes; Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout.
3. LEVEL 03 – Decomposition of each of the four (4) nodes in Level 02 into its constituent parts. This level must target specific, tangible, deliverable scopes of the Project Work.

B. The Contractor's proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS must be incorporated into the Baseline and Project Schedule.

1.10 MAJOR MILESTONES:

A. The schedule must include both contractual and non-contractual Milestones that are provided by the City. These Milestones must be properly associated with the related Work packages and maintained to represent the progress of the Project.

1.11 SHORT (THREE-WEEK) INTERVAL / TWO-WEEK LOOK-AHEAD:

A. On a bi-weekly basis, the Contractor must provide a three (3) week short interval schedule in a format satisfactory to the City. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead Activities and add any additional Activities planned for the next two (2) weeks. Electronic files and hard copies must be provided to the City on the first day of each work week with the prior week's actual progress included.

B. Each Task listed on the short interval schedule must be representative of the most current Project Schedule Update and include a reference to an Activity shown on the current update.

1.12 SUBMITTALS:

A. General

1. Development of the Baseline Schedule and updating of the Project Schedule must follow the DCMA and AACE International guidelines.

2. Each electronic submission of the Project Schedule must be assigned a unique file name consisting of the Project ID (as noted on the NTP followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals must be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.

3. The Contractor must provide all submittals in electronic format and two hard copies.

B. Preliminary Project Schedule

1. For acceptance of the preliminary Project Schedule the Contractor must submit the following:

a. Two (2) 11" x 17" hard copies of the proposed preliminary Project schedule, as well as the native electronic schedule data file, in .XER file format, per the direction of the City.

b. A Schedule Narrative Report detailing the Contractor's initial plan for executing the Contract work within the allotted Contract Duration, and include the following explanation of their provided preliminary schedule:

i. The proposed WBS;
ii. All proposed Project Calendars;
iii. All proposed Activity Codes, clearly defined;
iv. The proposed Activity ID format; and
v. Schedule basis narrative, which must memorialize assumptions made in the development of the schedule.

C. Baseline Schedule

1. The City will return comments within ten (10) Work Days after receipt of the initial Project Schedule Submission. If any of the required submissions are returned to the Contractor for corrections or revisions, they must be resubmitted within five (5) Work Days from receipt of

comments. Each resubmittal must comply with the requirements enumerated above. Review and response by the City will be given within ten (10) Work Days after resubmission.

2. At the request of the City, the Contractor will be required to participate in Project meetings necessary to obtain an acceptance of the above noted submittals.

3. Baseline Schedule submittal must contain a Narrative Report. It must include the following, or as directed by the City:

   a. A description of the Project scope and how the Work is represented in the schedule Activities;

   b. A description of the overall sequence of major components of Work;

   c. Planned work week for each definable feature of work;

   d. Description of the Critical Path and near Critical Paths;

   e. Basis of Durations, described in terms of quantity and production rate;

   f. How weather will be accommodated in the schedule, including a description of the weather calendar and the Activities it is applied to, and the NOAA Inclement Weather data that defined the number of non-Work Days;

   g. How regulatory, operational or third-party constraints are accommodated in the schedule;

   h. Description of key Project coordination points or events;

   i. Discussion of long lead items and basis of time frames for submittals;

   j. Description of anticipated means and methods for large quantity production Activities; and,

   k. Potential opportunities and risks, including quantification of the schedule reduction or expansion.

D. Project Schedule Updates

1. Every schedule submittal must be provided with a corresponding narrative. These schedule submittals and narratives are to be submitted in hard copy, as well as in the native electronic format, as attachments to emails or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files (P6 (.XER) for Primavera schedule files and MS Word and/or Adobe Acrobat for Narrative and supporting document submittals).

2. For each submittal of the updated Project Schedule, the following layouts, reports, and graphics are required in the specified formats, unless otherwise directed by the City:

   a. The Contractor must furnish two (2) 11” x 17” hard copies of the complete progress schedule with each initial schedule update and final update incorporating comments furnished by the City. Additionally, the Contractor must provide the native electronic schedule data file, in .XER file format, with the initial and final schedule update submission.

   b. An Activity bar chart layout grouped by Activity Code and then sorted by Start Date, Finish Date, and then Total Float.

   c. Each Activity line must display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start Date (ES), Finish Date (EF), and Total Float (TF), Baseline Original Duration (BL OD) Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF).

d. An Activities progress bar must show both current progress update ES and EF, and baseline ES and EF. The top line of the bar chart area must contain the updated ES and EF; the second line below must depict the accepted baseline ES and EF dates.

3. The City may request additional standard P6 reports from time to time at no additional cost.

4. The Monthly Update submittal must contain a Narrative Report. It must include the following, or as directed by the City:

a. Any changes to the schedule basis narrative
b. A discussion of progress through the update period and status of the Project with respect to completion of the schedule. The progress reporting must detail work Activities that relate to the Project's Critical Path and if these Activities are progressing as planned.
c. A discussion of changes, delays or other circumstances affecting Progress including identified risks and opportunities and the Contractor's strategy.
d. A listing and brief explanation of modifications to the previously submitted network including Logic changes and Activity additions, deletions or modifications.
e. An update on the status of long lead items and whether the item is on the Critical Path.
f. The Contractor must report on all out of sequence Activities, the cause of this deviation to plan, and the proposed resolution of this issue.
g. The Contractor must include an explanation of assumptions and exclusions made in developing the schedule update and narrative.

5. The Contractor must provide a copy of the computer file(s) in electronic format or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files and an electronic copy of the Narrative Report.

1.13 PROJECT SCHEDULE UPDATING:

A. The initial updating must take place immediately after the City accepts the Contractor's Baseline Schedule. The Data Date for the first update must not exceed seven (7) Days from the date of receipt of the accepted Baseline Schedule, or as directed by the City.

B. Subsequent updates of the Project Schedule must be submitted monthly until Substantial Completion. The schedule data date must be the last Work Day of the period unless otherwise directed by the City. Updates must be provided to the City no later than seven (7) Days after the 'schedule Data Date'.

C. Updates must reflect actual or reasonably anticipated progress as of the last Work Day of the period.

D. The City may request meetings with the Contractor to review the Project Schedule and Narrative and jointly verify Project health and information.

E. In addition, the City may request meetings with the Contractor's scheduling representative to:

1. Resolve out-of-sequence Logic;

2. Should out-of-sequence progress occur where Activities have reported progress without predecessor Activities being completed, the Contractor must obtain the City's approval in a Proposed Schedule before revising the Logic ties to reflect the way the Work is actually being performed. Use of progress override by default mechanisms that may be included in CPM scheduling software systems will not be allowed except on a case-by-case basis with the approval of the City. A written explanation for each instance must be included in the monthly submittal narrative.

3. Assess the impact, if any, of any pending change orders.

4. Incorporate accepted time extensions.

5. Review revised Logic (as-built and projected) and changes in Activity Duration, cost, and labor hours assigned.

F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in rejection of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the City.

G. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the Critical Path have occurred due to action or inaction of the Contractor and, as a result, the date for Substantial Completion will not be met, the Contractor must promptly take some or all of the following actions at no additional cost to the City, unless otherwise directed by the City:

1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

2. Increase the number of working hours per shift, shifts per day, or Work Days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.

3. Reschedule Activities to achieve maximum practical concurrence of accomplishment of Activities and comply with the revised schedule.

4. Submit to the City for review a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule.

5. Add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical or non-critical Activities fall behind the Contractor's Baseline Schedule at any time during the construction period.

H. The City may, at any time during the Project and at no additional cost to the City, require the Contractor to develop a more detailed schedule/ Fragnet than depicted in the Baseline Schedule to provide a clearer understanding of the effort needed to complete an Activity or group of Activities.

I. If the City determines that either the Critical Path is in the negative by four (4) weeks, or that the Project's date for completion may be affected, the Contractor may be required, at no additional cost to the City, to prepare a Recovery Schedule. Such Recovery Schedule is subject to review and acceptance by the City.

1. The recovery schedule must propose alternative methods, overtime, and other means available to the Contractor to recover the delays incurred to date.

2. The Recovery Schedule must be resource-loaded with manpower and equipment required to bring the date for Substantial Completion back into compliance.

J. The Contractor must submit an "As-Built Schedule", as the last schedule update showing all Activities, with the exception of punch list and closeout tasks, at Substantial Completion. This schedule must reflect the exact manner in which the Project was actually constructed.

1.14 TIME IMPACT ANALYSIS:

A. In addition to the requirements of the Standard Construction Contract Article 11, the Contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.

B. The Time Impact Analysis must include a written narrative and supporting impact schedule Fragnet detailing the Project delays resulting from the alleged delay. The impact schedule Fragnet, separate and distinct from the Progress Schedule update, must demonstrate that the changes or anticipated delays affect Activities of the current accepted Progress Schedule. The impact schedule will be incorporated into the Progress Schedule only after it is accepted by the Commissioner and a time extension is approved. The Fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these changes or delays on the date for Substantial Completion.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 16.20

(No Text on This Page)

SECTION 01 32 16.30
PROJECT SCHEDULES (METHOD C)

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 16.30

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes the following:

1. Methods
2. Definitions
3. Preliminary, Baseline, and Project Schedule Preparation Timeline
4. Preliminary Project Schedule Development
5. Project Schedule
6. Activity and Calendar Coding Structure
7. Work Breakdown Structure (WBS)
8. Major Milestones
9. Short (Three-Week) Interval/Two-Week Look-Ahead
10. Submittals
11. Project Schedule Updating
12. Time Impact Analysis

1.3 METHODS:

A. The Contractor must comply with Project schedule development and updating requirements as specified herein.

1. The Contractor must employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the City. Upon request, the Contractor must provide the City with qualifications and experience of the proposed scheduling staff member(s).

2. The Contractor must prepare, update, and maintain a detailed Project Schedule using a version of scheduling software that is compatible with the City's Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM). All schedule submittals must be developed using Oracle's Primavera P6 EPPM software. Schedules must be developed using accepted CPM techniques using the Precedence Diagramming Method (PDM). The Project Schedule must be developed following Defense Contract Management Agency (DCMA), and American

Association of Cost Engineering International (AACE International) guidance. The Contractor will be required to use the Contractor's own P6 license (whether single-user or Enterprise license), unless otherwise directed by the Commissioner. If directed by the Commissioner prior to the Notice to Proceed (NTP), the Contractor must use the Department's P6 Enterprise license and develop the Progress Schedule within the Department's Enterprise environment.

3. Once the Baseline Schedule is accepted by the City, progress updates to the Project Schedule must be submitted monthly, unless otherwise directed by the City, until Substantial Completion. The Data Date for the schedule updates must use the last Friday of the month, or as directed by the City.

4. The Contractor must be responsible for providing the monthly schedule updates once the Baseline Schedule is approved. Each monthly schedule update must be accompanied with a schedule narrative that explains the following:

   a) The progress of work during that particular period of performance;
   b) Any changes in schedule Logic;
   c) The physical conditions that were used to update every Activities Percent Complete;
   d) Any change in actual Start and Finish Dates;
   e) Any Duration changes;
   f) Any added and deleted Activities; and
   g) Any added Extra Work (e.g., change orders).

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	**Definition**
Activity	A representation of a discrete portion of the overall scope of Work or an event through Duration and description in a CPM schedule.
Baseline Schedule	The planned and detailed CPM schedule of Activities, including all Logic, Durations, Resource and Cost Loading, and showing the entire scope of Work. The Baseline Schedule must be accepted by the City.
Critical Path	The longest sequence of Activities in a network which establishes the minimum length of time for accomplishment of the end event of the Project.
Critical Path Method (CPM)	A management technique used to plan and control a project which combines all relevant information into a single plan defining the sequence and Duration of operations and depicting the interrelationship of the Work elements required to complete the Project.
Current Schedule	The most recently updated schedule that captures progress to date and forecasts the dates for each Activity.

Term	**Definition**
Data Date	The date used as a starting point for scheduling calculations. The Data Date is changed to the current end of period date when a schedule is updated for progress.
Duration	The amount of time, in workdays, an Activity will take to perform.
Finish Date	The earliest estimated date an Activity is calculated to be complete, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Free Float	The calculated amount of time that the estimated start or finish of an Activity can be delayed without impacting the start or finish of other downstream Activities logically connected in a progressive relationship. (See Finish Date and Late Finish).
Fragnet	Fragmentary network: a portion of a schedule detailing impacts of an event on specific Activities in the broader schedule.
Inclement Weather	Any weather condition, the duration of which varies in excess of the 3-year average published by the National Oceanic and Atmospheric Administration (NOAA) information for the local area.
Integrated Project Schedule	The Commissioner's overall schedule covering design, procurement, and construction. The Commissioner will use the Contractor's Project Schedule to update the Integrated Project Schedule.
Late Finish	An estimate of the latest plausible date an Activity's completion can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Late Start	An estimate of the latest plausible date an Activity's start can be postponed without rendering as unachievable the required completion of any downstream Milestones to which the Activity is Logically connected to in a progressive relationship.
Logic	A direct progressive relationship between Activities where one Activity's performance restricts the performance of another Activity.
Milestone	A key or critical point in time for reference or measurement.
Network Diagram	A graphic diagram of a network schedule, showing Activities and Activity relationships.
Original Duration	The estimated amount of time, in Work Days, an Activity is expected to take to complete at the beginning of a project as anticipated by the Contractor based on its planned means and methods at time of bid and documented in the Baseline Schedule.

Term	**Definition**
Percent Complete	The percentage of the scope of Work represented by an Activity completed as of the Data Date calculated as physical percent complete for payment purposes.
Project Schedule	The Contractor's schedule used to manage the orderly and expeditious completion of the Work. The Project Schedule is initially the accepted Baseline Schedule, and is updated throughout the Project.
Remaining Duration	The amount of time, in Work Days, the remaining scope of Work represented by an Activity is expected to take to complete, measured from the current Data Date.
Resource and Cost Loading	Values assigned for estimated dollars, manpower, equipment and/or materials necessary to complete the scope of Work represented by a specific Activity.
Recovery Schedule	A Recovery Schedule outlining and incorporating extraordinary efforts required to recover lost time with the aim of achieving completion of the Project within the stipulated contract Duration, plus authorized time extensions. In such case, special attention must be given to minimize delays and must establish the nature of efforts; for instance, resources and equipment required, extended hours of work, weekend work, accelerated fabrication, required action(s) or effort(s) by the Contractor, its subcontractors, consultants, clients, end users and/or other concerned parties to recover the schedule.
Revised and/or Updated Schedule	A Baseline Schedule, or Progress Project Schedule, or Recovery Schedule for the Project that shows the actual Duration of all the completed Activities, including Duration of and the reasons for delays, if any have occurred, AND revisions to all remaining Activities of the Contractor and its subcontractors, including changes, if any, to logical ties, interrelations and the sequence of each of the outlined Activities. Any such revisions should be shown on the row just below the approved schedule of the respective Activity so that revisions can be compared. The Revised and/or updated Schedule must be reviewed and approved by the City.
Start Date	The earliest estimated date an Activity is calculated to begin, based on the estimated performance of all prior Activities to which the Activity is logically connected in a progressive relationship.
Time Impact Analysis	A forward looking (prospective) schedule analysis used to forecast the impact to the Critical Path and to Milestone Finish Dates caused by a single event or series of events. Time Impact Analysis is not a retrospective (forensic) schedule analysis or a what-if schedule analysis of a potential event.
Total Float	The amount of time the start or finish of an Activity can be delayed without affecting the Project completion date.

Term	Definition
Work Breakdown Structure (WBS)	WBS is a deliverable-oriented decomposition of a Project into smaller components. A WBS provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.
Work Days (WD)	Work Days are every consecutive day on the calendar, excluding weekends (Saturday and Sunday) and holidays.

1.5 PRELIMINARY, BASELINE, AND PROJECT SCHEDULE PREPARATION TIMELINE:

A. Upon receipt of the NTP, the Contractor must promptly prepare a preliminary Project Schedule and subsequently a Baseline Schedule and must submit for the City's acceptance as follows:

1. Submit the Contractor's CPM Scheduler's qualifications to the City for approval within seven (7) Days after NTP. The City will respond to the submittal within seven (7) Days of the submittal receipt.

2. The preliminary Project Schedule must be submitted no later than twenty-one (21) Days after NTP.

3. The initial submittal of the Baseline Schedule must be provided to the City for review no later than forty-five (45) Days after NTP.

4. The Contractor must incorporate all corrections and revisions required by the City and provide an updated version of the Baseline Schedule for review and acceptance no later than seventy-five (75) Days after NTP to ensure that the Baseline Schedule is accepted no later than ninety (90) Days after the NTP. The ninety (90) Days must include fourteen (14) Days review time by the City for each submittal of the Baseline Schedule.

5. Once accepted, the Baseline Schedule will be the basis of Project Schedule updates.

B. Remedies

1. Preliminary Project Schedule: The City will take a credit of three thousand dollars ($3,000) if the preliminary Project Schedule is not submitted within twenty-one (21) Days of the NTP.

2. Acceptable Baseline Schedule: The City will take a credit of five thousand dollars ($5,000) if an acceptable Baseline Schedule is not submitted within ninety (90) Days of the NTP.

3. Monthly Progress Schedule updates: The City will take a credit of two thousand dollars ($2,000) for each schedule update not submitted within the period it was due.

4. Scheduling Firm Services: If an acceptable Baseline Schedule is not provided by the Contractor within ninety (90) Days of the NTP or three (3) updates are not provided by the Contractor during the period they are due, the City may engage the services of a scheduling firm to develop a Project schedule or update an existing schedule. The total costs of such services will be deducted from the monies due to the Contractor.

5. Any schedules and updates developed by such scheduling firm are for the City's sole use and do not, in any way, represent an acceptance of responsibility by the City to schedule the Work or relieve the Contractor of the obligation to complete the Work within the Durations specified by the Contract.

6. The City will only accept the submitted information after all corrections have been made and all issues have been resolved. The City may find the Contractor in default if items required by this Section are incomplete.

1.6 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT:

A. The preliminary Project Schedule must be a detailed plan (division level per Construction Specifications Institute (CIS) MasterFormat) of all operations, including submittals, permitting, testing, and construction Activities, for either the first ninety (90) Days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (section level per CSI MasterFormat) schedule of the major Activities for the remainder of the Work.

B. The preliminary Project Schedule will be reviewed by the City and returned with comments, as necessary, within fourteen (14) Days of submittal receipt. Information from the preliminary Project Schedule will be the general foundation for development of the Baseline Schedule.

1.7 PROJECT SCHEDULE:

A. The Baseline Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

B. After the Baseline Schedule is approved, the Project Schedule must be the Contractor's working schedule and must be used to plan, organize, execute and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor’s execution plan to complete the Work.

C. The Project Schedule must show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate Milestone Activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.

D. The Project Schedule must be the Contractor's working schedule used to plan, organize, execute, and track the Project. The Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.

E. All delay claims must be based on the current approved updates of the Project Schedule.

F. The Contractor must confirm in writing that all subcontractors performing any portion of the Work are in agreement with the accepted Baseline Schedule and the monthly updates.

G. The amount of detail represented in the Baseline and Project Schedule and supporting documents submitted must, at a minimum, include the following, items:

1. Contract Milestones must be identified and included in the Baseline and Project Schedule.
2. All submittal, owner review & approval, purchase, manufacture, and delivery Activities for all major materials and equipment.
3. Deliveries of owner-furnished equipment and/or materials.
4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
6. Performance of tests, submission of test reports, and approval of test results.

7. Commissioning Activities for all commissioned systems and equipment is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion. Such Activities must include, at a minimum, Pre-Functional testing and check sheets; Testing, Adjusting, and Balancing (TAB) verification; Functional Testing, including testing of all controls; and Owner's demonstration and orientation.
8. Completion dates of all items required for phased completion (if applicable).
9. Completion dates of all items required for Substantial Completion.
10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).
11. Completion dates for close-out of regulatory and punch list items prior to Final Acceptance and transfer of the Project.
12. Any additional detail requested by the Commissioner.

H. Activities identified in the Baseline and Project Schedule must have the Duration in units of whole Work Days. Construction Activity Durations must not exceed twenty (20) Work Days unless specifically approved by the City. This is to ensure that Activities are not generalized and that each Activity and sub-Activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction Activities such as procurement of materials, delivery of equipment, concrete curing, etc. may exceed twenty (20) Work Days without prior approval; however, these are still subject to review by the City. Durations must be based on the available resources required for performing each Activity and must be the result of definitive labor hours using established production rates, and with consideration of on-site working conditions. If requested by the City, the Contractor must justify the reasonableness of a planned Duration.

I. Activity descriptions must use plain language that clearly and uniquely defines each Activity. Each description must include a verb or work function (e.g. submit, form, pour etc.), an object (e.g. slab, foundation, etc.) and, for any construction Activities, a specific location. The Work related to each Activity must be limited to one responsibility and one trade.

J. Activity relationships must be assigned to clearly establish predecessor and successor relationships to each Activity. Open-ended Activities are not permitted with the exception of the first and last Activities in the network, the first Activity being NTP and the last being Final Acceptance. The use of relationship lag times is discouraged and only permitted with prior approval by the City. The use of negative lag is never permitted.

K. Activity constraint dates are only to be used to reflect contractual constraints unless specifically authorized by the City.

L. Float or slack, in any schedule, must not be for the exclusive use or benefit of either the City or the Contractor, but must be available for use by both the City and the Contractor.

M. Each resubmittal after the Project Schedule is delivered for acceptance must comply with all requirements of this section. Review and response by the City will be given within fourteen (14) Days after resubmission. The Contractor's receipt of the comments within the time specified must not, in any way, affect the Contractor's responsibility to complete the Project within the time fixed in Schedule A.

N. Failure by the City to return comments or indicate acceptance status will in no way relieve the Contractor's obligation to submit monthly schedule updates.

O. At the request of the City, the Contractor must be required to make a presentation to explain or clarify the intended logical sequence of construction Activities depicted in the detailed Project Schedule. The Contractor and designated scheduler must discuss anticipated challenges and outline construction methodology and flow of work to show how and when major Milestones will be achieved. In addition,

the Contractor may, at no cost to the City, be required to participate in additional Project meetings necessary to obtain acceptance of the above-noted submittals.

P. The Contractor must provide a Cost Flow Projection (CFP) summary covering from NTP to Final Acceptance. The CFP summary must match the expected billings for each period of performance.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.7.Q

Q. Schedule Cost and Resource Loading

1. At the direction of the City, and at no additional cost to the City, a Project Schedule must be cost loaded within thirty (30) Days after acceptance of the Baseline Schedule.
2. The Contractor must accurately load all Project Activities with direct field labor associated with the craft or trades required to complete that Activity. All labor must be noted in manhours required to complete the tasking. The Contractor must include in all Activities the hours required of for major pieces of equipment.
3. All Resource ID's must have a unique identifier assigned by the Contractor, and approved by the City, so the Project-specific data can be separated from other data in the system.
4. Cost loading must be accomplished by adding a single summary level cost loaded Activity in the Project Schedule. This Activity will allow initial generation and monthly updates of the planned value that is time-phased into monthly periods.
5. The intent of the cost loading is to facilitate cost forecasting, tracking, and reporting of monthly cost projection. Every month, the cost loaded summary Activity must be updated with earned value for prior months and revised monthly forecast for future periods. If there is a significant difference between the actual cumulative monthly invoice and the cumulative planned value from the cost loaded Project Schedule for any reporting month, the Contractor must provide the City with the reason for variance in the schedule narrative.

1.8 ACTIVITY AND CALENDAR CODING STRUCTURE:

A. The Baseline and Project Schedules must contain a sufficient number of Activities to represent adequate planning and execution of the Work so that it shows an accurate flow of work and demonstrates an understanding of the Project by the Contractor.

B. Activity ID and Calendar Coding

1. The Contractor's proposed Activity and calendar coding and must be submitted with the preliminary Project Schedule. A meeting may be requested by the City to discuss the scheme and other schedule information prior to the submittal of the Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Project Schedule.

C. Activity ID Coding

1. All Activities/Resources/Calendars (Baseline and Project Schedules) must be coded inside the P6 Project Environment / Project Level (NOT the Global Environment/Enterprise Level) to facilitate selection, sorting and preparation of reports.
2. Activity coding must consist of the Project ID followed by a dash, followed by Activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be created at the Project level and must utilize the coding scheme outlined in the table below:

Activity Code	Meaning
RESP	Responsibility: Identify the party (e.g. Contractor, subcontractor, City, etc.) responsible for the Activity.
PHAS	Phase: Breakdown of Activities in Milestones, pre-construction, procurement, construction and close-out Activities.
LOCN	Location: Breakdown by floor or elevation.
AREA	Area: Breakdown by room, area, block or wing. May be used as a subdivision of PHAS to include Milestones, permits, subcontractor approvals, submittals, fabrication and delivery, and subdivision of the Site and buildings into Logical modules, such as by blocks, wings, etc.
TRAD	Trade: Breakdown by CSI Code or section number in the Specifications.

a. Description of schedule Activities must include terminology that represents the scope of work associated with that particular Activity. Terminology used to describe similar actions must be consistent across all segments of work.

b. Naming convention for schedule Activities must be descriptive and indicate the associated work covered by the Activity. Activities must use a verb, noun, and location of the work in the Activity name.

3. Project Calendar Coding

a. All calendars created and assigned to Activities must be Project-level calendars. The Calendar Name must consist of the Project ID number followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME).

1.9 WORK BREAKDOWN STRUCTURE:

A. A multi-level hierarchal WBS must be incorporated in all P6 schedules. An initial, proposed WBS must be submitted with the preliminary Project Schedule. The levels (nodes) must include, but not be limited to:

1. LEVEL 01 – The Project Level.

2. LEVEL 02 – Contains a minimum of four (4) nodes: Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout.

3. LEVEL 03 – Decomposition of each of the four (4) nodes in Level 02 into its constituent parts. This Level must target specific, tangible, scopes of the Project Work.

4. LEVEL 04 – Decomposition of Level 03 Activities providing work package details that provide an understanding of the process to be used to execute the Project Work.

B. The Contractor's proposed WBS must be submitted with the preliminary Project Schedule. The accepted WBS must be incorporated into the Baseline and Project Schedule.

1.10 MAJOR MILESTONES:

A. The schedule must include both contractual and non-contractual Milestones that are provided by the City. These Milestones must be properly associated with the related Work and maintained to represent the progress of the Project.

1.11 SHORT (THREE-WEEK) INTERVAL / TWO-WEEK LOOK-AHEAD:

A. On a weekly basis, the Contractor must provide a three (3) week short interval schedule in a format satisfactory to the City. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead Activities and add any additional Activities planned for the next two (2) weeks. Electronic and hard copies must be provided to the City on the first day of each work week with the prior week's actual progress included.

B. Each task listed on the short interval schedule must be representative of the most current Project Schedule Update and include a reference to an Activity shown on the current update.

1.12 SUBMITTALS:

A. General

1. Development of the Baseline Schedule and updating of the Project Schedule must follow the DCMA and AACE International guidelines.

2. Each electronic submission of the Project Schedule must be assigned a unique file name consisting of the Project ID (as noted on the NTP), followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals must be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.

3. The Contractor must provide all submittals in electronic format and two hard copies.

B. Preliminary Project Schedule

1. For acceptance of the preliminary Project Schedule, the Contractor must submit the following:

a. Two (2) 11" x 17" hard copies of the proposed preliminary Project Schedule, as well as the native electronic schedule data file, in .XER file format, per the direction of the City.

b. A Schedule Narrative Report detailing the Contractor's initial plan for executing the Contract work within the allotted Contract Duration, and include the following explanation of their provided preliminary schedule:

i. The proposed (WBS);
ii. All proposed Project Calendars;
iii. All proposed Activity Codes, clearly defined;
iv. The proposed Activity ID format; and
v. Schedule basis narrative, which must memorialize the assumptions made in the development of the schedule.

C. Baseline Schedule

1. The City will return comments within ten (10) Work Days after receipt of the initial Project Schedule Submission. If any of the required submissions are returned to the Contractor for corrections or revisions, they must be resubmitted within five (5) Work Days from receipt of comments. Each resubmittal must comply with the requirements enumerated above. Review and response by the City will be given within ten (10) Work Days after resubmission.

2. At the request of the City, the Contractor will be required to participate in Project meetings necessary to obtain an acceptance of the above noted submittals.

3. Baseline Schedule submittal must contain a Narrative Report. It must include the following, or as directed by the City:

a. A description of the Project scope and how the Work is represented in the schedule Activities;

b. A description of the overall sequence of major components of Work;

c. Planned work week for each definable feature of work.

d. Description of the Critical Path and near Critical Paths;

e. Basis of Durations, described in terms of quantity and production rate;

f. How weather will be accommodated in the schedule, including a description of the weather calendar and the Activities it is applied to, and the NOAA Inclement Weather data that defined the number of non-work days;

g. How regulatory, operational or third-party constraints are accommodated in the schedule;

h. Description of key Project coordination points or events;

i. Discussion of long lead items and basis of time frames for submittals;

j. Description of anticipated means and methods for large quantity production Activities;

k. Potential opportunities and risks, including quantification of the schedule reduction or expansion; and

l. Assumptions/exclusions made in the schedule.

D. Project Schedule Updates

1. Every schedule submittal must be provided with a corresponding narrative. These schedule submittals and narratives must be submitted in hard copy and the native electronic format as attachments to emails or other media accepted by the City. When opened, the electronic format must provide flawless restoration of the native files (P6 (.XER) for Primavera schedule files and MS Word and/or Adobe Acrobat for narrative and supporting document submittals).

2. For each submittal of the updated Project Schedule, the following layouts, reports, and graphics are required in the specified formats, unless otherwise directed by the City:

   a. The Contractor must furnish two (2) 11” x 17” hard copies of the complete progress schedule with each initial schedule update and final update incorporating comments furnished by the City. Additionally, the Contractor must provide the native electronic schedule data file, in .XER file format with the initial and final schedule update submission.

   b. An Activity bar chart Layout grouped by Activity Code and then sorted by Start Date, Finish Date, and Total Float.

   c. Each Activity line must display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start Date (ES), Finish Date (EF), and Total Float (TF), Baseline Original Duration (BL OD), Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF).

   d. An Activities progress bar must show both current progress update ES and EF, and baseline ES and EF. The top line of the bar chart area must contain the updated ES and EF; the second line below must depict the accepted baseline ES and EF dates.

3. The City may request additional standard P6 reports from time to time at no additional cost.

4. The Monthly Update submittal must contain a Narrative Report. It must include the following, or as directed by the City:

a. Any changes to the schedule basis narrative;

b. Overall health of the Project;

c. Actual Activity Start Dates;

d. Actual Activity Finish Dates;

e. The physical conditions that were used to update Activities percent complete

f. Percent of Work reported in place;

g. Contract and Milestone completion date status:

   i. Number of Days ahead or behind schedule; and
   ii. Days lost/gained compared with the previous update.

h. Schedule change report organized by Milestone and area comparing the number of Activities that were planned to start and finish to the number that actually started and finished for the reporting period;

i. Lookahead report listing each Activity in the CPM schedule that is scheduled to be performed during the next reporting period;

j. Plans for executing scheduled Activities during the next reporting period;

k. Analysis, organized by Milestone and area, of the Critical Path and near Critical Path(s) describing:

   i. The nature of the Critical Path/near Critical Path;
   ii. Impact on other Activities, Milestones and Finish dates; and
   iii. Identify, or update, risks and opportunities that may impact the Critical Path/near Critical Paths.

l. List of current and anticipated delays by Milestone:

   i. Cause of the delay;
   ii. Corrective actions and schedule adjustments to correct the delay;
   iii. Impact of the delay on other Activities, Milestones and completion dates; and
   iv. Weather delays, when applicable. The Contractor must describe how the impacts of weather conditions and constraints were absorbed and accounted for in the schedule.

m. Changes in Activity description, Logic, or Duration must be submitted as a separate Proposed Schedule and approved by the City prior to being submitted as an official update. Once allowed, said changes must be grouped and organized in the report in a manner that communicates in detail the rationale associated with each change and the impact upon construction sequence, relationships and the Critical Path. A standard Digger Report is not sufficient to meet this requirement;

n. Added/deleted Activities and the rationale associated with each action;

o. Pending issues and status of other items;

p. Permits;

q. Contract modifications;

r. Current and potential extra Work, including change orders;

s. Status of long lead procurement items and whether the item is on the Critical Path;

t. Status of Project submittals;

u. Out of sequence report describing the necessity of each Activity relationship shown therein, as described within this Section;

v. Illogical progress/restraint reports (if any);

w. Other Project or scheduling concerns;

x. Electronic copy of the latest CPM schedule update file in Primavera (.XER) format; and

y. Primavera scheduling error report.

1.13 PROJECT SCHEDULE UPDATING:

A. The initial updating must take place immediately after the City accepts the Contractor's Baseline Schedule. The Data Date for the first update must not exceed seven (7) Days from the date of receipt of the accepted Baseline Schedule, or as directed by the City.

B. Subsequent updates to the Project Schedule must be submitted monthly until Substantial Completion is achieved. The schedule Data Date must be set to the last Work Day of the period unless otherwise directed by the City. Updates must be provided to the City no later than seven (7) Days after the 'schedule Data Date'.

C. Updates must reflect actual or reasonably anticipated progress as of the last Work Day of the period.

D. The City may request meetings with the Contractor to review the Project Schedule and narrative and jointly verify Project health and information.

E. In addition, the City may request meetings with the Contractor's scheduling representative to:

1. Resolve out-of-sequence Logic.

2. Should out-of-sequence progress occur where Activities have reported progress without predecessor Activities being completed, the Contractor must obtain the City's approval in a Proposed Schedule before revising the Logic ties to reflect the way the Work is actually being performed. Use of progress override by default mechanisms that may be included in CPM scheduling software systems will not be allowed except on a case-by-case basis with the approval of the City. A written explanation for each instance must be included in the monthly submittal narrative.

3. Assess the impact, if any, of any pending change orders.

4. Incorporate accepted time extensions.

5. Review revised Logic (as-built and projected) and changes in Duration, cost, and labor hours assigned.

F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in rejection of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the City.

G. Delays to the Critical Path – Whenever it becomes apparent from the monthly CPM schedule update that delays to the Critical Path have occurred due to action or inaction of the Contractor, and as a result the date for Substantial Completion will not be met, the Contractor must promptly take some or all of the following actions at no additional cost to the City, unless otherwise directed by the City:

1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

2. Increase the number of working hours per shift, shifts per day, or Work Days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.

3. Reschedule Activities to achieve maximum resource utilization across the Project and comply with the revised schedule.

4. Submit to the City a written statement of the steps the Contractor intends to take to remove or arrest the delay to the schedule. The Contractor must promptly provide the necessary level of effort to bring the Work back on schedule.

5. Add to its equipment and materials or construction forces, as well as increase the working hours, if operations for critical, less critical, or non-critical Activities fall behind the Contractor's Baseline Schedule at any time during the construction period.

H. The City may, at any time during the Project and at no additional cost to the City, require the Contractor to develop a more detailed schedule/Fragnet than depicted in the Baseline Schedule to provide a clearer understanding of the effort needed to complete an Activity or group of Activities.

I. If the City determines that either the Critical Path is in the negative by four (4) weeks, or that the Project's date for completion may be affected, the Contractor may be required, at no additional cost to the City, to prepare a Recovery Schedule. Such Recovery Schedule is subject to review and acceptance by the City. The Recovery Schedule must propose alternative methods, overtime, and other means available to the Contractor to recover the delays incurred to date.

J. The Contractor must submit an "As-Built Schedule", as the last schedule update showing all Activities, with the exception of punch list and closeout tasks, at Substantial Completion. This schedule must reflect the exact manner in which the Project was actually constructed.

1.14 TIME IMPACT ANALYSIS:

A. In addition to the requirements of the Standard Construction Contract Article 11, the Contractor must submit a Time Impact Analysis to the Engineer with all requests for time extension.

B. The Time Impact Analysis must include a written narrative and supporting impact schedule Fragnet detailing the Project delays resulting from the alleged delay. The impact schedule Fragnet, separate and distinct from the Progress Schedule update, must demonstrate that the changes or anticipated delays affect Activities of the current accepted Progress Schedule. The impact schedule will be incorporated into the Progress Schedule only after it is accepted by the Commissioner and a time extension is approved. The Fragnet submitted as part of the Time Impact Analysis must illustrate the impact of these changes or delays on the date for Substantial Completion.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 32 16.30

SECTION 01 32 33
PHOTOGRAPHIC DOCUMENTATION

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SECTION 01 32 33

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section includes the following:
   1. Photographic Media
   2. Construction Photographs
   3. Pre-construction Photographs
   4. Periodic Construction Progress Photographs
   5. Special Photographs
   6. DVD Recordings
   7. Final Completion Construction Photographs

B. RELATED SECTIONS: include without limitation the following:
   1. Section 01 10 00 SUMMARY
   2. Section 01 33 00 SUBMITTAL PROCEDURES
   3. Section 01 35 91 HISTORIC TREATMENT PROCEDURES
   4. Section 01 78 39 CONTRACT RECORD DOCUMENTS
   5. Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS

C. PHOTOGRAPHER - The Contractor must employ and pay for the services of a professional photographer who will take photographs showing the progress of the Work.

1.3 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: “Design Consultant” must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 SUBMITTALS:

A. Qualification Data: For photographer.

B. Key Plan: With each Progress Photograph Submittal include a key plan of Project site and building with notation of vantage points marked for location and direction of each image. Indicate location, elevation or story of construction. Include same label information as corresponding set of photographs.

C. Construction Progress Photograph Prints: Take Progress Photographs bi-weekly and submit four (4) color prints of each photographic view for each trade to the Resident Engineer. Such Progress Photographs must be included in each monthly progress report or as otherwise directed by the Resident Engineer.

D. Digital Files: Submit digital files in the format required.

1.5 QUALITY ASSURANCE:

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three (3) years.

1.6 COORDINATION:

A. The Contractor and its subcontractor(s) must cooperate with the photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, such as temporary lighting required to produce clear and well-lit photographs without obscuring shadows.

1.7 COPYRIGHT:

A. The Contractor must include the provisions of this Subsection 1.7 in the agreement between the Contractor and the Photographer who will provide the construction photographs described in this Section. The Contractor must submit to the Resident Engineer a copy of its agreement with the Photographer.

B. Any photographs, images and/or other materials produced pursuant to this Agreement, and any and all drafts and/or other preliminary materials in any format related to such items produced pursuant to this Agreement, will, upon their creation, become the exclusive property of the City.

C. Any photographs, images and/or other materials provided pursuant to this Agreement ("Copyrightable Materials") will be considered "work-made-for-hire" within the meaning and purview of Section 101 of the United States Copyright Act, 17 U.S.C. § 101, and the City will be the copyright owner thereof and of all aspects, elements and components thereof in which copyright protection might exist. To the extent that the Copyrightable Materials do not qualify as "work-made-for-hire," the Photographer hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to the Copyrightable Materials to the City, free and clear of any liens, claims, or other encumbrances. The Photographer will retain no copyright or intellectual property interest in the Copyrightable Materials. The Copyrightable Materials must be used by the Photographer for no purpose other than in the performance of this Agreement without the prior written permission of the City. The Department may grant the Photographer a license to use the Copyrightable Materials on such terms as determined by the Department and set forth in the license.

D. The Photographer acknowledges that the City may, in its sole discretion, register copyright in the Copyrightable Materials with the United States Copyright Office or any other government agency authorized to grant copyright registrations. The Photographer must fully cooperate in this effort and agrees to provide any and all documentation necessary to accomplish this.

E. The Photographer represents and warrants that the Copyrightable Materials: (i) are wholly original material not published elsewhere (except for material that is in the public domain); (ii) do not violate any copyright Law; (iii) do not constitute defamation or invasion of the right of privacy or publicity; and (iv) are not an infringement, of any kind, of the rights of any third party. To the extent that the Copyrightable Materials incorporate any non-original material, the Photographer has obtained all necessary permissions and clearances, in writing, for the use of such non-original material under this Agreement, copies of which must be provided to the City.

PART II – PRODUCTS

2.1 PHOTOGRAPHIC MEDIA:

A. Digital Images: Digital files must be captured as 7.2 megapixel files or greater, with a minimum pixel array of 2,400 pixels by 3,000 pixels. The camera used to capture the digital files must be a Digital SLR (Single Lens Reflex) camera or approved equal; "point and shoot" cameras or camera phones are not acceptable. Digital cameras must produce images using true optical resolution; "digital zoom" is not acceptable. Images must not be resized or interpolated. The file format for digital files must be Joint Photographic Experts Group format ("JPG"). The digital files must not be modified or processed in any way to alter the JPG file's metadata, including the photograph's original capture date.

B. Digital Files: Digital files must be submitted on Digital Versatile Disk ("DVD") or as specified by the Commissioner. DVDs must be inserted in standard weight Archival Quality clear poly sheet protectors and submitted in a hard cover three (3) ring binder. The information imprinted on each print must be provided on an Excel file included on the DVD. The DVD must be labeled with the Project ID and the Project description. Labeling using adhesive labels is not acceptable.

C. Prints:
   1. Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte color prints on single-weight commercial-grade stock paper, with 1-inch wide margins and punched for standard 3-ring binder.
   2. Identification: On the front of each photograph affix a label in the margin with Project name and date photograph was taken. On the back of each print, provide an applied label or rubber-stamped impression with the following information:
      a. Project Contract I.D. Number.
      b. Project Contract Name.
      c. Name of Contractor. (and Subcontractor Trade Represented)
      d. Subject of Image Taken.
      e. Date and time photograph was taken if not date stamped by camera.
      f. Description of vantage point, indicating location, direction and other pertinent information.
      g. Unique sequential identifier.
      h. Name and address of photographer.

PART III – EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS:

A. General: Take photographs that provide the largest possible depth-of-field while still in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
   1. Maintain key plan with each set of construction photographs that identifies each photographic location and direction of view.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
   1. Date and Time: Include date and time in filename for each image.
   2. Field Office Images: Maintain one set of images on USB drive, or other electronic media requested by the Commissioner, in the field office at the Project site so that it is available at all times for reference. Ensure that the images are the same as for those submitted to Commissioner.

3.2 PRE-CONSTRUCTION & PRE-DEMOLITION PHOTOGRAPHS:

A. Before commencement of Contract Work at the Project site, take color photographs of Project site and surrounding properties, including existing structures or items to remain during construction, from different vantage points, as directed by the Resident Engineer.
   1. Flag applicable excavation areas and construction limits before taking construction photographs.

2. Take photographs of minimum eight (8) views to show existing conditions adjacent to property before starting the Work.
3. Take applicable photographs of minimum eight (8) views of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required or directed by the Resident Engineer to record settlement or cracking of adjacent structures, pavements, and improvements.

B. Demolition Operations: Take photographs as directed by the Resident Engineer of minimum of eight (8) views each before commencement of demolition operations, at mid-point of operations and at completion of operations.

C. Pre-Demolition Photographs: Take archival quality color photographs, to include all exterior building facades, of all structures at the Project site designated to be fully demolished or removed in compliance with New York City Building Code requirements. Submit four (4) complete sets of pre-demolition photographs, in the format specified herein, to the Resident Engineer for submission to the New York City Department of Buildings.

3.3 PERIODIC CONSTRUCTION PROGRESS PHOTOGRAPHS:

A. Take photographs of minimum eight (8) views bi-weekly as directed by the Resident Engineer of construction progress for each contract trade. Select vantage points to show status of construction and progress since last photographs were taken.

3.4 SPECIAL PHOTOGRAPHS:

A. The photographer must take special photographs of subject matter or events as specified in other sections of the Project Specifications from vantage points specified or as otherwise directed by the Resident Engineer.

B. Historical Elements: As required in Section 01 35 91 HISTORIC TREATMENT PROCEDURES, for Contract Work at designated landmark structures or sites, the photographer, as specified and required by individual sections of the Contract documents or at the direction of the Commissioner, must take images of existing elements scheduled to be removed for replacement, repair or replication in quantities as directed, including post-construction photographs of completed Work as directed by the Commissioner.

1. Take Presentation Quality Photographs of designated landmark structures as directed by the Commissioner for submission to the New York City Landmarks Preservation Commission. Provide a minimum of four (4) color photographic prints of each view as directed.

3.5 VIDEO RECORDING:

A. When Video Recording of Demonstration and Orientation sessions is required, the Contractor must provide the services of a Videographer as indicated in Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.

3.6 FINAL COMPLETION CONSTRUCTION PHOTOGRAPHS:

A. For submission as Project Record Documents, take color photographs of minimum eight (8) unobstructed views of the completed Project and/or Project site, as directed by the Commissioner and after all scaffolding, hoists, shanties, field offices or other temporary work has been removed and final cleaning has been done after date of Substantial Completion. Submit four (4) sets of each view of Presentation Quality photographic prints, including negatives and/or digital images electronic file.

END OF SECTION 01 32 33

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 – GENERAL:

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Coordination Drawings, Catalogue Cuts, Material Samples, and other Submittals required by the Contract Documents.
B. Review of Submittals does not relieve the Contractor of responsibility for any Contractor's errors or omissions in such Submittals, nor from responsibility for complying with the requirements of the Contract.
C. Responsibility of the Contractor: The approval of Shop Drawings will be general and will not relieve the Contractor of the following responsibilities:
   1. Accuracy of such Shop Drawings;
   2. Proper fitting and construction of the Work
   3. Furnishing of materials or Work required by the Contract that may not be indicated on the Shop Drawings.
D. Approval of Shop Drawings must not be construed as approving departures from the Contract Drawings, Supplementary Drawings, or Specifications.
E. This Section includes the following:
   1. Definitions
   2. Submission Procedures
   3. Coordination Drawings
   4. LEED Submittals
   5. Ultra Low Sulfur Diesel Fuel Reporting
   6. Construction Photographs and Recordings
   7. As-Built Documents

1.3 RELATED SECTIONS: Include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
D. Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION
E. Section 01 77 00 CLOSEOUT PROCEDURES
F. Section 01 78 39 CONTRACT RECORD DOCUMENTS
G. Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS
H. Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: “Design Consultant” must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and Specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

C. Submittals: Written and graphic information that requires responsive actions and includes, without limitation, all Shop Drawings, product data, letters of certification, tests and other information required for quality control and as required by the Contract Documents.

D. Informational Submittals: Written information that does not require responsive action. Informational Submittals may be rejected for non-compliance with the Contract.

E. Shop Drawings: Drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, except for coordination drawings, specifically prepared for the Project by the Contractor or any subcontractor, manufacturer, supplier or distributor, which illustrates how specific portions of the Work must be fabricated and/or installed.

F. Coordination Drawings: As required in Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION.

G. Product Data and Quality Assurance Submittals: Includes manufacturer’s standard catalogs, pamphlets, and other printed materials including without limitation the following:

1. Catalogue and Product specifications
2. Installation instructions
3. Color charts
4. Catalog cuts
5. Rough-in diagrams and templates
6. Wiring diagrams
7. Performance curves
8. Operational range diagrams
9. Mill reports
10. Design data and calculations
11. Certification of compliance or conformance
12. Manufacturer’s instructions and field reports

1.5 COORDINATION DRAWINGS:

A. The Contractor must provide reproducible Coordination Drawing(s) of the reflective ceiling showing the integration of all applicable Contract Work, including general construction work as well as trade work (Plumbing, HVAC, and Electrical) to be performed by subcontractors. The Coordination Drawing(s) must include, without limitation, the following information:
   1. General Construction Contract Work: show the reflective ceiling plan, including starting points, ceiling and beam soffits elevations, ceiling heights, roof openings, etc.
   2. HVAC Contract Work: show ductwork, heating and sprinkler piping, location of grilles, registers, etc., and access doors in hung ceilings. Locations must be fixed by elevations and dimensions from column centerlines and/or walls.
   3. Plumbing Contract Work: show piping, valves, cleanouts etc., indicating locations, elevations and indicating the necessary access doors.

4. Electrical Contract Work: show fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.

B. The Contractor must issue the completed Coordination Drawing(s) to the Resident Engineer for his/her review. The Resident Engineer may call as many meetings as necessary with the Contractor, including attendance by applicable subcontractors, and may call on the services of the Design Consultant where necessary, to resolve any conflicts that become apparent.

C. Upon resolution of any conflicts, the Contractor must provide a final Coordination Drawing(s) which will become the Master Coordination Drawing(s). The Master Coordination Drawing(s) must be signed and dated by the Contractor to indicate acceptance of the arrangement of the Work.

D. A reproducible copy of the Master Coordination Drawing(s) must be provided by the Contractor to each of the appropriate subcontractor(s), the Resident Engineer, and the Design Consultant for information.

E. Shop Drawings must not be submitted prior to acceptance of the final coordinated drawings and must be prepared in accordance with the Master Coordination Drawing(s). No work will be permitted without accepted Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.

1.6 SUBMITTAL PROCEDURES:

A. Refer to Section 01 35 03 GENERAL MECHANICAL REQUIREMENTS and Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS for additional Submittal requirements involving electrical and mechanical work or equipment of any nature called for in the Project.

B. Coordination: Coordinate preparation and processing of Submittals with performance of construction activities.

1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals, and related activities that require sequential activities, with the Submittal Schedule specified in Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION.
2. Coordinate transmittal of different types of Submittals for related parts of the Work so processing will not be delayed because of need to review Submittals concurrently for coordination.
3. The Commissioner reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.

C. Submittals Schedule: The Submittals Schedule is set forth in Schedule F, which is included in the Addendum.

D. Identification: Place a permanent label or title block on each Submittal for identification.

1. Indicate name of firm or entity that prepared each Submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Consultant.

3. Include the following minimum information on label for processing and recording action taken:
   a. Project name, DDC Project Number, and Contract Number
   b. Date
   c. Name and address of Design Consultant
   d. Name and address of Contractor
   e. Name and address of subcontractor
   f. Name and address of supplier
   g. Name of manufacturer
   h. Submittal number or other unique identifier, including revision identifier
   i. Number and title of appropriate Specification Section
   j. Drawing number and detail references, as appropriate
   k. Location(s) where product is to be installed, as appropriate
   l. Other necessary identification

E. Transmittal:

1. Package each Submittal individually and appropriately for transmittal and handling. Transmit each Submittal using a transmittal form in triplicate. Transmittals received from sources other than the Contractor will be returned without review. Re-submission of the same drawings or product data must bear the original number of the prior submission and the original titles.

2. Transmittal Form: Provide locations on form for the following information:

   a. Project name, DDC Project number and Contract Number
   b. Date
   c. Destination (To:)
   d. Source (From:)
   e. Names of Contractor, subcontractor, manufacturer, and supplier
   f. Category and type of Submittal
   g. Submittal purpose and description
   h. Specification Section number and title
   i. Drawing number and detail references, as appropriate
   j. Transmittal number, numbered consecutively
   k. Submittal and transmittal distribution record
   l. Remarks
   m. Signature of transmitter

F. Shop Drawings:

1. Procedures for Preparing, Forwarding, Checking, and Returning all Shop Drawings must be, generally, as follows:

   a. The Contractor must make available to its subcontractors the necessary Contract Documents and must instruct such subcontractor to determine dimensions and conditions in the field, particularly in reference to coordination between the trade subcontractors. The Contractor must direct its subcontractors to prepare Shop Drawings for submission to the Design Consultant in accordance with the requirements of these General Conditions. The Contractor must also direct its subcontractors to "Ring Up" corrections made on all re-submissions for approval, so as to be readily seen, and that the appropriate symbol per item 2 below (e.g., "GC") be used to identify the source of the correction or information that has been added.

      The Contractor must:

      1. Review and be responsible for information shown on its subcontractor's Shop and Installation Drawings and manufacturers' data, and conformity to Contract Documents.
      2. "Ring Up" corrections made on all submissions for approval, so as to be readily seen, and that the symbol "GC", "PL", "HVAC", or "EL" be used to indicate that the correction and/or information added was made by the Contractor and/or its subcontractor(s).
      3. Clearly designate which entity is to perform the Work when the term, "work by others" or other similar phrases are indicated on the Contract Drawings before submission to the Design Consultant.
      4. Stamp submissions "Recommended for Acceptance", date and forward to the Design Consultant.

2. The Contractor must promptly prepare and submit project specific layout detail and Shop Drawings of such parts of the Work as are indicated in the Specifications, Schedule F of the Addendum or as required. These Shop Drawings must be made in accordance with the Contract Drawings, Specifications and Supplementary Drawings, if any. The Shop Drawings must be accurate and distinct and give all the dimensions required for the fabrication, erection, and installation of the Work.

3. Size of Drawings: The Shop Drawings, unless otherwise directed, must be on sheets of the same size as the Contract Drawings, drawn accurately and of sufficient scale to be legible, with a one half (1/2) inch marginal space on each side and a two (2) inch marginal space for binding on the left side.

4. Scope of Drawings: Shop Drawings must be numbered consecutively and must accurately and distinctly represent all aspects of the Work, including without limitation the following:

   a. All working and erection dimensions
   b. Arrangements and sectional views
   c. Necessary details, including performance characteristics and complete information for making necessary connections with other Work
   d. Kinds of materials including thickness and finishes
   e. Identification of products
   f. Fabrication and installation drawings
   g. Roughing-in and setting diagrams
   h. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
   i. Shop work manufacturing instructions
   j. Templates and patterns
   k. Schedules
   l. Design calculations
   m. Compliance with specified standards
   n. Notation of coordination requirements
   o. Notation of dimensions established by field measurement
   p. Relationship to adjoining construction clearly indicated
   q. Seal and signature of professional engineer if specified
   r. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring
   s. All other information necessary for the Work and/or required by the Commissioner

5. Titles and Reference: Shop Drawings must be dated and contain:
   a. Name of the Project, DDC Project Number, and Contract Number
   b. The descriptive names of equipment or materials covered by the Contract Drawings and the classified item number or numbers.
   c. The locations or points and sequence at which materials, or equipment, are to be installed in the Work
   d. Cross references to the section number, detail number, and paragraph number of the Contract Specifications
   e. Cross references to the sheet number, detail number, etc., of the Contract Drawings

6. Field Measurements: In addition to the above requirements, the Shop Drawings must be signed by the Contractor and, if applicable, the subcontractor responsible for preparation of the Shop Drawings. Each Shop Drawing must be stamped with the following wording:

   FIELD MEASUREMENTS: The Contractor certifies that it has verified and supplemented the Contract Drawings by taking all required field measurements, which said measurements correctly reflect all field conditions and that this Shop Drawing incorporates said measurements.

7. Contractor's Statement with Submittal: Any Submittal by the Contractor for acceptance, including without limitation, all dimensional drawings of equipment, blueprints, catalogues, models, samples and other data relative to the equipment, the materials, the Work or any part thereof, must be accompanied by a statement that the Submittal has been examined by the Contractor and that everything shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If there is any discrepancy between what is shown in the Submittal and the requirements of the Contract Drawings and Specifications, the Contractor must, in its statement, list

and clearly describe each discrepancy.

Acceptance will be given based upon the Contractor's representation that what is shown in the Submittal is in accordance with the requirements of the Contract Drawings and Specifications. If the Contractor's statement indicates any discrepancy between what is shown in the Submittal and the requirements of the Contract Drawings and Specifications, such change is subject to review and prior written acceptance by the Design Consultant. In addition, such change may require a change order in accordance with Article 25 of the Contract. In the event any such change is approved, any additional expense or increased cost in connection with the change is the sole responsibility of the Contractor.

8. Submission of Shop Drawings:

   a. Initial Submission: The Contractor must submit seven (7) copies, or as requested by the Resident Engineer, of each Shop Drawing to the Design Consultant for his/her review and acceptance. If PDF drawings are requested by the Resident Engineer, they must be provided in an original "printed from digital" format, and not scanned. The Design Consultant will transmit Shop Drawings to appropriate sub-consultants for review and acceptance, including Commissioning Authority/Agent as applicable. A satisfactory Shop Drawing will be stamped "No Exceptions Taken", be dated and distributed by the Design Consultant as follows:
      1) Two (2) copies thereof will be returned to the Contractor by letter
      2) Three (3) copies of the approved Shop Drawing and copy of the transmittal letter to the Contractor will be forwarded to DDC
      3) One copy will be retained by the Design Consultant
      4) One copy will be forwarded / retained by sub-consultant(s) as appropriate

      Should the Shop Drawing(s) be "Rejected" or noted "Revise and Resubmit" by the Design Consultant, the Design Consultant will return the Shop Drawings to the Contractor with the necessary corrections and changes to be made as indicated thereon.

   b. Revisions: The Contractor must make such corrections and changes and again submit seven (7) copies of each shop drawing to the Design Consultant. The Contractor must revise and resubmit the Shop Drawing as required by the Design Consultant until the Shop Drawings are stamped "No Exceptions Taken". However, Shop Drawings which have been stamped "Make Corrections Noted" will be considered an "Acceptable" Shop Drawing and NEED NOT be resubmitted.

   c. Commencement of Work: No Work or fabrication called for by the Shop Drawings must be done until the acceptance of the said drawings by the Design Consultant is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractor's subcontractors which Shop Drawing indicated Work related to, adjacent to, impinging upon, or affecting Work to be done by other subcontractors must be transmitted to the subcontractors so affected. [These accepted Shop Drawings must be distributed to the affected subcontractors when required with a copy of the transmittal to the Resident Engineer.]

   d. Variations: If the Shop Drawings show variations from the Contract requirements because of standard shop practice or other reasons, the Contractor must make specific mention of such variations in its letter of Submittal. Acceptance of the Shop Drawings must constitute acceptance of the subject matter thereof only and not of any structural apparatus shown or indicated.

G. Product Data:

   1. General: Except as otherwise prescribed herein, the submission, review, and acceptance of Product Data and Catalogue cuts must conform to the procedures specified in subsection 1.6 F, Shop Drawings.

2. If information must be specially prepared for the Submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.

3. Mark each copy of the Submittal to show which products and options are applicable.

4. Include the following information, as applicable:

   a. Manufacturer's written recommendations.
   b. Manufacturer's product specifications.
   c. Manufacturer's installation instructions.
   d. Standard color charts.
   e. Manufacturer's catalog cuts.
   f. Wiring diagrams showing factory-installed wiring.
   g. Printed performance curves.
   h. Operational range diagrams.
   i. Mill reports.
   j. Standard product operation and maintenance manuals.
   k. Compliance with specified referenced standards.
   l. Testing by recognized testing agency.
   m. Application of testing agency labels and seals.
   n. Notation of coordination requirements.

5. Submit Product Data before or concurrent with Samples.

6. Submission of Product Data:

   a. Initial Submission: The Contractor must submit seven (7) sets of Product Data to the Design Consultant for his/her review and acceptance. The Design Consultant will transmit Product Data to appropriate sub-consultants for review and acceptance, including Commissioning Authority/Agent as applicable. A satisfactory catalogue cut will be stamped "No Exception Taken", be dated and distributed as follows:

      1) Two (2) copies thereof will be returned to the Contractor by letter

      2) Three (3) copies of the Product Data and copy of the transmittal letter to the Contractor will be forwarded to DDC

      3) One copy will be retained by the Design Consultant

      4) One copy will be forwarded / retained by sub-consultant(s) as appropriate

      Should the Product Data be “Rejected” or noted “Revise and Resubmit” by the Design Consultant, the Design Consultant will return one (1) set of such Product Data to the Contractor with the necessary corrections and changes to be made indicated and one (1) set to DDC.

7. Revisions: The Contractor must make such corrections and changes and again submit seven (7) copies of each Product Data for the review of the Design Consultant. The Contractor must revise and resubmit the Product Data as required by the Design Consultant until the submission is stamped “No Exceptions Taken” by the Design Consultant. However, Product Data which has been stamped "Make Corrections Noted" must be considered an "Accepted" Product Data and NEED NOT be resubmitted.

H. Samples of Materials:

1. For samples of materials involving electrical Work of any nature, refer to Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS.

2. Samples must be in triplicate or as directed by the Resident Engineer, and of sufficient size to show the quality, type, range of color, finish and texture of the material.

3. Each of the samples must be labeled as follows:

   a. Name of the Project, DDC Project Number and Contract Number
   b. Name and quality of the material
   c. Date
   d. Name of Contractor, subcontractor, manufacturer and supplier
   e. Related Specification or Contract Drawing reference to the samples submitted

4. A letter of transmittal, in triplicate, from the Contractor requesting acceptance must accompany all such samples.

5. Transportation charges to the Design Consultant's office must be prepaid on all samples forwarded.

6. Samples for testing purposes must be as required in the Specifications.

7. Samples on Display: When samples are specified to be equal to approved product, they must be carefully examined by the Contractor and by those whom the Contractor expects to employ for the furnishing of such materials.

8. Timely Submissions Log/Schedule: Samples must be submitted in accordance with approved Shop Drawing log so as to permit proper consideration without delaying any operation under the Project. Materials should not be ordered until acceptance is received, in writing, from the Design Consultant. All materials must be furnished equal in every respect to the accepted samples.

9. The acceptance of any samples will be given as promptly as possible, and will be only for the characteristic color, texture, strength, or other feature of the material named in such acceptance, and no other. When this acceptance is issued by the Design Consultant, it is done with the distinct understanding that the materials to be furnished will fully and completely comply with the Specifications, the determination of which may be made at some later date by a laboratory test or by other procedure. Use of materials will be permitted only so long as the quality remains equal to the approved samples and complies in every respect with the Specifications, and the colors and textures of the samples on file in the office of the Design Consultant, for the Project.

10. Acceptability of test Data: The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.

11. Valuable Samples: Valuable samples, such as hardware, plumbing and electrical fixtures, etc., not destroyed by inspection or test, will be returned to the Contractor and may be incorporated into the Work after all questions of acceptability have been settled, providing suitable permanent records are made as to the location of the samples, their properties, etc.

12. Equivalent Quality: Any material, article and/or equipment which is designated in the Drawings and/or Specifications by a number in the catalogue of any manufacturer or by a manufacturer's grade or trade name is designated for the purpose of describing the material, article and/or equipment and fixing the standard of performance and/or function, as well as the quality and/or finish. Any material, article and/or equipment which is other than what is specified in the Drawings and/or Specifications will only be accepted if the Commissioner makes a written determination that such material, article and/or equipment is equivalent to that which is specified in the Drawings and/or Specifications.

13. The submission of any material, article and/or equipment as the equal of any material, article and/or equipment set forth in the Drawings and/or Specifications as a standard must be accompanied by any and all information essential for determining whether such proposed material, article and/or equipment is equivalent to that which is specified. Such information must include, without limitation, illustrations, drawings, descriptions, catalogues, records of tests, samples, as well as information regarding the finish, durability and satisfactory use of such proposed material, article and/or equipment under similar operating conditions.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.7

1.7 LEED SUBMITTALS:

A. Comply with Submittal requirements specified in the following sections:

1. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL;
2. Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS, as applicable;
3. Section 01 81 13.13 VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS;
4. Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS;
5. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS; and/or,
6. Section 01 91 15 BUILDING ENCLOSURE COMMISSIONING REQUIREMENTS.

B. LEED Building Submittal information must be assembled into one package per each applicable Specification Section, separate from all other non-LEED Submittals. Each Submittal package must have a separate transmittal and identification as described in Subsection 1.5 herein.

C. Number of Copies: Submit four (4) copies of LEED Submittals, in accordance with procedure described in Article 1.5 herein, unless otherwise indicated.

D. Material Safety Data Sheets (MSDSs) for LEED Certification: Submit information necessary to show compliance with LEED certification requirements, which will be the limit of the Design Consultant's review for LEED compliance.

1. Designated LEED Submittals that include non-LEED MSDS data will not be reviewed. The entire Submittal will be returned for re-submission.

E. Product Cut Sheets and/or Shop Drawings for LEED Certification: Provide product cut sheets and/or shop drawings with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project. For detailed requirements refer to Subsection 1.6 of Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 PROJECTS, or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.

1. Provide the quantity, length, area, volume, weight, and/or cost of each product submitted as required to satisfy LEED documentation requirements. Refer to Subsection 1.6 of Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 PROJECTS.

1.8 ULTRA LOW SULFUR DIESEL FUEL AND BEST AVAILABLE TECHNOLOGY REPORTING:

A. In accordance with Section 01 10 00 SUMMARY, Subsection 1.10 E**,** the Contractor must submit reports to the Commissioner regarding the use of Ultra Low Sulfur Diesel Fuel and Best Available Technology (BAT) in Non road Vehicles. Submission of such reports must be in accordance with the schedule, format, directions and procedures established by the Commissioner.

1.9 CONSTRUCTION PHOTOGRAPHS AND VIDEO RECORDINGS:

A. Submit construction progress photographs and Video recordings in accordance with requirements of Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.

1.10 AS-BUILT DOCUMENTS:

A. Submit all as-built documents in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 33 00

SECTION 01 35 03

GENERAL MECHANICAL REQUIREMENTS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 35 03

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. The General Mechanical Requirements contained herein must be followed by the Contractor, as well as its subcontractor for HVAC work. This Section sets forth the General Requirements applicable to mechanical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Section and the requirements of the Specifications and/or the Contract Drawings, whichever requirement is the most stringent must take precedence.

1.3 RELATED SECTIONS: Include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 33 00 SUBMITTAL PROCEDURES
C. Section 01 35 06 GENERAL ELECTRICAL REQUIREMENTS
D. Section 01 42 00 REFERENCES
E. Section 01 77 00 CLOSEOUT PROCEDURES
F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

A. CONCEALED PIPING AND DUCTS: piping and ducts hidden from sight in masonry or other construction, in floor fill, trenches, partitions, hung ceilings, furred spaces, pipe shafts and in service tunnels not used for passage. Where piping and ducts run in areas that have hung ceilings, such piping and ducts must be installed in the hung ceilings. For Work on existing piping, any insulation on such existing piping is to be tested for asbestos and abated if found to be positive by a certified asbestos contractor. Such testing and abatement must occur prior to the performance of any Work on these pipes.

1.5 SUBMITTALS:

A. INTENT OF MECHANICAL CONTRACT DRAWINGS – Mechanical Contract Drawings are, in part, diagrammatic and show the general arrangement of the equipment, ducts, and piping included in the Contract and the approximate size and location of the equipment.

B. The Contractor must follow these Contract Drawings in laying out the Work and verify the spaces in which it will be installed. The Contractor must submit, as directed, Mechanical Shop Drawings, roughing drawings,

manufacturer's Shop Drawings, field drawings, cuts, bulletins, etc., of all materials, equipment and methods of installation shown or specified in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. Submit sheet metal shop standards. Submit manufacturer's product data including gauges, materials, types of joints, scaling materials and installations for metal ductwork materials and products.
2. Submit scaled layout drawing (3/8"=1') of metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, slopes of horizontal runs, wall and floor penetrations and connections. Show modifications of indicated requirements made to conform to local shop practice and how those modifications ensure that free area, materials and rigidity are not reduced. Layouts should include all the room plans, mechanical equipment rooms and penthouses. Method of attachment of duct hangers to building construction all with the support details. Coordinate Shop Drawings with related trades prior to submission.
3. Indicate duct fittings, particulars such as gauges, sizes, welds and configuration prior to start of work for low-pressure systems.
4. Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data and shop drawings in maintenance manual.

1.6 ACCESS:

A. All Work must be installed by the Contractor to readily provide access for inspection, operation, maintenance and repair. Minor deviations from the arrangement indicated on the Contract Drawings may be made to accomplish this, but they must not be made without prior written approval by the Commissioner.

1.7 CHANGES IN PIPING, DUCTS, AND EQUIPMENT:

A. Wherever field conditions are such that for proper execution of the Work, reasonable changes in location of piping, ducts, and equipment are necessary and required, the Contractor must make such changes as directed and approved, without extra cost to the City.

1.8 CLEANING OF PIPING, DUCTS, AND EQUIPMENT:

A. Piping, ducts, and equipment must be thoroughly cleaned by the Contractor of all dirt, cuttings, and other foreign substances. Should any pipe, duct, or other part of the several systems be obstructed by any foreign matter, the Contractor will be required to pay for disconnecting, cleaning, and reconnecting wherever necessary for the purpose of locating and removing obstructions. The Contractor must pay for repairs to other work damaged in the course of removing obstructions. For work on existing piping, ducts, and equipment, the Contractor must pay special attention during this task so as not to disturb the insulation on such piping, ducts, or equipment.

1.9 STANDARDIZATION OF SIMILAR EQUIPMENT:

A. Unless otherwise particularly specified, all equipment of the same kind, type, or classification, used for identical purposes, must be the product of one (1) manufacturer.

1.10 SUPPORTING STRUCTURES DESIGNED BY THE CONTRACTOR:

A. Unless otherwise specified, supporting structures for equipment to be furnished by the Contractor must be designed by an Engineer licensed in New York State retained by the Contractor. Supporting structures must be built by the Contractor of sufficient strength to safely withstand all stresses to which they may be

subjected, within permissible deflections, and must meet the following standards:

1. Structural Steel - ASTM Standard Specifications, AISC and New York City Construction Codes.
2. Concrete for supports for equipment must conform to the Specifications for concrete herein, but in no case must be less than the requirements of the New York City Construction Codes for average concrete.
3. Steel reinforcement for concrete must be of intermediate grade and must meet the requirements of the Standard Specifications for Billet Steel-Concrete Reinforcement Bars, ASTM.
4. Drawings and calculations must be submitted for review and acceptance in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1.11 ELIMINATION OF NOISE:

A. All systems and/or equipment provided under the Contract must operate without objectionable noise or vibration.

B. Should operation of any one or more of the several systems produce noise or vibration which is, in the opinion of the Commissioner, objectionable, the Contractor must, at its own expense, make changes in piping, equipment, etc., and do all work necessary to eliminate objectionable noise or vibration.

C. Should noise or vibration that is found objectionable by the Commissioner be transmitted by any pipe or portions of the structure from systems and/or equipment installed under the Contract, the Contractor must, at its own expense, install such insulators and make such changes in or additions to the installations as may be necessary to prevent transmission of this noise or vibration.

1.12 PRELIMINARY FIELD TEST:

A. As soon as conditions permit, the Contractor must furnish all necessary labor and materials for, and must make preliminary field tests of the equipment to ascertain compliance with the requirements of the Contract. If the preliminary field tests disclose equipment that does not comply with the Contract, the Contractor must, prior to the acceptance test, make all changes, adjustments, and replacements as required.

1.13 INSTRUCTIONS ON OPERATION:

A. At the time the equipment is placed in permanent operation by the City, the Contractor must make all adjustments and tests required by the Commissioner to prove that such equipment is in proper and satisfactory operating condition. The Contractor must instruct the City's operating personnel on the proper maintenance and operation of the equipment for the period of time called for in the Specifications.

1.14 CERTIFICATES:

A. On completion of the Work, the Contractor must obtain certificates of inspection, approval, and acceptance, and be in compliance with all laws from all agencies and/or entities having jurisdiction over the Work and must deliver these certificates to the Commissioner in accordance with Section 01 77 00 CLOSEOUT PROCEDURES. The Work will not be deemed substantially complete until the certificates have been delivered.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 35 03

(No Text on This Page)

SECTION 01 35 06
GENERAL ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section sets forth the General Requirements applicable to electrical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Section and the requirements of the Project Specifications and/or the Contract Drawings, whichever requirement is the most stringent, as determined by the Commissioner, must take precedence.

B. This Section includes the following:

1. Related Sections
2. Definitions
3. Procedure for Electrical Approval
4. Submittals
5. Electrical Installation Procedures
6. Electrical Conduit System Including Boxes (Pull, Junction and Outlet)
7. Electrical Wiring Devices
8. Electrical Conductors and Terminations
9. Circuit Protective Devices
10. Distribution Centers
11. Motors
12. Motor Control Equipment

1.3 RELATED SECTIONS: Include without limitation the following:

A.	Section 01 10 00	SUMMARY
B.	Section 01 33 00	SUBMITTAL PROCEDURES
C.	Section 01 35 03	GENERAL MECHANICAL REQUIREMENTS
D.	Section 01 42 00	REFERENCES
E.	Section 01 77 00	CLOSEOUT PROCEDURES
F.	Section 01 78 39	CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

A. WIRING: contains wire and raceway (rigid steel, heavy wall conduit unless specifically indicated otherwise).

B. POWER WIRING: wiring from a panel board or other specified source to a starter (if required), then to a disconnect (if required), then to the final point of usage such as a motor, unit, or device.

C. CONTROL and/or INTERLOCK WIRING: wiring that signals the device to operate or shut down in response to a signal from a remote control device such as a temperature, smoke, pressure, float, etc. device (starters and disconnect switches are not included in this definition) regardless of the voltage required for the controlling device.

D. RIGID STEEL CONDUIT: rigid steel heavy wall conduit that is hot-dip galvanized inside and outside. The conduit must meet the requirements of the latest edition, as amended, of the "Standard for Rigid Steel Conduit" of the Underwriters' Laboratories, Inc. Unless otherwise specified in the Specifications or indicated on the Contract Drawings, rigid steel conduit must be used for all exposed work, all underground conduits in contact with earth, and fire alarms systems, as required by the New York City Construction Codes.

E. ELECTRICAL METALLIC TUBING (EMT): industry standard thin wall conduit of galvanized steel. All elbows, bends, couplings and similar fittings which are installed as a part of the conduit system must be compatible for use with electric metallic tubing. Couplings and terminating fittings must be of the pressure type as approved by the Commissioner. Set screw fittings will not be acceptable. EMT must meet the requirements of the latest edition, as amended, of the "Standard for Electrical Metallic Tubing" of the Underwriters Laboratories Inc. EMT may only be used where specifically indicated. In no case will EMT be permitted in spaces other than hung ceilings and dry wall partitions.

F. FLEXIBLE METALLIC CONDUIT (FMC): a conduit made through the coiling of a self-interlocking ribbed strip of aluminum or steel, forming a hollow tube through which wires can be pulled. For final connections to motors and motorized equipment, not more than a 4' - 0" length of flexible conduit may be used. For watertight installations, this conduit must be of a watertight type, attached with watertight glands or fittings for final connections from outlet box to recessed lighting fixtures and in locations only where specifically permitted by the Specifications or Contract Drawings.

1.5 PROCEDURE FOR ELECTRICAL APPROVAL:

This Section sets forth General Electrical information, as well as required approvals for all electrical work required for the Project, including ancillary electrical work which may be included in the work of other trade subcontractors.

A. ELECTRIC SERVICE: The electric service supply is subject to commercial and operating variation of the utility company. Proper provision must be made to have all apparatus operate normally under these conditions.

B. ACCEPTANCE: Acceptance and approval of the Work will be contingent upon the inspection and test of the installation by the City regulatory agency.

C. TESTS: The Contractor must notify the Commissioner when the Contractor has completed the work and is ready to have it inspected and tested. Upon completion of the Work, tests must be made as required by the Commissioner of all electrical materials, electrical and associated mechanical equipment, and of appliances installed hereunder. The Contractor must furnish all labor and material for such tests. Should the tests show that any of the material, appliances or workmanship is not first class or not in compliance with the Contract, on written notice the Contractor must remove and promptly replace the materials to be in conformity with the Contract.

D. CERTIFICATE OF THE BUREAU OF ELECTRICAL CONTROL, OF THE DEPARTMENT OF BUILDINGS (B.E.C.): Prior to requesting a substantial completion inspection, the Contractor must file a Certificate of Inspection issued by B.E.C. On completion of the Work, the Contractor must obtain certificates of inspection, approval, acceptance and compliance from all agencies and/or entities having jurisdiction over the work and must deliver these certificates to the Commissioner in accordance with Section 01 77 00 CLOSEOUT PROCEDURES.

E. RESPONSIBILITY FOR CARE AND PROTECTION OF EQUIPMENT:

1. The Contractor furnishing any equipment must be responsible for the equipment until it has been inspected, tested and accepted, in accordance with the requirements of the Contract.

2. After delivery, before and after installation, the Contractor must protect all equipment against theft, injury or damage from all causes. The Contractor must carefully store all equipment received for work which is not immediately installed. If any equipment has been subject to possible injury by water, it must be thoroughly dried out and put through a special dielectric test as directed by the Commissioner, at the expense of the Contractor or replaced by the Contractor without additional cost to the City.

F. UNIFORMITY OF EQUIPMENT: Any two (2) or more pieces of equipment, apparatus or materials of the same kind, type, or classification, which are intended to be used for identical types of service, must be made by the same manufacturer.

1.6 SUBMITTALS:

A. CONTRACTOR'S ELECTRICAL DRAWINGS AND SAMPLES FOR APPROVAL:

1. The Contractor must submit to the Commissioner for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, complete dimensional drawings of all equipment, wiring diagrams, motor test data, details of control, installation layouts showing all details and locations and including all schedules, and descriptions and supplementary data to comprise complete working drawings and instructions for the performance of the Work. A description of the operation of the equipment and controls must be included. A letter, in triplicate, must accompany each submittal.

2. The Contractor must submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, duplicate samples of such materials and appliances as may be requested by the Commissioner for approval. These samples must be properly tagged for identification and submitted for examination and test. After the samples are approved, one (1) sample will be returned to the Contractor and the other sample will be filed in the office of the Commissioner's representative for inspection use. After the Contract is completed, the second set of samples will be returned to the Contractor.

B. TIMELINESS: All material must be submitted in accordance with the submittal schedule in sufficient time for the progress of construction. Failure to promptly submit acceptable samples and dimensional drawings of equipment will not be accepted as grounds for an extension of time. The Commissioner may decline to consider submittals unless all related items are submitted at the same time.

C. CONTRACTOR'S STATEMENT WITH SUBMITTALS: Contractor must submit a statement in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.

D. BULLETINS AND INSTRUCTIONS: The Contractor must furnish and deliver to the Commissioner in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS and Section 01 77 00 CLOSEOUT PROCEDURES, after acceptance of the work, four (4) complete sets of instructions, technical bulletins and any other printed matter (diagrams, prints, or drawings) required to provide complete information for the proper operation, maintenance and repair of the equipment and the ordering of spare parts.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 ELECTRICAL INSTALLATION PROCEDURES:

This Sub-Section sets forth the General Installation Procedure that must apply to all electrical work and electrical equipment appearing in the Contract.

(Refer to Sub-Section 1.4 DEFINITIONS for terms used in this section)

A. INTENT OF CONTRACT DOCUMENTS: The Drawings and Specifications are to be interpreted as a means of conveying the scope and intent of the work without giving every minor electrical detail. It is intended, nevertheless, that the Contractor must provide whatever labor and materials are found necessary, within the scope of the Contract, for the successful operation of the installation. Specific details of individual installations are to be finally decided upon when the Contractor submits Working or Shop Drawings for approval to DDC. Whenever there are two (2) or more methods to complete Project work within the Contract scope, the Commissioner reserves the right to choose that method which, in the Commissioner's opinion, will afford the most satisfactory performance, lasting qualities, and access for repairs, even if this selection is the costliest.

B. SCHEMATIC PLANS – APPROXIMATE LOCATIONS: Conduits and wiring are shown on the plans for diagrammatic purposes only. Therefore, conduit layouts may not necessarily give the actual physical route of the conduits. The Contractor who installs a conduit system will also be required, as part of the work, to furnish and install all hangers and pull-boxes, including any special pull-boxes found necessary to overcome interferences, and to facilitate the pulling of electrical cables. Similarly, the locations of equipment, appliances, outlets and other items shown on Contract Drawings are only approximate and are to be definitively established when equipment Shop Drawings are submitted and approved by DDC during construction.

C. SLEEVES: required for conduits passing through walls or floors; must be furnished and set by the Contractor installing the conduits. Sleeves in waterproofed floors must be provided with flashing extending twelve (12) inches in all directions from sleeve and secured to waterproofing. Flashing must be turned down into space between pipe and sleeve and caulked watertight. Flashing must be twenty (20) ounces cold rolled copper. Sleeves must be supplied with welded flanges similar to those supplied by the subcontractor for Plumbing Work and must extend one (1) inch above finished floor.

D. COORDINATION: The Contractor must keep in close touch with the construction progress and promptly obtain the necessary information for the accurate placement of its work well before Project construction operations obstruct its work. The Contractor is to consult all other Contract Drawings, as well as approved equipment Shop Drawings on file in the Resident Engineer's Field Office. This will aid in avoiding interferences, omissions, and errors in the electrical installation.

E. RESTORATION: If drilling or cutting is done on finished surfaces of equipment or the structure, any marring of the surface must be repaired or replaced by the Contractor. The Contractor must be held responsible for corrective restoration due to its cutting or drilling, and for any damage to the Project or its contents caused by the Contractor or the Contractor's workers. If any piercing of waterproofing occurs because of the installation of the work, the Contractor must restore the waterproofing, at its own expense, to the satisfaction of the Commissioner.

F. ELECTRICAL WORK AT SITE: The Contractor furnishing equipment consisting of a number of related electrical devices or appliances, mounted in a single enclosure, or on a common base, must furnish this unit, ready for connection and operation, complete with internal wiring, connections, terminal boxes with

copper connectors and/or lugs and ample electrical leads. The cost of any wiring, re-wiring, or other work required to be done on this unit in the field, must be borne by the Contractor, without additional cost to the City.

G. COOPERATION AMONG SUBCONTRACTORS: Whenever an electrically operated unit or system involves the combined work of several subcontractors for its installation and successful operation, the Contractor must require each subcontractor to exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2

3.2 ELECTRICAL CONDUIT SYSTEM INCLUDING BOXES (PULL, JUNCTION AND OUTLET):

This Sub-Section sets forth the requirements applying to the installation of electrical conduits, boxes or fittings. Rigid steel conduit must be used throughout, unless otherwise directed by the Commissioner. Where the word 'conduit' is used without a modifier such as, rigid steel, EMT, etc., must be interpreted to mean rigid steel, heavy wall, threaded conduit.

(Refer to Sub-Section 1.4 DEFINITIONS for terms used in this section)

A. INSTALLATIONS AND APPLICATIONS:

1. Unless otherwise specified or indicated on the Contract Drawings, conduit runs must be installed concealed in finished spaces.

2. CONDUIT SIZES: The sizes of conduits must be as indicated on the Contract Drawings. Wherever conduit sizes are not indicated, the conduit must meet the requirements of the New York City Electrical Code to accommodate the conductors to be installed therein.

3. Conduits must be reamed smooth after cutting. No running threads will be permitted. Universal type couplings must be used where required. Conduit joints must be screwed up to butt. Empty conduits after installation must have all open ends temporarily plugged to prevent the entrance of water or other foreign matter.

4. Conduits installed in concrete or masonry must be securely held in place during pouring and construction operations. A group of conduits terminating together must be held in place by a template.

5. UNDERGROUND STEEL CONDUITS: Unless otherwise specified, all underground steel conduits in contact with earth must be encased by the Contractor who installs them, in a covering of not less than two (2) inches of an approved concrete mixture. Concrete mix must be one (1) part cement to four and one-half (4 ½) parts of fine and coarse aggregate.

6. EXCAVATION RESTORATION PERMITS: When installing underground conduits, duct banks or manholes, the Contractor must perform the work of cutting pavement, excavation shoring, keeping trenches or holes pumped dry, backfilling, restoration of surfaces to original condition and removal of excess earth and rubbish from premises. During the work, the Contractor must provide adequate crossovers, protective barriers, lamps, flags, etc., to safeguard traffic and the public. When the work is in a public highway or street, the Contractor must secure and pay for all necessary permits, inspection fees, and the cost of repaving.

7. EXPOSED CONDUIT SUPPORTS: Exposed conduits must be supported by Galvanized hangers with necessary inserts, beam clamps of approved design, or attached to walls or ceilings by expansion bolts. Exposed conduits must be supported or fastened at intervals not more than five (5) feet.

8. Exposed conduits must be installed parallel or at right angles to ceilings, walls and partitions. Where direction changes of exposed conduit cannot be made with neat bends, as may be required around beams or columns, conduit-type fittings must be used.

9. Conduit must be installed with an expansion joint approved by the Commissioner in the following conditions:

    a. Wherever the conduit crosses a building expansion joint, the Contractor will be held responsible for determining where the building expansion joints are located.

    b. Every 200 feet, when in straight runs of 200 feet or longer.

10. Conduits may only enter and leave a floating slab in a vertical direction, and only in an approved manner. Horizontal entries into floating slabs are not permitted.

11. Conduits installed in pipe shafts must be properly supported to carry the total weight of the raceway system complete with cable. In addition, at least one (1) horizontal brace per 10 ft. section must be provided to assure stability of the raceway system.

12. BUSHINGS AND LOCKNUTS: Approved bushings and locknuts must be used wherever conduits enter outlet boxes, switch boxes, pull boxes, panel board cabinets, etc.

13. CONDUIT BENDS: must be made without kinking conduit or appreciably reducing the internal diameter. All bends in conduits of two (2) inch in diameter or larger must be made with a hydraulic or power pipe bender. The radius of the inner edge of any bend must not be less than six (6) times the internal diameter of the conduit where rubber covered conductors are to be installed, and not less than ten (10) times the internal diameter of the conduit where lead covered conductors are to be used. Long gradual sweeps will be required, rather than sharp bends, when changes of direction are necessary.

14. EMPTY CONDUITS

    a. TESTS: All conduits and ducts required to be installed and left empty must be tested for clear bore and correct installation by the Contractor using a ball mandrel and a brush and snake before the installation will be accepted. The ball must be turned to approximately 85% of the internal diameter of the raceway to be tested. Two (2) short wire brushes must be included in the mandrel assembly. Snaking of conduits, ducts, etc., must be performed by the Contractor in the presence of the Resident Engineer. Any conduits or ducts which reject the mandrel must be cleared at once with the Contractor bearing all costs, such as chopping concrete, to replace the defective conduit and restore the surface to its original condition.

    b. TAGS: Numbers or letters must be assigned to the various conduit runs, and as they test clear they must be identified by a fiber tag not less than 1-¼ inch width, attached by means of a nylon cord. All conduit terminations in panel, splice or pull boxes, as well as those out of the floor or ceiling, must be tagged.

    c. TEST RECORDS: As the conduit runs clear, a record must be kept under the heading of "Empty Conduit Tested, Left Clear, Tagged and Capped" showing conduit designation, diameter, location, date tested and by whom. When complete, this record must be signed by the Resident Engineer and submitted in triplicate for approval. This record must be entered on the Contract Record Drawings under Section 01 78 39 CONTRACT RECORD DOCUMENTS.

    d. CAPPING: After test, all empty conduit and duct openings, must be capped or plugged by the Contractor as directed.

    e. DRAG LINES: A drag line must be left in all empty conduit.

B. BOXES:

1. The Contractor must furnish and erect all pull boxes indicated on the plans or where required. Sides, top and bottom of pull boxes must be Galvanized coated and must be built of No. 12 USSG steel reinforced at corners by substantial angle irons and riveted or welded to plates. Bottom or side of pull boxes must be removable and held in place by corrosion resistant machine screws. Pull boxes in damp locations must have threaded hubs and gaskets and be NEMA 4X. All pull boxes must be suspended from ceiling or walls in the most substantial manner.

2. In centering outlets, the Contractor is cautioned to allow for overhead pipes, ducts and other obstructions, and for variations in arrangement and thickness of fireproofing, soundproofing and plastering. Precaution should be exercised regarding the location of window and door trims, paneling, etc. Mistakes resulting from failure to exercise precaution must be corrected by the Contractor at no additional cost to the City. Outlets in hung ceilings must be supported from the black iron or structure.

3. The exact location of all outlets in finished rooms must be as directed by the Commissioner. When the interior finish has been applied, the Contractor must make any necessary adjustment of its work to properly center the outlets. All outlet boxes for local switches near doors must be located at the strike side of doors as finally hung, whether so indicated on the drawings or not.

4. Exposed wall outlet boxes must be securely anchored, erected neatly and tight against the walls.

5. All wall outlets of each type must be set accurately at the same level on each floor, except where otherwise specified or directed by the Commissioner. Where special conditions occur, outlets must be located as directed.

6. MOUNTING HEIGHTS: The following heights are standard heights and are subject to correction due to coordination with Contract Drawings. All such changes must be approved by the Resident Engineer. Heights given are from finished floor to center line of outlet or device on wall or partition, unless otherwise indicated.

a.	General Convenience Outlets (mount vertical)	1'-6"
b.	Clock Outlets	8'-6"or 1'-6" below ceiling
c.	Wall Lighting Switches	4'-0"
d.	Motor Controllers	5'-0"
e.	Motor Push-button	4'-2"
f.	Telephone Outlets	As Directed by the Commissioner
g.	Fire Alarm Bells	8'-6"or 1'-6" below ceiling
h.	Fire Alarm Stations	4'-0"
i.	Intercom Outlet	1'-6"
j.	Cooking and Refrigerator Unit	As Directed

7. Outlet boxes must be of a design and construction approved by the Commissioner. The type of box, including its form and dimensions, must be appropriate for: its specific location; the kind of fixture to be used; and, the conduits (both quantity and type) that will connect to it. All ferrous outlet boxes must meet the requirements for zinc coating as specified under Electrical Conduit Systems.

8. Knockouts will only be opened to insert conduit. Any outlet boxes with more openings than are necessary for conduit insertion must be sealed by the Contractor without additional charge.

9. All outlet boxes and junction boxes for exposed work must be galvanized cast iron or cast aluminum with threaded openings. Outlet boxes for exposed inside work in damp locations must be galvanized cast iron or cast aluminum with threaded hubs and neoprene gaskets.

10. Junction boxes must not be less than 4 11/16" square and must be equipped with zinc coated plates. Where plates are exposed they must be finished to match the room decor.

11. FIXTURE SUPPORTS: Outlet boxes supporting lighting fixtures must be equipped with fixture studs held by approved galvanized stove bolts or integral with the box. Cast iron or malleable boxes must have four (4) tapped holes for mounting required cover or fixtures.

12. Outlet boxes exposed to the weather or indicated W.P. must be cast iron or cast aluminum with the covers made watertight with neoprene gaskets. The boxes must have external lugs for mounting. Drilling of the body of the fitting for mounting will not be permitted. The cover screws must be appropriate in size, non-corrodible and not less than four (4) in number for each box opening.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 ELECTRICAL WIRING DEVICES:

A. WALL SWITCHES: must be of the best specification grade, quiet type, and must have a rating of 20 Amperes at 277 volts, as manufactured by Bryant, Hubbell or approved equal. The mechanism must be equipped with arc snuffers. They must be of the tumbler type, single pole. Switches of the 3-way type must have a similar rating.

B. RECEPTACLES:

1. CONVENIENCE OUTLETS: must be of the best specification grade, duplex, two-pole, 3-wire, 20 Amperes at 125 volts. It must have a grounding pole that must be grounded to the conduit system. Receptacles must be capable of both back and side wiring and must have only one (1) grounding screw. Receptacles must be Hubbell Catalog #5262 or approved equal.

2. HEAVY DUTY RECEPTACLE OUTLETS: must have the Ampere rating and the number of poles specified on the Contract Drawings and must be Hubbell, Russell-Stoll, Bryant, AH & H or approved equal. Each outlet must have a grounding pole, which must be grounded to the conduit system.

3. FLOOR RECEPTACLES: must be Russell & Stoll #3040 or approved equal, to fit into floor box previously specified.

4. NAMEPLATES: are required for all receptacles other than 120V.

C. CLOCK HANGERS: Clock outlets for surface type clocks must be equipped with a supporting hook and recessed faceplate to conceal the electrical cord.

D. WATERTIGHT DEVICES: For installations exposed to weather or in damp locations, the devices must be in a gasketed, cast iron enclosure.

E. PLATES:

1. Every convenience outlet and switch outlet must be covered by means of a stainless steel No. 302 - 0.4" antimagnetic plate with an approved finish, unless provided otherwise in the detailed Specifications.

2. Where two (2) or three (3) switches are grouped together, a single faceplate must be used. Where more than three (3) switches are located at one (1) point, the faceplates may be made up in multiple units.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4

3.4 ELECTRICAL CONDUCTORS AND TERMINATIONS:

A. CONDUCTORS FOR LIGHT AND POWER: All wire and cable must be of annealed copper of 98% conductivity. Aluminum wire or cable will not be permitted. The insulation must be flame retardant, moisture and heat resistant, thermoplastic, type THW or THWN rated for 600 volts at 75 degrees Celsius (C.) for both wet and dry locations. Wires No. 8 or larger must be stranded. Wires and cables must also

be subject to the requirements of the NYCEC. Cables for incoming service, or wire in conduits contiguous with the earth, in concrete, or other damp or wet locations, must be synthetic rubber insulated with neoprene jacket, heat and moisture resistant and must be equal to UL Type USE and rated for 600 volts at 75 degrees C. for both wet and dry locations.

B. FIXTURE WIRE: Lighting fixtures must be wired with No. 14 gauge wire designated as AWM and rated at 105 degrees C.

C. OTHER TYPES: Cables and wires for interior communication systems are described in applicable detailed Specifications.

D. MINIMUM SIZE: Conductors smaller than No. 12 AWG must not be used for light or power.

E. COLOR CODE: Wires must have a phase color code, and multiple conductor cables must be color coded.

F. CABLE DATA: The Contractor must submit for approval the following information for each size and type of cable to be furnished:

1. Manufacture of Cable - Location of Plant.
2. Minimum insulation resistance at standard test temperature.
3. Days required for delivery to site of work after order to proceed with manufacture.

G. ORIGINAL REELS: Cable and wire must be delivered to the site of the work on original sealed factory reels.

H. WIRE INSTALLATION:

1. INSTALL WIRES AFTER PLASTERING: Feeder and branch circuits wiring must not be installed into conduit before the rough plastering work is completed. No conductors must be pulled into floor conduits before floor is poured.
2. CONDUIT SECURED IN PLACE: No conductor must be pulled into any conduit run before all joints are made up tightly and the entire run rigidly secured in place.
3. WIRE ENDS: All wires must be left with sufficiently long ends for proper connection and stowing.
4. PULLING COMPOUNDS: to ease the pulling-in of wires into the conduit, only approved compounds as recommended by cable manufacturers must be used.
5. PRESSURE CONNECTORS: pressure connectors for wires must be of the cast copper or forged copper pressure plate type. Connectors must be O.Z., Burndy, National Electric Products or approved equal.
6. Splices and feeder taps in the gutters of panel boxes must be made by means of pressure plate-type connectors encased in composition covers as manufactured by O.Z., Burndy, National Electric Products or approved equal.
7. Splices in branch wiring for sound systems and fire systems, must be first made mechanically secure, then soldered and taped.
8. In lieu of soldered splices (except for sound and fire systems, which must have soldered splices) the following alternates are acceptable for operating temperatures up to 105 degrees C., for fluorescent fixtures and for the splicing of branch circuit wiring up to No. 8 AWG wire:
    a. Mechanical splices made with mechanical connectors as manufactured by the Minnesota Manufacturing Company "Scotchlock" or approved equal. Mechanical connectors requiring a special tool (pressure connectors, insulators and locking rings) by Buchanan or approved equal. The tool used for connector application must be as approved by the connector manufacturer.

b. For branch circuit wire and cable No. 6 AWG and larger, the seamless tubular connector will only be accepted. Application of this connector must be with a tool recommended by the connector manufacturer.

9. TAGS: All feeders and risers must be tagged at both ends, and in all pull and junction boxes and gutter spaces through which they pass. Such tags must be of fiber and have the feeder designation and size stamped thereon.

10. BRANCH CIRCUIT WIRING:

a. The Contractor installing branch circuit wiring must test the work for correct connections and leave all loop splices in the fixture outlet boxes properly spliced and taped. The Contractor must provide wire ends long enough for convenient connection to device.

b. NEUTRALS: No common neutrals must be used except for lighting branch circuits. Each neutral wire must be terminated separately on a neutral busbar in the panelboard. No common neutrals will be permitted for convenience receptacle branch circuits.

I. TERMINATIONS

1. LUGS: All lugs for all devices and all cable terminations must be copper. AL/CU rated lugs will not be permitted. The only exception to this requirement is when the particular device is not manufactured with copper lugs by any manufacturer. Lugs for No. 6 AWG cable and larger must be cast copper or forged copper pressure plate type. Lugs for 1/0 and larger must be fastened with two (2) bolts.

2. All lugs must be of the proper size to accept the cable connected to them. Any subcontractor furnishing a device containing lugs is to coordinate with the Contractor to ensure that the device terminations are adequate for the wire or cable (whose size may be larger than expected due to voltage drop considerations) connected to the device.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.5

3.5 CIRCUIT PROTECTIVE DEVICES:

This Section sets forth the circuit protective devices such as circuit breakers and safety switches, used in connection with Motor Control Equipment, Distribution Centers, Panel boards and Service Entrance.

A. CIRCUIT BREAKERS:

1. CIRCUIT BREAKERS: must be operable in any position and must be of the quick-make, quick-break type on manual operation. The handle must be trip free, preventing contacts from being held in closed position against abnormal overloads or short circuits. Positive visual indication of automatic tripped position of breaker must be provided, in addition to the "On" and "Off" indication. All circuit breakers must be of the bolted type.

2. TRIP RATING: Circuit breakers must be provided with the required number of trip elements, calibrated at 40 degrees C., ambient temperature, in accordance with wire sizes or motor currents as shown on Contract Drawings or indicated in the Specifications.

3. POLE BARRIER: Multipole pole breakers must be designed to break all poles simultaneously. They must be provided with barriers between poles and arc suppressing devices.

4. ELEMENTS: Multipole circuit breakers must have frames of not less than a 100 Ampere rating. Multipole circuit breakers for 480 volts AC operation must have an NEMA interrupting rating of 18,000 Amperes, unless a higher rating is specified in the Specifications or indicated on the Contract Drawings.

5. For circuit breakers with frame size up to and including 225 Amperes, the breakers may be

provided with non-interchangeable trip elements. For frame ratings above 225 Amperes, the breakers must be provided with interchangeable trip elements, which can be replaced readily.

6. Single pole circuit breakers for branch circuits must have a frame size of no less than 100 Amperes, and must be rated at 125 volt A.C. with a NEMA interrupting rating of 10,000 Amperes, unless a higher rating is specified in the Specifications or indicated on the Contract Drawings.

7. INVERSE TIME ACTION: The circuit breakers must be dual element type, one (1) element with time limit characteristics, so that tripping will be prevented on momentary overloads, but will occur before dangerous values are reached and the other with instantaneous trip action. Inverse time delay action must be effective between a minimum tripping point of 125% of rating of breaker and an instantaneous tripping point between 600% and 700% of rated current.

8. CONSTANCY OF CALIBRATION: The tripping elements must insure constant calibration and be capable of withstanding excessive short circuit conditions without injury.

9. CONTACTS: must be non-welding under operating conditions and of the silver to silver type.

10. TEMPERATURE RISE: Current carrying parts, except thermal elements, must not rise in temperature in excess of 30 degrees C. while carrying current at the part's rated current and frequency.

11. NUMBERING: Each circuit breaker must be distinctly numbered when installed in a group with other breakers. The calibration of trip element must be indicated on each breaker.

B. SAFETY SWITCHES:

NEMA TYPE HD: When safety switches are permitted to be used for service entrance, motor disconnecting means or to control other types of electrical equipment, they must be of the type HD of a rating not less than 30 Amperes. Enclosures must be provided with means for locking. For ratings above 60 Amperes terminals must have double studs.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.6

3.6 DISTRIBUTION CENTERS:

This Section sets forth the construction and installation procedure for Switchboards, Panel boards and Cabinets.

A. PANEL BOARDS, GENERAL TYPE: The panel boards must be of the automatic circuit breaker type with individual breakers for each circuit, removable without disturbing the other units. Circuit breakers must be in accordance with the requirements outlined under Section 3.5, "Circuit Protective Devices."

B. NUMBER AND RATING OF CIRCUIT BREAKERS: The Contract Drawings show a layout of each panel, giving the number, frame, size and trip setting of circuit breakers and number of branch circuits and spare breakers. Each branch circuit must be distinctly numbered.

C. BUS BAR CONSTRUCTION AND SUPPORT: Panel Boards must be of the dead front type and must have bus bars and branch circuits designed to suit the system and voltage. Current carrying parts, exclusive of circuit breakers, must be copper and based on a maximum density of 1,000 Amperes per square inch. Bus bars for the main switchboard must be designed for the frame rating of the Service Breaker. Bus bars must run up the center of the panel, unless otherwise indicated, and must have connected thereto the various branch circuits. Unless otherwise specified, bus bars for each panel board must be equipped with main lugs only and capacity as required on Contract Drawings. Where main protection is required, automatic circuit breakers must be used. A neutral bus of at least the same capacity as a live bus bar must be provided for the connection of all neutral conductors. Each terminal must be identified. All current carrying parts, exclusive of circuit breakers, must be of copper with a minimum number of joints. The bus bar structure must be a self-supporting unit, firmly fastened to a ½

inch plastic board, extending the full length and width of assembly which must serve to insulate the bus structure from the back of panel box. Other methods affording equally effective bus structure support and insulation will be given consideration. An insulating barrier must separate neutral bus from other parts of panel.

D. CIRCUIT BREAKER ASSEMBLY: The entire circuit breaker and bus bar assembly must be mounted on an adjustable metal base or pan and secured to the back of the panel box. The panel must have edges flanged for rigidity.

E. PANEL MOUNTING: The panel must be centered in the panel box, line up with the door openings, be set level and plumb, and no live parts may be exposed with the door open.

F. PANEL CABINET:

1. PANEL CABINET INSTALLATION: When installed, surface mounted in panel closets must be mounted on Kindorf channel.

2. Where cabinets cannot be set entirely flush due to mustow walls or partitions or where cabinet is extra deep, the protruding sides of cabinet must be trimmed with a metal or hardwood return molding of approved design and fastened to cabinet so as to conceal the intersection between the wall and cabinet.

G. NAMEPLATES: Where required, nameplates must be made of engraved Lamicoid sheet, or approved equal. Letters and numbers must be engraved white on a black background (except for Firehouse projects which must have white letters on a red background). The Contractor must submit an engraved sample for approval as to design and style of lettering before proceeding with the manufacture of the nameplate. Nameplates must be of suitable size and must also be provided at the top of the switchboard or section thereof and on the trim at the top of all lighting and power panels. Similar nameplates must also be provided for each distribution circuit breaker giving the breaker number, the number of the feeder, and the name of the equipment fed.

H. SHOP DRAWINGS: showing all details of boxes, panels, etc., must be submitted for approval.

I. DIRECTORIES: A directory must be fastened with brass screws and consist of a noncorrosive metal frame with dimensions not less than five (5) inches x eight (8) inches and a transparent window of Plasticile, Plexiglass, Lucite, Polycarbonate or approved equal that is not less than 1/16 inch thick over cardboard or heavy paper. The directory must be typewritten and show the number and name of each circuit, and lighting or equipment supplied. The size of riser feeder must be as indicated on the directory. The dimensions of the directory must be submitted for approval for each size of panel.

J. CONSTRUCTION

1. FINISH: Panel boxes, doors and trim for installation in dry locations, must be zinc coated after fabrication by the hot-dip galvanizing or electroplate process on inside and outside surfaces. In damp locations, panel boards must be enclosed and gasketed NEMA 3R type. Panel boards located outdoors or exposed to the weather must be NEMA 3X type.

2. PAINTING: Panel boxes, doors and trim must receive a coat of approved priming paint and a second coat of approved paint in the field after installation. Paint must be applied to the inside and outside of boxes and on both sides of trim. Panel trims and doors must receive a third or finishing coat on the outside after installation. Approval as to texture and color must be obtained before the final coat is applied.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.7

3.7 MOTORS:

This Section sets forth the general design, construction and performance requirements, which must apply to all

motors furnished in the Contract.

A. MOTOR DESIGN: All motors must be designed to comply with the New York State Energy Conservation Construction Code and the New York City Energy Conservation Code. In the event of any conflict or inconsistency between such codes, the New York City Energy Conservation Code must prevail. Motors must have standard NEMA frames and must have nameplate ratings adequate to meet the specified conditions of operation. Motor performance under variable conditions of voltage and frequency must be within the limits set in NEMA standards, unless modified in the Specifications. Motors must be expressly designed for the hazard duty load, voltage and frequency as specified in the Contract. All motor windings must be copper. All motors intended to operate on a 208 volt system must be designed and rated for 200 volts.

B. STANDARDS OF COMPARISON: In the absence of specific motor specifications, in general, the best standard products of the leading motor manufacturers must be considered as a standard for comparison. The requirements of the NEMA standards for motors and generators must be deemed to contain the minimum requirements of performance and design.

C. OBJECTIONABLE NOISES: Objectionable noises will not be tolerated and exceptionally quiet motors may be required for certain specified locations. Noise control tests as per the New York City Construction Codes may be performed as directed by the Commissioner. Such motors must bear a nameplate lettered "Quiet Motor." Springs and slip rings must be of approved non-ferrous material.

D. BEARINGS:

1. Bearings, unless specified otherwise, must be of the ball or roller type. Motors one (1) horsepower and larger that are equipped with ball roller bearings must also have lubrication of the pressure-relief greasing type. The Contractor furnishing four (4) or more such motors must also furnish, as part of the Contract, a pressure grease gun of rugged design, of approximately ten (10) ounce capacity, complete with necessary adapters. The Contractor must also provide ten (10) pounds of approved gun grease.

2. For any particular unit where sleeve bearings are deemed desirable, permission for their use may be granted by the Commissioner. Motors one (1) horsepower and larger that are equipped with sleeve type bearings must, in addition to having protected fittings easily accessed for oiling, be provided with visible means for determining normal oil level. Lubrication must be positive, automatic and continuous.

E. MOTOR TERMINALS AND BOXES: Each motor must be furnished with flexible leads of sufficient length to extend for a distance of not less than three (3) inches beyond the face of the conduit terminal box. This box must be furnished of ample size to make and house motor connections. These requirements must be met irrespective of any other standards or practices. Size of cable terminals and conduit terminal box holes must be subject to approval. For motors five (5) horsepower or larger, each terminal must come with two (2) cast or forged copper pressure type connectors with bolts, nuts and washers. For motors of smaller ratings, connectors of other acceptable types may be furnished. For installations exposed to the weather or moist locations, terminal boxes must be of cast iron with threaded hubs and gasketed covers. Cover screws must be of non-corrosive material.

F. MOTOR TEMPERATURE RISES: The motor nameplate temperature rises for the various types of motor enclosures must be as listed below:

1.	Open Frame	40 degrees C.
2.	Totally enclosed and enclosed fan cooled	55 degrees C.
3.	Explosion proof and submersible	55 degrees C.
4.	Partially enclosed and drip proof	40 degrees C.

The temperature of the various parts of a motor must meet the requirements of NEMA standards for the size and type of the motors. Tests for heating must be made by loading the motor to its rated horsepower and keeping it so loaded for the rated time interval or until the temperature becomes constant.

G. SPECIAL CODE INSTALLATIONS: Electrical installations covered by special publications of NBFU and by special City rulings and regulations must comply in design and safety features with such applicable codes, regulations and rulings, and must be furnished and installed complete with all accessories and safety devices as therein specified.

H. MOTORS ON LIGHTING PANELS: The largest A.C. motor permitted on branch circuits of lighting panels must not exceed 1/4 horsepower.

I. MOTORS RATED: ½ horsepower and larger must be polyphase.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8

3.8 MOTOR CONTROL EQUIPMENT:

This Section sets forth the requirements for motor controllers and associated devices. Such requirements are applicable to all motor control equipment furnished or installed.

A. MANUFACTURER: All control equipment furnished under the Contract must be the product of a single manufacturer. Exceptions to this rule may be granted in the case of controllers for fractional horsepower motors driving special equipment, the various units of which have been engineered to obtain specific performance.

B. CONTROL ITEMS REQUIRED: The Contractor furnishing motors must also furnish therewith complete disconnecting, starting and control equipment as required by the detailed Specifications, the various code authorities and for the successful operation of the driven equipment. These items include circuit breakers, magnetic starters with overload protection and low voltage release or protection, push button stations, pilot lights and alarms, float, pressure, temperature and limit switches, load transfer switches, devices for manual operation and speed controllers, etc. The Contractor must furnish as many of these items as required for the successful operation of the driven unit.

1. Where a motor is to be located out of sight of the controller, the Contractor must furnish an approved disconnecting means to be mounted near motor.

C. TYPES OF STARTERS:

1. SQUIRREL CAGE: A.C. motors of the squirrel cage type, rated from one (1) to thirty (30) horsepower, must have magnetic across the line starters; motors rated above thirty (30) horsepower must be furnished with reduced voltage (autotransformer type) starter or part winding start with time delay to reduce inrush current. Size of starters must be based on 200V operation.

2. SLIP RING: A.C. motors of the slip-ring type must be furnished with primary across the line starters interlocked with secondary starting and regulating equipment. The interlocking feature must prevent starting of the motor when the secondary controller is off the initial starting point.

3. MAGNETIC: For fractional horsepower motors, magnetic type starters are not required unless the particular method of controlling the driven equipment makes them necessary. Where individual single phase fractional horsepower motors or the sum of fractional horsepower motors controlled by an automatic device are ½ horsepower or more, magnetic starters and circuit breakers must be used. Single phase A.C. motors smaller than ½ horsepower or three-phase A.C. motors smaller than one (1) horsepower where manual control is specified may be furnished with starters of toggle switch or push button type with inbuilt thermal protection. No additional disconnecting means is required to be furnished with this type of starter. This type of starter may also be used in series with automatic control devices such as thermostats, float and pressure switches, provided the individual motor or the sum of fractional horsepower motors is less than ½ horsepower. Means for manual operation must be provided.

D. DISCONNECTING BREAKER: All motor starters, unless otherwise specified, must be provided with a disconnecting means in the form of a circuit breaker of the type specified under Article 3.5 CIRCUIT PROTECTIVE DEVICES. This disconnecting means must be contained in the same housing with the starter and must be operable from outside. Means must be provided for locking the handle of the circuit breaker in the "OFF" position if it is desired to take the equipment out of service and prevent unauthorized starting.

E. CONTROL CABINET – DRY LOCATIONS: All starters must be furnished with general purpose, NEMA Type 1, sheet metal enclosures with hinged covers and baked enamel finish.

F. CONTROL CABINET – WATERTIGHT: In wet locations, cast iron watertight enclosures with threaded hubs, galvanized and gasketed hinged covers must be provided.

G. PANELS: Motor control devices and appliances must be mounted on approved insulating slabs with all wiring and connections made on the back of the slabs.

H. WIRING AND TERMINALS: Wiring connections for currents of one hundred (100) Amperes or less may be made with copper wire or cable with special flameproof insulating coverings. Such wires must be installed in a neat workmanlike manner, flat against the slab, and held in place by clips. Connections must be made with pressure connectors for No. 8 AWG and larger wires, and with grommets for small stranded wires. Except for incoming and outgoing main leads, all connections must terminate on approved connector blocks, which may be installed on the face of the slab. For small, across the line starters, the above requirements may be modified if satisfactory connections are provided.

I. COPPER BUS: For currents exceeding one hundred (100) Amperes, copper bus must be used in place of wires. The bus must be constructed of copper rods, tubing or flat strap, bent and shaped properly and securely attached to the slab in a neat and workmanlike manner. The cross section of copper must provide sufficient areas to keep current density at not more than one thousand (1,000) Amperes per square inch.

J. COOPERATION: The Contractor’s subcontractor(s) who furnish electrically operated equipment must give to the Contractor and the Contractor’s electrical subcontractor full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

END OF SECTION 01 35 06

(No text on this page)

SECTION 01 35 26
SAFETY REQUIREMENTS PROCEDURES

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

B. The Contractor shall comply with the requirements of "*The City of New York Department of Design and Construction Safety Requirements".* This document is included in the Information for Bidders.

1.2 SUMMARY:

A. This Section includes administrative and general procedural requirements for Safety and Health Requirements, including:

1. Definitions
2. Required Safety Meeting
3. Compliance with Regulations
4. Submittals
5. Personnel Protective Equipment
6. Hazardous and / or Contaminated Materials
7. Emergency Suspension of Work
8. Protection of Personnel
9. Environmental Protection

1.3 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: "Design Consultant" must mean the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.4 REQUIRED SAFETY MEETINGS:

A. Prior to commencing construction, the Resident Engineer will schedule and hold a preconstruction kick-off meeting either at DDC's main office or at the Project site with representatives of the Contractor, including the principal on-site project representative, one or more safety representatives, the Commissioner's designated representatives and other concerned parties for the purpose of reviewing the Contract safety requirements. Additionally, implementing Work safety provisions must be discussed.

B. The Contractor is responsible for conducting weekly documented jobsite safety meetings, given to all jobsite personnel including all subcontractors on the Project, with the purpose of discussing safety topics and job-specific requirements at the DDC worksite.

1.5 COMPLIANCE WITH REGULATIONS:

A. The Work, including contact with or handling of hazardous materials, disturbance or dismantling of structures containing hazardous materials, and disposal of hazardous materials, shall comply with the applicable requirement for 29 CFR Parts 1910 and 1926, and 40 CFR, Parts 61, 261, 761 and 763.

B. Work involving disturbance or dismantling of asbestos or asbestos-containing materials, demolition of structures containing asbestos and removal of asbestos, shall comply with 40 CFR Part 61, Subparts A and M, and 40 CFR Part 763, as applicable.

C. Additionally, Work shall comply with all applicable federal, state, and local safety and health regulations.

D. In case of a conflict between applicable regulations, the more stringent requirements shall apply.

E. All workers working on the DDC Project site are required by NYC Local Law 41 to complete the OSHA 10-hour training course.

1.6 SUBMITTALS:

A. The Contractor shall submit to the Resident Engineer, copies of the Safety Program, Site Safety Plan and other required documentation in accordance with the "*New York City Department of Design and Construction Safety Requirements*".

B. Permits: If hazardous materials are disposed of off-site, the Contractor must submit to the Resident Engineer copies of shipping manifests, permits from applicable federal, state, or local authorities and disposal facilities, and certificates that the material has been disposed of in accordance with regulations.

C. Accident Reporting: Submit a copy of each accident report to the Resident Engineer in accordance with the "*New York City Department of Design and Construction Safety Requirements*".

D. All asbestos and lead project regulatory notifications are to be submitted to DDC's Office of Environmental and Geotechnical Services (OEGS) through the Resident Engineer.

E. Request for Subcontractor Approval: Any subcontractor performing environmental work must submit required documentation for approval to perform such work as required by DDC's OEGS.

PART II – PRODUCTS

2.1 PERSONNEL PROTECTIVE EQUIPMENT:

A. Special facilities, devices, equipment, and similar items used by the Contractor in execution of the Work shall comply with 29 CFR Part 1910, subpart I, Part 1926, subpart E, and other applicable regulations.

2.2 HAZARDOUS AND / OR CONTAMINATED MATERIALS:

A. The Contractor shall bring to the attention of the Commissioner, any material encountered during execution of the Work that the Contractor suspects to be hazardous and / or contaminated.

B. The Commissioner shall determine whether the Contractor shall perform tests to determine if the material is hazardous and / or contaminated. A change to the Contract price may be provided, subject to the applicable provisions of the Contract.

C. If the material is found to be hazardous, the Commissioner may direct the Contractor to remediate the hazard and a change to the Contract price may be provided, subject to the applicable provisions of the Contract.

PART III – EXECUTION

3.1 EMERGENCY SUSPENSION OF WORK:

A. When the Contractor is notified by the Commissioner of noncompliance with the safety provisions of the Contract, the Contractor shall immediately, unless otherwise instructed, correct the unsafe condition, at no additional cost to the City.

B. If the Contractor fails to comply promptly, all or part of the Work may be stopped by notice from the Commissioner.

C. When, in the opinion of the Commissioner, the Contractor has taken satisfactory corrective action, the Commissioner shall provide written notice to the Contractor that the Work may resume.

D. The Contractor shall not be allowed any extension of time or compensation for damages in connection with a work stoppage for an unsafe condition.

3.2 PROTECTION OF PERSONNEL:

A. The Contractor shall take all necessary precautions to prevent injury to the public, occupants, or damage to property of others. The public and occupants includes all persons not employed by the Contractor or a subcontractor.

B. Whenever practical, the work area shall be fenced, barricaded, or otherwise blocked off from the public or occupants to prevent unauthorized entry into the work area, in compliance with the requirements of Section 01 50 00 TEMPORARY FACILITIES, SERVICES AND CONTROLS, and including without limitation, the following:

1. Provide traffic barricades and traffic control signage where construction activities occur in vehicular areas.
2. Corridors, aisles, stairways, doors, and exit ways shall not be obstructed or used in a manner to encroach upon routes of ingress or egress utilized by the public or occupants, or to present an unsafe condition to the public or occupants.
3. Store, position and use equipment, tools, materials, scraps and trash in a manner that does not present a hazard to the public or occupant by accidental shifting, ignition, or other hazardous activity.
4. Store and transport refuse and debris in a manner to prevent unsafe and unhealthy conditions for the public and occupants. Cover refuse containers and remove refuse on a frequent regular basis acceptable to the Resident Engineer. Use tarpaulins or other means to prevent loose transported materials from dropping from trucks or other vehicles.

3.3 ENVIRONMENTAL PROTECTION:

A. Dispose of solid, liquid and gaseous contaminants in accordance with local codes, laws, ordinances and regulations.

B. Comply with applicable federal, state, and local noise control laws, ordinances, and regulations, including but not limited to 29 CFR 1910.95, 29 CFR 1926.52 and NYC Administrative Code Chapter 28 of Title 15.

END OF SECTION 01 35 26

(No Text on This Page)

SECTION 01 35 91
HISTORIC TREATMENT PROCEDURES

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 35 91

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section includes administrative and procedural requirements for the treatment of Landmark Structures and Landmark Quality Structures, as identified in the Addendum. Specific requirements are indicated in other sections of the Specifications.

B. This Section includes, without limitation, the following:

1. Storage and protection of existing historic materials
2. General Protection
3. Protection during use of heat-generating equipment
4. Photographic Documentation
5. NYC Landmarks Preservation Commission Final Approval signoffs

1.3 RELATED SECTIONS: include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION
C. Section 01 33 00 SUBMITTAL PROCEDURES
D. Section 01 77 00 CLOSEOUT PROCEDURES
E. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: “Design Consultant” means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

C. Landmark Structure or Site: Any building or site which has been designated as a landmark, or any building or site within a landmark district, as designated by the New York City (NYC) Preservation Commission or the New York State Historic Preservation Office.

D. Landmark Quality Structure: Any building which has been determined by the City to be of landmark quality and/or historical significance.

E. Preservation: To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.

F. Rehabilitation: To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

G. Restoration: To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.

H. Reconstruction: To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time.

I. Stabilize: To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present.

J. Protect and Maintain: To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least degree of intervention.

K. Repair: To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

L. Replace: To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:

1. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.
2. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.
3. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated.

M. Remove: To detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

N. Remove and Salvage: To detach items from existing construction and deliver them to the City ready for reuse.

O. Remove and Reinstall: To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.

P. Existing to Remain or Retain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled.

Q. Material in Kind: Material that matches existing materials as much as possible, in species, cut, color, grain, and finish.

1.5 SUBMITTALS:

A. Historic Treatment Program: Submit a written plan for each phase or process, including protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of the Work.

B. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of the Work, submit for the Commissioner's approval a written description, including evidence of successful use on other comparable projects and provide a program of planned testing to demonstrate the effectiveness of the alternative methods and materials for use on this Project.

C. Qualification Data: Submit qualification data for historic treatment specialists as specified and required by individual sections of the Project specifications.

D. Photographs for Designated Landmark Structures: Submit photographs in accordance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION and as described in this section.

E. Record Documents: Include modifications to manufacturer's written instructions and procedures, as documented in the historic treatment preconstruction conference and as the Work progresses.

1.6 QUALITY ASSURANCE:

A. Special Experience Requirements: Special Experience Requirements may apply to the firm that will provide Historic Treatment Services. If applicable, such Special Experience Requirements are set forth in the Bid Booklet.

B. Historic Treatment Preconstruction Conference: The Resident Engineer will schedule and hold a preconstruction meeting at the site in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION.

1. Review manufacturer's written instructions for precautions and effects of products and procedures on building materials, components, and vegetation.

a. Record procedures established as a result of the review and distribute to affected parties.

1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS:

A. Removed and Salvaged Historic Materials: As specified and required by individual sections of the Project specifications.

B. Removed and Reinstalled Historic Materials: As specified and required by individual sections of the Project specifications.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling during historic treatment. When permitted by the Commissioner, items may be removed to a suitable, protected storage location during historic treatment and reinstalled in their original locations after historic treatment operations are complete.

D. Storage and Protection: When removed from their existing location, store historic materials, at a location acceptable to the Commissioner, within a weather tight enclosure where they are protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.

1. Identify removed items with an inconspicuous mark indicating their original location.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 GENERAL PROTECTION:

A. Comply with manufacturer's written precautions against harmful effects of products and procedures on adjacent building materials, components, and vegetation.

B. Ensure that supervisory personnel are present when work begins and throughout its progress.

C. Temporary Protection of Historic Materials during Construction:

1. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.
2. Attachments of temporary protection to existing construction must be approved by the Commissioner prior to installation.

D. Protect landscape work adjacent to or within work areas as follows:

1. Provide barriers to protect tree trunks.
2. Bind spreading shrubs.
3. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than eight (8) hours at a time.
4. Set scaffolding and ladder legs away from plants.

E. Existing Drains: Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify the Commissioner immediately of drains or systems that are stopped or blocked. Do not begin Work pertaining to this Section until the drains are in working order.

1. Provide a method to prevent solids, including stone or mortar residue, from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of the Work performed under this Contract.
2. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT:

A. No roofing work requiring the use of an open flame will be permitted on any Landmark Structure or any Landmark Quality Structure whose roof or wall structure is made of wood or primarily of wood.

B. Comply with the following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:

1. Obtain Commissioner's approval for operations involving use of open-flame or welding equipment. Notification must be given for each occurrence and location of work with heat-generating equipment.
2. Where possible, use heat-generating equipment in shop areas or outside the building.
3. Before work with heat-generating equipment commences, furnish personnel to serve as a fire watch (or watches) for location(s) where work is to be performed.
4. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
5. Remove and keep the area free of combustibles, including rubbish, paper, waste, etc., within the area of operations.
6. If combustible material cannot be removed, provide fireproof blankets to cover such materials.
7. Where possible, furnish and use baffles of metal or gypsum board to prevent the spraying of sparks or hot slag into surrounding combustible material.
8. Prevent the extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.

9. Inspect each location of the day's work not sooner than thirty (30) minutes after completion of operations to detect hidden or smoldering fires and to ensure that proper housekeeping is maintained.

C. Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to automatic sprinkler heads, shield the individual heads temporarily with guards.

3.3 PHOTOGRAPHIC DOCUMENTATION:

A. Photographs for Designated Landmark Structures: Show existing conditions prior to any historic treatments, including one overall photograph and two close-up photographs of all areas of work affected. Show one overall photograph and two close-up photographs of all areas of work after the successful execution of all historical treatments.

3.4 NEW YORK CITY LANDMARKS PRESERVATION COMMISSION FINAL APPROVALS SIGNOFF:

A. For all projects involving a Landmark Structure or Site, the Contractor, at the completion of the Work, must submit to the Commissioner, in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS, all documentation concerning the successful execution of all historic treatments. This must include, but not be limited to, copies of all before and after photographs of historic treatments, one copy of the Contractor's as-built drawings, copies of testing and analysis results, including cleaning, mortar analysis, pointing mortars and all other information pertaining to work performed under the NYC Landmarks Preservation Commission jurisdiction.

END OF SECTION 01 35 91

(No Text on This Page)

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section includes the following:
   1. Definitions
   2. Conflicting Requirements
   3. Quality Assurance
   4. Quality Control
   5. Approval of Materials
   6. Special Inspections (Controlled Inspection)
   7. Inspections by Other City Agencies
   8. Certificates of Approval
   9. Acceptance Tests
   10. Repair and Protection

B. This section includes administrative and procedural requirements for quality control to assure compliance with quality requirements specified in the Contract Documents.

C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Documents.

D. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Documents.

E. Provisions of this section do not limit requirements for the Contractor to provide quality assurance and quality control services required by the Commissioner or authorities having jurisdiction.

F. Specific test and inspection requirements are specified in the individual sections of the Specifications.

G. LEED: Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.

H. COMMISSIONING: Refer to the Addendum to identify whether this Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED-NC procedures, as described in Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS and/ or Section 01 91 15 GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE. The Contractor must cooperate with the Commissioning Agent and provide whatever assistance is required.

1.3 RELATED SECTIONS: Include without limitation the following:

A. Section 01 10 00 SUMMARY

B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION

C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION

D. Section 01 33 00 SUBMITTAL PROCEDURES

E. Section 01 77 00 CLOSEOUT PROCEDURES

F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. Design Consultant: "Design Consultant" means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

C. Commissioning: A Total Quality Assurance process that includes checking the design and installation of equipment, as well as performing functional testing of the same to confirm that the installed equipment is operating and in conformance with the Contract Documents and the City's requirements.

1.5 CONFLICTING REQUIREMENTS:

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, the Contractor must comply with the most stringent requirement. The Contractor must refer any uncertainties and/or conflicting requirements to the Commissioner for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified must be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. The Contractor must refer any uncertainties to the Commissioner for a decision before proceeding.

1.6 QUALITY ASSURANCE:

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required. Individual Specification Sections specify additional requirements.

B. Installer Qualifications: Special Experience Requirements may apply to the firm that will install, erect or assemble specified work required for the Project. If applicable, such Special Experience Requirements are set forth in the Bid Booklet.

C. Manufacturer Qualifications: Special Experience Requirements may apply to the firm that will manufacture equipment, products or systems specified for the Project. If applicable, such Special Experience Requirements are set forth in the Bid Booklet.

D. Fabricator Qualifications: Special Experience Requirements may apply to the firm that will fabricate material, products or systems specified for the Project. If applicable, such Special Experience Requirements are set forth in the Bid Booklet.

E. Professional Engineer Qualifications: A professional engineer who is licensed to practice in the State of New York and who is experienced in providing engineering services of the kind indicated. Engineering

services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

G. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by the Resident Engineer.
2. Notify Resident Engineer seven (7) days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Design Consultant's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise directed or indicated.

1.7 QUALITY CONTROL:

A. City's Responsibilities: Where quality-control services are indicated as the City's responsibility in the Specifications, the City will engage a qualified testing agency to perform these services.

1. COST OF TESTS BORNE BY THE CITY: Where the City directs tests to be performed to determine compliance with the Specifications regarding materials or equipment, and where such compliance is ascertained as a result thereof, the City will bear the cost of such tests.
2. The City will furnish the Contractor with names, addresses, and telephone numbers of testing entities engaged and a description of the types of testing and inspecting they are engaged to perform.
3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor.

B. Contractor's Responsibility: Tests and inspections not explicitly assigned to the City are the Contractor's responsibility. Unless otherwise indicated, the Contractor must provide quality control services as set forth in the Specifications and those required by authorities having jurisdiction, whether specified or not.

1. COST OF TESTS BORNE BY CONTRACTOR – In the case of tests which are specifically called for in the Specifications to be provided by the Contractor or tests which are required by any authority having jurisdiction, but are not indicated as the responsibility of the City, the cost thereof will be borne by the Contractor and will be deemed to be included in the Contract price. The Contractor must reimburse the City for expenditures incurred in providing tests on materials and equipment submitted by the Contractor as the equivalent of that specifically named in the Specifications and rejected for non-compliance.
2. Where services are indicated as Contractor's responsibility, the Contractor must engage a qualified testing agency to perform these quality-control services. Any testing agency engaged by the Contractor to perform quality control services is subject to prior approval by the Commissioner.
3. The Contractor must not employ same entity engaged by the City, unless agreed to in writing by the Commissioner.
4. The Contractor must notify testing agencies and the Resident Engineer at least 72 hours in advance of the date and time for the performance of Work that requires testing or inspecting.
5. Where quality control services are indicated as Contractor's responsibility, the Contractor must submit a certified written report of each quality-control service, in triplicate, to the Commissioner.

6. Testing and inspecting requested by the Contractor and not required by the Contract Documents are Contractor's responsibility.
7. The Contractor must submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, the Contractor must engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Results must be submitted in writing as specified in Section 01 33 00 SUBMITTAL PROCEDURES.

D. Retesting/Re-inspecting: Regardless of whether the original tests or inspections were the Contractor's responsibility, the Contractor must provide quality control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Associated Services: The Contractor must cooperate with entities performing required tests, inspections, and similar quality control services, and must provide reasonable auxiliary services as requested. The Contractor must notify the testing agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist testing entity in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing entities.
6. Design mix proposed for use for material mixes that require control by the testing entity.
7. Security and protection for samples and for testing and inspecting equipment at the Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimal delay and avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

2. Coordinate and cooperate with the Commissioning Authority/Agent as applicable for start-up, inspection and functional testing in the implementation of the Commissioning Plan.

G. Manufacturer’s Directions: Where the Specifications provide that the manufacturer's directions are to be used, such printed directions must be submitted to the Commissioner.

H. Inspection of Material: In the event that the Specifications require the Contractor to engage the services of an entity to witness and inspect any material especially manufactured or prepared for use in or part of the permanent construction, such entity will be subject to prior written approval by the Commissioner.

1. NOTICE - The Contractor must give notice in writing to the Commissioner, sufficiently in advance of its intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice must contain a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Commissioner will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials, or the Commissioner will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or the Commissioner will notify the Contractor that inspection will be waived.

I. No Shipping Before Inspection: The Contractor must comply with the foregoing before shipping any material.

J. Certificate of Manufacture: When the Commissioner so requires, the Contractor must furnish to the Commissioner, authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Specifications. These certificates must include copies of the results of physical tests and chemical analyses where necessary, that have been made directly on the product, or on similar products being fabricated by the manufacturer. This may include such approvals as the Bureau of Standards and Appeals (B.S.A.), the Materials and Equipment (M.E.A.) acceptance Index, the Bureau of Electrical Control (B.E.C.), etc.

K. Acceptance: When materials or manufactured products comprise of such quantity that it is not practical to make physical tests or chemical analyses directly on the product furnished, a certificate stating the results of such tests or analyses of similar materials which were concurrently produced may, at the discretion of the Commissioner, be considered as the basis for the acceptance of such material or manufactured product.

L. Testing Compliance: The testing personnel must make the necessary inspections and tests, and the reports thereof must be in such form as will facilitate checking to determine compliance with the Specifications, indicating thereon all analyses and/or test data and interpreted results thereof.

M. Reports: Six (6) copies of the reports must be submitted and authoritative certification thereof must be furnished to the Commissioner as a prerequisite for the acceptance of any material or equipment.

N. Rejections: If, in making any test, it is ascertained by the Commissioner that the material or equipment does not comply with the Specifications, the Contractor will be notified thereof, and will be directed to refrain from delivering said materials or equipment, or to promptly remove it from the site or from the Work and replace it with acceptable material at no additional cost to the City.

O. Furnish Designated Materials: Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Specifications, the Contractor must immediately proceed to furnish the designated material or equipment.

1.8 APPROVAL OF MATERIALS:

A. Local Laws: All materials, appliances and types or methods of construction must be in accordance with the Specifications and must in no event be less than that necessary to conform to the requirements of the New York City (NYC) Construction Codes, Administrative Code and Charter of the City of New York.

B. Approval of Manufacturer: The names of proposed manufacturers, material suppliers, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings must be submitted to the Commissioner for approval, as early as possible, to afford proper review and analysis. No manufacturer will be approved for any materials to be furnished under the Contract unless it has a plant of ample capacity and have successfully produced similar products. All approvals of materials or equipment that are legally required by the NYC Construction Codes and other governing authorities must be obtained prior to installation.

C. All Materials: Fixtures, fittings, supplies and equipment furnished under the Contract must be new and unused, except as approved by the Commissioner, and of standard first-grade quality and of the best workmanship and design. The City of New York encourages the use of recycled products where practical.

D. INFORMATION TO SUPPLIERS - In asking for prices on materials under any item of the Contract, the Contractor must provide the manufacturer or dealer with such complete information from the Specifications and Contract Drawings as may in any case be necessary, and in every case the Contractor must inform the manufacturer or dealer of all the General Conditions and requirements herein contained.

1.9 SPECIAL INSPECTIONS:

A. SPECIAL INSPECTIONS:

1. Inspection of selected materials, equipment, installation, fabrication, erection, or placement of components and connections made during the progress of the Work to ensure compliance with the Contract Documents and provisions of the NYC Construction Codes, will be made by a Special Inspector. The City of New York will retain the services of the Special Inspector and bear the costs for the performance of Special Inspections in compliance with NYC Construction Codes requirements or as additionally may be called for in the project specifications, except as noted below for Form TR-3: Technical Report for Concrete Design Mix. The Special Inspector will be an entity that is in compliance with the requirements of the NYC Construction Codes. The Contractor must notify the relevant Special Inspector in writing at least 72 hours before the commencement of any Work requiring special inspection.

2. Form TR3: Technical Report Concrete Design Mix: The Contractor will be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Design Mix, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.

3. The Contractor must notify the relevant Special Inspector in writing at least 72 hours before the commencement of any Work requiring Special Inspection. The Contractor will be responsible for and bear related costs to assure that all construction or work has suitable access and remains exposed for inspection purposes until the required inspection is completed.

4. Inspections and tests performed under “Special Inspection” will not relieve the Contractor of the responsibility to comply with the Contract Documents, and that there is no warranty given to the Contractor by the City of New York in connection with such inspection and tests or certifications made under “Special Inspections”.

5. The Contractor must coordinate with the Resident Engineer or DDC Project Manager to provide access and schedule the Work for inspection by the Special Inspector.

1.10 INSPECTIONS BY OTHER CITY AGENCIES:

A. Letter of Completion: Just prior to Substantial Completion of the Project, the Commissioner will file with the Department of Buildings, an application for a Letter of Completion or a Certificate of Occupancy for the structure.

B. Final Inspections: In connection with the above-mentioned application for a Letter of Completion or a Certificate of Occupancy and before certificates of final payments are issued, the Contractor will be required to arrange for all final inspections by the inspection staff of the Department of Buildings, Fire Department, or other Governmental Agencies having jurisdiction, and secure all reports, sign offs, certificates, etc., by such inspection staff or other governmental agencies, in order that a Letter of Completion or Certificate of Occupancy can be issued promptly.

1.11 CERTIFICATES OF APPROVAL:

A. Responsibility: The Contractor will be responsible for and must obtain all final approvals for the Work installed under the Contract in the form of such certificates that are required by all governmental agencies having jurisdiction over the Work of the Contract.

B. Transmittal: All such certificates must be forwarded to the Commissioner through the Resident Engineer.

1.12 ACCEPTANCE TESTS:

A. Government Agencies: All equipment and appliances furnished and installed under the Contract must conform to the requirements of the Specifications and will in no event be less than that necessary to comply with the minimum requirements of the law and all of the governmental agencies having jurisdiction.

B. Notice of Tests: Whenever the Specifications and/or any governmental agency having jurisdiction requires the acceptance test, the Contractor will give to all concerned, written notice of the time when these tests will be conducted.

C. Energy: The City will furnish all energy, fuel, water, and light required for tests.

D. Labor and Materials: The Contractor must furnish labor and all other material and instruments necessary to conduct the acceptance tests at no additional cost to the City.

E. Certificates: The Final Acceptance by the Commissioner will be contingent upon the Contractor delivering to the Commissioner all necessary certificates evidencing compliance in every respect with the requirements of the regulatory agencies having jurisdiction.

F. Results: If the results of tests and Special Inspections indicate that the material or procedures do not meet requirements as set forth on the Contract Drawings or in the Specifications or are otherwise unsatisfactory, the Contractor must only proceed as directed by the Resident Engineer. Additional costs resulting from retesting, re-inspecting, replacing of material and/or damage to the Work and any delay caused to the schedule will be borne by the Contractor.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, the Contractor must repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

END OF SECTION 01 40 00

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SECTION 01 42 00
REFERENCES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 DEFINITIONS:

REFER TO THE ADDENDUM, Article IX, FOR ADDITIONAL DEFINITIONS AND REVISIONS TO THE CONTRACT AND SPECIFICATIONS

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

B. "APPROVED," ETC. - "Approved," "acceptable," "satisfactory," and words of similar import will mean and intend approved, acceptable, or satisfactory to the Commissioner.

C. Design Consultant: “Design Consultant” means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

D. "DIRECTED," "REQUIRED," ETC.- Wherever reference is made in the Contract to the Work or its performance, the terms "directed," "required," "permitted," "ordered," "designated," "prescribed," "determined," and words of similar import will, unless expressed otherwise, imply the direction, requirements, permission, order, designation or prescription of the Commissioner.

E. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings.

1.3 CODES, AGENCIES AND REGULATIONS:

A.B.A	Architectural Barriers Act
A.D.A.A.G.	Americans with Disabilities Act (ADA) Accessibility Guidelines
B.G. & E.	Bureau of Gas and Electricity of the City of New York
B.S. A.	New York City Board of Standards and Appeals
DOE	Department of Energy
E.C.C.C.N.Y.S.	Energy Conservation Construction Code of New York State
EPA	Environmental Protection Administration
N.Y.C.C.C.	New York City Construction Codes – includes:
	New York City Energy Conservation Code (N.Y.C. E.C.C)
	New York City Plumbing Code (N.Y.C. P.C.)
	New York City Building Code (N.Y.C. P.C.)
	New York City Mechanical Code (N.Y.C. M.C.)
	New York City Fuel Gas Code (N.Y.C. F.G.C.)
N.Y.S.D.O.L	New York State Department of Labor
N.Y.C.D.E.P	New York City Department of Environmental Protection
N.Y.C.E.C.	New York City Electrical Code
N.Y.C.F.C	New York City Fire Code
N.Y.S...D.E.C.	New York State Department of Environmental Conservation
O.S.H.A.	Occupational Safety & Health Administration

1.4 INDUSTRY STANDARDS:

A. STANDARD REFERENCES – Unless otherwise specifically indicated in the Contract Documents, whenever reference is made to the furnishing of materials or testing thereof that conforms to the standards of any technical society, organization or body, it must be construed to mean the latest standard, code, specification adopted and published by that technical society, organization or body, as of the date of the bid opening, unless the provisions of the N.Y.C.C.C. adopts a different or earlier dated version of such standard. All references to the ICC A117.1 are only to the 2009 version, whether or not a specific version is specified.

B. APPLICABILITY OF STANDARDS: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect, to the extent referenced, as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.

C. CONFLICTING REQUIREMENTS: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantity or quality, comply with the most stringent requirements. Immediately refer uncertainties and requirements that are different but apparently equal, to the Commissioner in writing for a decision before proceeding.

D. STANDARD SPECIFICATIONS - When no reference is made to a code, standard, or specification, the Standard Specifications of the ASTM or the AIEE, as the case may be, shall govern.

E. REFERENCES - Reference to a technical society, organization, or body may be made in the Specifications by abbreviations. Abbreviations and acronyms used in the Specifications and other Contract Documents mean the associated name. The following names are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the Issue Date of the Contract Documents.

AA	Aluminum Association, Inc. (The)
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists (The)
ABAA	Air Barrier Association of America
ABMA	American Bearing Manufacturers Association
ACI	ACI International (American Concrete Institute)
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies, Inc. (The)
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGC	Associated General Contractors of America (The)
AGMA	American Gear Manufacturer Association
AHA	American Hardboard Association (Now part of CPA)
AHAM	Association of Home Appliance Manufacturers
AI	Asphalt Institute
AIA	American Institute of Architects (The)

AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)
ALSc	American Lumber Standard Committee, Incorporated
ALI	Automotive Lift Institute
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
AOSA	Association of Official Seed Analysts, Inc.
APA	APA - The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute
ARI	Air-Conditioning & Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE/SEI	American Society of Civil Engineers, Structural Engineering Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	ASTM International (Formerly: American Society for Testing and Materials International)
AWCI	AWCI International (Association of the Wall and Ceiling Industry International)
AWCMA	American Window Covering Manufacturers Association (Now WCSC)

AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWSC	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BICSI	BICSI
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International)
BISSC	Baking Industry Sanitation Standards Committee
CIBSE	Charted Institute of Building Services Engineers
CCC	Carpet Cushion Council
CDA	Copper Development Association
CEA	Canadian Electricity Association
CFFA	Chemical Fabrics & Film Association, Inc.
CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CIMA	Cellulose Insulation Manufacturers Association
CIPRA	Cast Iron Pipe Research Association
CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPA	Composite Panel Association
CPPA	Corrugated Polyethylene Pipe Association

CPSC	Consumer Product Safety Commission
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CSI	Cast Stone Institute
CSI	Construction Specifications Institute (The)
CSSB	Cedar Shake & Shingle Bureau
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute)
DASMA	Door and Access Systems Manufacturer's Association International
DHI	Door and Hardware Institute
DOC	U.S. Department of Commerce – National Institute of Standards and Technology
EIA	Electronic Industries Alliance
DOJ	U.S. department of Justice
EIMA	EIFS Industry Members Association
DOL	U.S. Department of labor
EJCDC	Engineers Joint Contract Documents Committee
DOTn	U.S. Department of Transportation
EN	European Committee of Standards
EJMA	Expansion Joint Manufacturers Association, Inc.
ESD	ESD Association
EVO	Efficiency Valuation Organization
FEMA	Federal Emergency Management Agency

FIBA	Federation Internationale de Basketball Amateur (The International Basketball Federation)
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation)
FMG	FM Global (Formerly: FM - Factory Mutual System)
FMRC	Factory Mutual Research (Now FMG)
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.
FSA	Fluid Sealing Association
FSC	Forest Stewardship Council
GA	Gypsum Association
GANA	Glass Association of North America
GRI	(Now GSI)
GS	Green Seal
GSI	Geosynthetic Institute
HI	Hydraulic Institute
HI	Hydronics Institute
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)
HPVA	Hardwood Plywood & Veneer Association
HPW	H. P. White Laboratory, Inc.
HUD	U.S. Department of Housing and Urban Development
IAPMO	International Association of Plumbing and Mechanical Officials
IAS	International Approval Services (Now CSA International)
IBF	International Badminton Federation
ICC	International Code Council, Inc.
ICEA	Insulated Cable Engineers Association, Inc.

ICRI	International Concrete Repair Institute, Inc.
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
IESNA	Illuminating Engineering Society of North America
IEST	Institute of Environmental Sciences and Technology
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Alliance
ILI	Indiana Limestone Institute of America, Inc.
ISO	International Organization for Standardization
ISSFA	International Solid Surface Fabricators Association
ITS	Intertek
ITU	International Telecommunication Union
KCMA	Kitchen Cabinet Manufacturers Association
LMA	Laminating Materials Association (Now part of CPA)
LPI	Lightning Protection Institute
MBMA	Metal Building Manufacturers Association
MFMA	Maple Flooring Manufacturers Association, Inc.
MFMA	Metal Framing Manufacturers Association
MH	Material Handling (Now MHIA)
MHIA	Material Handling Industry of America
MIA	Marble Institute of America
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

NAAMM	National Association of Architectural Metal Manufacturers
NACE	NACE International (National Association of Corrosion Engineers International)
NADCA	National Air Duct Cleaners Association
NAGWS	National Association for Girls and Women in Sport
NAIMA	North American Insulation Manufacturers Association
NBGQA	National Building Granite Quarries Association, Inc.
NCAA	National Collegiate Athletic Association (The)
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NCTA	National Cable & Telecommunications Association
NEBB	National Environmental Balancing Bureau
NECA	National Electrical Contractors Association
NeLMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFHS	National Federation of State High School Associations
NFPA	NFPA (National Fire Protection Association)
NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NLGA	National Lumber Grades Authority
NIS	National Institute of Standards and Technology
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association)

NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	NSF International (National Sanitation Foundation International)
NSSGA	National Stone, Sand & Gravel Association
NTMA	National Terrazzo & Mosaic Association, Inc. (The)
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)
NWWDA	National Wood Window and Door Association (Now WDMA)
OPL	Omega Point Laboratories, Inc. (Acquired by ITS - Intertek)
PCI	Precast / Pre-stressed Concrete Institute
PDCA	Painting & Decorating Contractors of America
PDI	Plumbing & Drainage Institute
PGI	PVC Geomembrane Institute
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America)
PPS	Power Piping Society
PTI	Post-Tensioning Institute
RCSC	Research Council on Structural Connections
RFCI	Resilient Floor Covering Institute
RIS	Redwood Inspection Service
RMI	Rack Manufacturers Institute
RTI	(Formerly: NTRMA - National Tile Roofing Manufacturers Association) (Now TRI)
SAE	SAE International
SCAQMD	South Coast Air Quality Management District
SCS	Scientific Certification System

SDI	Steel Deck Institute
SDI	Steel Door Institute
SEFA	Scientific Equipment and Furniture Association
SGCC	Safety Glazing Certification Council
SHBI	Steel Heating Boiler Institute
SIA	Security Industry Association
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SMPTE	Society of Motion Picture and Television Engineers
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)
SPIB	Southern Pine Inspection Bureau (The)
SPRI	Single Ply Roofing Industry
SSINA	Specialty Steel Industry of North America
SSPC	SSPC: The Society for Protective Coatings
STI	Steel Tank Institute
SWI	Steel Window Institute
SWRI	Sealant, Waterproofing, & Restoration Institute
TCA	Tile Council of America, Inc.
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
TMS	The Masonry Society
TPI	Truss Plate Institute, Inc.

TPI	Turfgrass Producers International
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute)
UL	Underwriters Laboratories Inc.
ULC	Underwriters Laboratories of Canada
UNI	Uni-Bell PVC Pipe Association
USAV	USA Volleyball
USC	United States Code
USGBC	U.S. Green Building Council
USITT	United States Institute for Theatre Technology, Inc.
WASTEC	Waste Equipment Technology Association
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association (Now WCSC)
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association)
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association)
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California)
WIC	Woodwork Institute of California (Now WI)
WMMPA	Wood Moulding & Millwork Producers Association
WRI	Wire Reinforcement Institute, Inc.
USEPA	United States Environmental Protection Agency
WSRCA	Western States Roofing Contractors Association
WWPA	Western Wood Products Association

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 42 00

(No Text on This Page)

SECTION 01 50 00
TEMPORARY FACILITIES, SERVICES AND CONTROLS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes the following:
1. Temporary Water System
2. Temporary Sanitary Facilities
3. Temporary Electric Power, Temporary Lighting System, and Site Security Lighting
4. Temporary Heat
5. Dewatering Facilities and Drains
6. Temporary Field Office for Contractor
7. DDC Field Office
8. Material Sheds
9. Temporary Enclosures
10. Temporary Partitions
11. Temporary Fire Protection
12. Work Fence Enclosure
13. Rodent and Insect Control
14. Plant Pest Control Requirements
15. Project Identification Signage
16. Project Construction Sign and Rendering
17. Security Guards/Fire Guards on Site
18. Safety

1.3 RELATED SECTIONS: include without limitation the following:

A. Section 01 10 00 SUMMARY

B. Section 01 42 00 REFERENCES

C. Section 01 54 11 TEMPORARY ELEVATORS AND HOISTS

D. Section 01 54 23 TEMPORARY SCAFFOLDS AND SWING STAGING

E. Section 01 77 00 CLOSE OUT PROCEDURES

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	Definition
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Permanent Enclosure	As determined by the Commissioner, permanent or temporary roofing that is complete, insulated, and weather tight; exterior walls which are insulated and weather tight; and all openings that are closed with permanent construction or substantial temporary closures.

1.5 SUBMITTALS:

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Reports: Submit reports of tests, inspections, meter readings and similar procedures for temporary use.

1.6 PROJECT CONDITIONS:

A. Temporary Use of Permanent Facilities and Services: The Contractor will be responsible for the operation, maintenance, and protection of each permanent facility and service during its use as a construction facility before Final Acceptance by the City, regardless of previously assigned responsibilities.

B. The Contractor must install, operate, maintain and protect temporary facilities, services, and controls, including without limitation:

1. Keep temporary services and facilities clean and neat in appearance;
2. Operate temporary services in a safe and efficient manner;
3. Relocate temporary services and facilities as needed as Work progresses;
4. Do not overload temporary services and facilities or permit them to interfere with progress;
5. Provide necessary fire prevention measures; and
6. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on-Site.

1.7 NON-REGULAR WORK HOURS (OVERTIME):

A. The Contractor must provide the temporary services, facilities and controls set forth in this section during non-regular working hours if the Contract Drawings and/or the Specifications indicate that the Work, or specific components thereof, must be performed during non-regular working hours. In such case, all costs for the provision of temporary services, facilities and controls during non-regular working hours will be deemed included in the total Contract price.

B. The Contractor must provide the temporary services, facilities and controls set forth in this section during non-regular working hours if a change order is issued directing the Contractor to perform the Work, or specific components thereof, during non-regular working hours. In such case, compensation for the provision of temporary services, facilities and controls during non-regular working hours will be provided

through the change order.

1.8 SERVICES BEYOND COMPLETION DATE:

A. The Contractor must provide the temporary services, facilities and controls set forth in this section until the date on which it completes all required Work at the Site, including all Final Approved Punch List Work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. The Contractor must provide such temporary services, facilities and controls even if completion of all required Work at the Site occurs after the time fixed for such completion in Schedule A.

PART II – PRODUCTS

2.1 MATERIALS:

A. The Contractor must provide undamaged materials in serviceable condition and suitable for use intended.

B. Tarpaulins: Waterproof, fire-resistant UL labeled with flame spread rating of fifteen (15) or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

C. Water: Potable and in compliance with requirements of the New York City Department of Environmental Protection (DEP).

2.2 EQUIPMENT:

A. The Contractor must provide undamaged equipment in serviceable condition and suitable for use intended.

B. Water Hoses: Heavy-duty abrasive-resistant flexible rubber hoses, one hundred (100) feet (thirty (30) m) long with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Electric Power Cords: Grounded extension cords.

1. Provide hard-service cords where exposed to abrasion or traffic.

2. Provide waterproof connectors to connect separate lengths of electric cords where single lengths do not reach areas of construction Activity.

3. Do not exceed safe length-voltage ratio.

D. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART III –EXECUTION:

3.1 INSTALLATION, GENERAL:

A. The Contractor must locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. The Contractor must provide each facility ready for use when needed to avoid delay. The Contractor must not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities as approved by the Resident Engineer.

3.2 TEMPORARY WATER SYSTEM:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2 A

A. TEMPORARY WATER SYSTEM - NEW FACILITIES: During construction, the Contractor must furnish a Temporary Water System as set forth below.

1. Immediately after the Commissioner has issued an order to start the Work, the Contractor must file an application with DEP for the schedule of charges for water use during construction. The Contractor will be responsible for payment of water charges.

2. Immediately after the Commissioner has issued an order to start the Work, the Contractor must file an application with DEP's Bureau of Water Supply and obtain a permit to install the temporary water supply system. The system must be installed and maintained for the use of the Contractor and its subcontractors. A copy of the above-mentioned permit must be filed with the Commissioner. The Contractor must provide temporary water main, risers and waste stacks as directed and install on each floor, outlets with two (2) 3/4" hose valve connections over a barrel installed on a steel pan. The Contractor must provide drains from the pans to the stack and house sewer and hose bibs to drain the water supply risers and mains. During winter months, the Contractor must take the necessary precautions to prevent the temporary water system from freezing. The Contractor must provide repairs to the temporary water supply system for the duration of the Project until said temporary system is dismantled and removed.

3. Disposition of Temporary Water System: The Contractor will be responsible for dismantling the temporary water system when no longer required for the construction operations, or when replaced by the permanent water system installed for the Project, or as otherwise directed by the Resident Engineer. All repair work resulting from the dismantling of the temporary water system will be the responsibility of the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2 B

B. TEMPORARY WATER SYSTEM – PROJECTS IN EXISTING FACILITIES:

1. When approved by the Commissioner, use of existing water system will be permitted for temporary water service during construction, as long as the system is cleaned and maintained in a condition acceptable to the Commissioner. At Substantial Completion, the Contractor must restore the existing water system to conditions existing before initial use.

2. The Contractor will be responsible for all repairs to the existing water system permitted to be used for temporary water service during construction. The Contractor will be responsible to maintain the existing system in a clean condition on a daily basis, acceptable to the Commissioner.

3. The Contractor will be responsible for payment of water charges as directed by the Commissioner. Billing will be in accordance with the New York City Water Board Water and Wastewater Rate Schedule.

C. WASH FACILITIES: The Contractor must install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition, including without limitation:

1. Dispose of drainage properly;

2. Supply cleaning compounds appropriate for each condition; and

3. Include safety showers, eyewash fountains and similar facilities for the convenience, safety and sanitation of personnel.

D. DRINKING WATER FACILITIES: The Contractor must provide drinking water fountains or containerized tap-dispenser bottled-drinking water units, complete with paper cup supplies. Where power is available, provide

electric water coolers to maintain dispensed water temperature at forty-five (45) to fifty-five (55) deg. F (7 to 13 deg. C).

3.3 TEMPORARY SANITARY FACILITIES:

A. The Contractor must provide toilets, wash facilities, and drinking water fixtures in compliance with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities. Provide toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility, and provide covered waste containers for used materials.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3 B

B. SELF-CONTAINED TOILET UNITS:

1. The Contractor must provide temporary single-occupant toilet units of the chemical, aerated re-circulation, or combustion type for use by all construction personnel. Units must be properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Quantity of toilet units must comply with the latest Occupational Safety and Health Administration (OSHA) regulations.

2. Toilets: The Contractor must install separate, self-contained toilet units for male and female personnel. Shield toilets to ensure privacy.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3 C

C. EXISTING TOILETS:

1. TOILET FACILITIES: When approved by the Commissioner, the Contractor must arrange for the use of existing toilet facilities by all personnel during the execution of the Work. The Contractor will be responsible to clean and maintain facilities in a condition acceptable to the Resident Engineer and, at Substantial Completion , to restore facilities to the condition at the time of initial use.

2. MAINTENANCE - The Contractor must maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs.

3. NUISANCES - The Contractor must not cause any sanitary nuisance to be committed by its employees or the employees of its subcontractors in or about the Work and must enforce all sanitary regulations of the City and State Health Authorities.

3.4 TEMPORARY ELECTRIC POWER, TEMPORARY LIGHTING SYSTEM, AND SITE SECURITY LIGHTING:

A. SCOPE: This section sets forth the General Conditions and procedures relating to Temporary Electric Power, Temporary Lighting System, and Site Security Lighting during the construction period.

B. TEMPORARY ELECTRIC POWER: The Contractor must provide and maintain a temporary electric power service and distribution system of sufficient size, capacity and power characteristics required for construction operations for all required Work by the Contractor and its subcontractors, including but not limited to, power for the temporary lighting system, site security lighting, construction equipment, hoists, temporary elevators and all field offices. temporary electric power must be provided as follows:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (1)

1. CONNECTION TO UTILITY LINES:

a. Temporary electric power service for use during construction must be provided as follows: The Contractor must make all necessary arrangements with the public utility company and pay all charges for the Temporary Electric Power system. The Contractor must include in its total Contract price any charges for temporary electric power, including charges that may be made

by the public utility company for extending its electrical facilities, and for making final connections. The Contractor will make payment directly to the public utility company.

b. APPLICATIONS FOR METER: The Contractor must complete an application to the public utility company and sign all documents necessary for, and pay all charges incidental to, the installation of a watt hour meter or meters for Temporary Electric Power. The Contractor must pay to the public utility company all bills for temporary electric energy used throughout the Work as they become due.

c. SERVICE AND METERING EQUIPMENT: The Contractor must furnish and install, at a suitable location on the Site, approved service and metering equipment for the Temporary Electric Power System, ready for the installation of the public utility company's metering devices. The temporary service mains to and from the metering location must not be less than one hundred (100) Amperes, 3-phase, 4-wire and must be of sufficient capacity to take care of all demands for all construction operations and must meet all requirements of the New York City Electrical Code.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (2)

2. CONNECTION TO EXISTING ELECTRICAL POWER SERVICE:

a. When approved by the Commissioner, electrical power service for the temporary lighting system and for the operation of small tools and equipment less than ¼ horsepower may be taken from the existing electric distribution system if the existing system is of adequate capacity for the temporary power load. The Contractor must cooperate and coordinate with the facility custodian, so as not to interfere with the normal operation of the facility.

b. There will be no charge to the Contractor for the electrical energy consumed.

c. The Contractor must provide, maintain and pay all costs for separate temporary electric power for any temporary power for equipment larger than 1/4 horsepower. When directed by the Commissioner, the Contractor must remove its own temporary power system.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 B (3)

3. ELECTRICAL GENERATOR POWER SERVICE:

a. When connection to utility lines or existing facility electric service is not available or is not adequate to supply the electric power need for construction operations, the Contractor must provide self-contained generators to provide power beyond that available.

b. Pay for all energy consumed in the progress of the Work, exclusive of that available from the existing facility or utility company.

c. Provide for control of noise from the generators.

d. Comply with the Ultra Low Sulfur Fuel in Non-Road Vehicles requirements as set forth in Article 5.4 of the Contract.

C. USE OF COMPLETED PORTIONS OF THE ELECTRICAL WORK:

1. USE OF MAIN DISTRIBUTION PANEL: As soon as the permanent electric service feeders and equipment metering equipment and main distribution panel are installed and ready for operation, the Contractor must have the temporary lighting and power system changed over from the temporary service points to the main distribution panel.

2. COST OF CHANGE OVER: The Contractor will be responsible for all costs due to this change over of service and it must also make application to the public utility company for a watt hour meter to be set on the permanent meter equipment.

3. The requirements for temporary electric power service specified herein must be adhered to after change over of service until Final Acceptance of the Project.

4. NO EXTRA COST: The operation of the service and switchboard equipment will be under the supervision of the Contractor, but this will in no way be interpreted to mean the acceptance of such part of the installation or relieve the Contractor from its responsibility for the complete Work or any part thereof. There will be no additional charge for supervision by the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 D

D. TEMPORARY LIGHTING SYSTEM:

1. The Contractor must provide adequate service for the temporary lighting system, or a minimum of one hundred (100) Amperes, 3-phase, 4-wire service for the temporary lighting system, whichever is greater, and make all necessary arrangements with the public utility company and pay all charges by them for the Temporary Lighting System.

2. The Contractor must furnish and connect to the metered service point a Temporary Lighting System to illuminate the entire area where Work is being performed and points adjacent to the Work, with separately fused circuits for stairways and bridges. Control switches for stairway circuits must be located near entrance on ground floor.

3. ITEMS: The Temporary Lighting System provided by the Contractor must consist of wiring, fixtures, left-hand double sockets (one (1) double socket for every 400 square feet, with one (1) lamp and one (1) three-prong outlet), lamps, fuses, locked-type guards, pigtails and any other incidental material. Additional details may be outlined in the detailed Specifications for the electrical Work. Changes may be made, provided the full equivalent of those requirements is maintained.

4. The Temporary Lighting System will be progressively installed as required for the advancement of the Work under the Contract.

5. RELOCATION: The cost for the relocation or extension of the original Temporary Lighting System, as required by the Contractor or its subcontractors, that is not required due to the normal advancement of the Work, as determined by the Resident Engineer, will be borne by the Contractor.

6. PIGTAILS: The Contractor must furnish pigtails with left-hand sockets with locked-type guards and forty (40) feet of rubber covered cable. The Contractor must furnish and distribute a minimum of three (3) complete pigtails to each subcontractor. See the detailed Electrical Specifications for possible additional pigtails required.

7. LAMPS: The Contractor must furnish and install one (1) complete set of lamps, including those for the trailers. Broken and burned out lamps in the temporary lighting system, DDC field office, and construction trailers must be replaced by the Contractor. All lamps must be compact fluorescent.

8. CIRCUIT PROTECTION: The Contractor must furnish and install Ground Fault Interruption (GFI) protection for the temporary lighting and site security lighting systems.

9. MAINTENANCE OF TEMPORARY LIGHTING SYSTEM:

   a. The Contractor must maintain the Temporary Lighting System in good working order during the scheduled hours established.

   b. The Contractor must include in its total Contract price all costs in connection with the Temporary Lighting System, including all costs for installation, maintenance and electric power.

10. REMOVAL OF TEMPORARY LIGHTING SYSTEM: The temporary lighting system must be removed by the Contractor when authorized by the Commissioner.

11. HAND TOOLS: The temporary lighting system must not be used for power purposes, except that light hand tools not larger than 1/4 horsepower may be operated from such system by the Contractor and its subcontractors.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4 E

E. SITE SECURITY LIGHTING (NEW CONSTRUCTION ONLY):

1. The Contractor must furnish, install and maintain a system of site security lighting, as herein specified, to illuminate the construction Site of the Project, with the system connected to and energized from the Temporary Lighting System. All costs in connection with site security lighting will be deemed included in the total Contract price.

2. It is essential that the site security lighting system be completely installed and operating at the earliest possible date. The Contractor must direct its subcontractors to cooperate, coordinate and exert every effort to accomplish an early complete installation of the site security lighting system. If, after the system is installed and in operation, a part of the system interferes with the Work of any trade, the Contractor will be completely responsible for the expense of removing, relocating, and replacing all equipment necessary to reinstate the system to proper operating conditions.

3. The system must consist of flood lighting by pole-mounted guarded sealed-beam units. Floodlight units must be mounted sixteen (16) feet above grade. Floodlights must be spaced around the perimeter of the Site to produce an illumination level of no less than one (1) foot candle around the perimeter of the Site, as well as in any potentially hazardous area or any other area within the Site that might be deemed by the Resident Engineer to require security illumination. The system must be installed in a manner acceptable to the Resident Engineer. The first lighting unit in each circuit must be provided with a photoelectric cell for automatic control. The photoelectric cell must be installed as per manufacturer's recommendations.

4. All necessary poles must be furnished and installed by the Contractor.

5. The site security lighting must be kept illuminated at all times during the hours of darkness. The Contractor must, at its own expense, keep the system in operation and must furnish and install all material necessary to replace all damaged or burned out parts.

6. The Contractor must be on telephone call alert for maintaining the system during the operating period stated above.

7. All materials and equipment furnished under this section will remain the property of the Contractor and must be removed and disposed of by the Contractor when authorized in writing by the Resident Engineer.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.5

3.5 TEMPORARY HEAT:

A. GENERAL:

1. Definition: The provision of Temporary Heat means the provision of heat in order to permit construction to be performed in accordance with the Progress Schedule during all seasons of the year and to protect the Work from the harmful effects of low temperature. In the event the building, or any portion thereof, is occupied during construction, the provision of Temporary Heat will include the provision of heat to permit normal operations in such occupied areas.

   a. The provision of Temporary Heat must be in accordance with the temperature requirements set forth in sub-section 3.5 C herein.

   b. The provision of Temporary Heat must include the provision of: 1) all fuel necessary and required, 2) all equipment necessary and required, and 3) all operating labor necessary and

required. Operating labor must mean that minimum force required for the safe day-to-day operation of the system for the provision of Temporary Heat and must include, without limitation, heating maintenance labor and/or fire watch as required by New York City Fire Department (FDNY) regulations. Operating labor may be required seven (7) days per week and during non-regular working hours, for the period of time required by seasonal weather conditions.

c. In the event the building, or any portion thereof, is occupied and the Project involves the replacement, modification, and/or shut down of the permanent heating system, or any key component thereof, and such system is a combined system which furnishes domestic hot water for the building occupants, the provision of Temporary Heat must include the provision of domestic hot water at the same temperature as the system which is being replaced. Domestic hot water must be provided in accordance with the phasing requirements set forth in the Contract Documents.

2. Responsibility: The Contractor's responsibility for the provision of Temporary Heat, including all expenses in connection therewith, is as set forth below:

a. Projects Involving enclosure of the building:

1) Prior to Enclosure: Until the Commissioner determines that the building has been enclosed, as set forth in sub-section 3.5 B, the Contractor is responsible for the provision of Temporary Heat.

2) Post Enclosure: Once the Commissioner determines that the building, or any portion thereof, has been enclosed, as set forth in sub-section 3.5 B, the Contractor is responsible for the provision of Temporary Heat by one or more of the following means: 1) by an existing heating system (if any), 2) by a permanent heating system which is being installed as part of the Project, or 3) by a temporary heating system(s).

3) The Contractor must, within two (2) weeks of the kick-off meeting, submit to DDC for review its proposed plan to provide Temporary Heat. Such plan is subject to approval by the Resident Engineer. The Contractor must provide Temporary Heat in accordance with the approved plan until written acceptance by the Commissioner of the Work of all Contractors, including punch list Work, unless directed otherwise in writing by the Commissioner. The responsibility of the Contractor provided for herein is subject to the exception set forth in sub-section 3.5 A.2 (b) herein.

b. Projects not involving enclosure of the building:

1) If the Project involves the installation of a new permanent heating system if one did not exist previously, or the replacement, modification, and/or shut down of the existing permanent heating system, or any key component thereof, the Contractor will be responsible for the provision of Temporary Heat, except as otherwise provided in sub-section 3.5 H.3(b).2 herein.

2) If the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification, and/or shut down of the existing permanent heating system, or any key component thereof, there is no Contractor responsibility of the provision of Temporary Heat, unless otherwise specified in the Contract Documents. However, if the Commissioner, pursuant to sub-section 3.5 H.3 (b).1 herein, determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor will be responsible for the provision of Temporary Heat and must be paid for the same in accordance with sub-section 3.5 H.3 (b).1 herein.

B. ENCLOSURE OF STRUCTURES:

1. Notification: The Contractor must notify all its subcontractors and the Resident Engineer at least thirty (30) Days prior to the anticipated date that the building(s) will be enclosed.

2. Commissioner Determination: The Commissioner will determine whether the building, or any portion thereof, has been enclosed. As indicated in sub-section 3.5 A.2 above, once the building has been enclosed, the Contractor will be responsible for the provision of Temporary Heat. The Commissioner's determination with respect to building enclosure will be based upon all relevant facts and circumstances, including without limitation, 1) whether the building meets the criteria set forth in Paragraph 3 below, and 2) whether the openings in the building, such as doorways and windows, have been sufficiently covered so as to provide reasonable heat retention and protection from the elements.

3. Criteria for enclosure:

a. Roof Area:

1) A building will be considered to be roofed when the area to be roofed is covered by a permanent structure and all openings through the permanent structure are covered and protected by temporary covers as described in Paragraph (c) below.

2) Intermediate floor structures of multi-floor buildings will be considered to be roofed subject to the same requirements of the building roof.

3) The final roofing system need not be in place for the building or structure to be determined to be enclosed, provided, however, all openings through the permanent structure covering the roof must be covered and protected by temporary covers, as described in Paragraph (c) below.

b. Walls: For the walls to be determined to be enclosed, permanent exterior wall elements or facing material must be in place and all openings must be covered and protected by temporary covers, as described in Paragraph (c) below.

c. Temporary Covers: In order to be acceptable, temporary covers must be securely fixed to prevent the entrance of rain, snow and direct wind. The minimum material requirements for temporary covers are as follows: 1) minimum ten (10) millimeter plastic, 2) minimum twelve (12) ounce waterproof canvas tarpaulins, or 3) a minimum three-eighths (3/8) inch thickness exterior grade plywood.

d. Temporary covers for openings will be the responsibility of the Contractor and such Work will be deemed included in the Contract price.

C. TEMPERATURE REQUIREMENTS:

1. Unoccupied Buildings: The temperature requirement for the provision of Temporary Heat in unoccupied buildings will be the GREATER of the following: 1) fifty (50) degrees Fahrenheit, or 2) the temperature requirement for the particular type of Work set forth in the Contract Documents.

2. Occupied Buildings: The temperature requirement for the provision of Temporary Heat in occupied buildings, or portions thereof, will be the GREATER of the following: 1) sixty-eight (68) degrees Fahrenheit, or 2) the temperature requirement for the particular type of Work set forth in the Contract Documents.

D. DURATION:

1. The Contractor must be required to provide Temporary Heat until Final Acceptance, including all punch list work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. The Contractor must be responsible for the provision of Temporary Heat for the time specified herein, regardless of any delays in completion of the Project, including delays that

result in the commencement of the provision of Temporary Heat during a season that is later than that which may have been originally anticipated. The Contractor must include in its total Contract price all expenses in connection with the provision of Temporary Heat in accordance with the requirements specified herein.

2. The total Contract duration is set forth in Schedule A of the Addendum. The table set forth below indicates the number of full heating seasons that are deemed included in various Contract durations, which are specified in CCDs. At a minimum, a full heating season must extend from October 15th to April 15th.

Contract Duration	Full Heating Seasons Required
up to 360 CCD	1 full heating season
360 to 720 CCD	2 full heating seasons
more than 720 CCD	3 full heating seasons

E. METHOD OF TEMPORARY HEAT:

1. The method of temporary heat must be in conformance with the New York City Fire Code and with all applicable laws, rules, and regulations. Prior to implementation, such method must be subject to the written approval of the Commissioner.

2. The method of temporary heat must:

   a. Not cause the deposition of dirt or smudges upon any finished Work or cause any defacement or discoloration to the finished Work.

   b. Not be injurious or harmful to people or materials.

   c. Portable fueled heating devises or equipment will NOT be allowed for use as temporary heat other than construction-related curing or drying in conformance with the NYC Fire Code.

3. No open fires will be permitted.

F. TEMPORARY HEATING SYSTEM:

1. The temporary system for the provision of Temporary Heat provided by the Contractor following enclosure of the building must be complete, including, subject to provisions of paragraph E above, boilers pumps, radiators, space heaters, water and heating piping, insulation and controls. The temporary system for the provision of Temporary Heat must be capable of maintaining the minimum temperature requirements set forth in Paragraph C above.

G. COORDINATION:

1. The Contractor, in the provision of Temporary Heat, must coordinate its operations in order to insure sufficient and timely performance of all required Work, including Work performed by trade subcontractors. The Contractor must supply and pay for all water required and used in the building for the operation of the heating system(s) for the purpose of Temporary Heat. The Contractor must include all expenses in connection with the supply of water for Temporary Heat in its total Contract price. During the period in which Temporary Heat in an enclosed building is being furnished and maintained, the Contractor must provide proper ventilating and drying, open and close the windows and other openings when necessary for the proper execution of the Work and when directed by DDC. The Contractor must maintain all permanent or temporary enclosures at its own expense.

H. USE OF PERMANENT HEATING SYSTEMS:

1. Use of Permanent Heating System for Temporary Heat after Building Enclosure:

a. The Contractor must provide all labor and materials to promptly furnish and set all required equipment, convectors and/or radiators, piping, valves, fitting, etc., in ample time for their use for the provision of Temporary Heat after enclosure of the building.

b. New portions of the permanent heating system that are used for furnishing Temporary Heat must be left in near-perfect condition when delivered to the City for operation. Any repairs required, other than for ordinary wear and tear on the equipment, must be made by the Contractor at his/her expense. The starting date for the warranty or guarantee period for such equipment must be the date of Substantial Completion acceptance.

c. In the event that the Contractor does not advance the installation of the permanent heating system in sufficient time to permit its use for Temporary Heat as determined by DDC, the Contractor must furnish and install a separate system for the provision of Temporary Heat as required to maintain the minimum temperature requirements set forth in Paragraph C above.

2. All equipment for the system for the provision of Temporary Heat must be placed so as to comply with the requirements specified hereinbefore, and must be connected, disconnected and suitably supported and located so as to permit construction Work, including finish Work such as wall plastering and painting, to proceed. The installation of the system for the provision of Temporary Heat by the Contractor, including the placing of ancillary system equipment, must be coordinated with the operations of all trade subcontractors so as to insure sufficient and timely performance of the Work. Once the permanent heating system is operating properly, the Contractor must remove all portions of the system for Temporary Heat not part of the permanent heating system.

3. Temporary Heat Allowance for Special Conditions or and/or Unforeseen Circumstances:

a. The City may establish an Allowance in the Contract for payment of costs and expenses in connection with the provision of Temporary Heat as set forth herein. If established, the City will include an amount for such Allowance on the Bid Form, and the Contractor must include such Allowance amount in its total Contract price. The Contractor will only be entitled to payment from this Allowance under the conditions and in accordance with the requirements set forth below. In the event this Allowance or any portion thereof remains unexpended at the conclusion of the Contract, such Allowance must remain the sole property of the City. Should the amount of the Allowance be insufficient to provide payment for the expenses specified below, the City will increase the amount of the Allowance.

b. The Allowance set forth herein may be utilized only under the conditions set forth below.

1. In the event the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification, and/or shut down of the existing permanent heating system, or any key component thereof, and the Commissioner determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor must be responsible for the provision of Temporary Heat, as directed by the Commissioner. The City must pay such Contractor for all costs for labor, material, and equipment necessary and required for the same. Payment must be made in accordance with Article 26 of the Contract, except that the cost of fuel must be as set forth in Paragraph (c) below.

2. In the event the Commissioner determines that there is a need for maintenance of the permanent heating system by the Contractor after Final Acceptance by the Commissioner of the Work, and that the need for such maintenance is not the fault of the Contractor, the Contractor must provide the required maintenance of the permanent heating system for the period of time directed by the Commissioner. The City will pay the Contractor for the cost of direct labor and fuel necessary and required in connection with such maintenance, excluding the cost of any foremen or other supervision. Payment must be made in accordance with Article 26 of the Contract, except that the cost of fuel must be as set forth in Paragraph (c) below.

c. Payment for Fuel Costs: Payment from the Allowance set forth herein for the cost of fuel necessary and required to operate the system for the provision of Temporary Heat, or to maintain the permanent heating system under the conditions set forth in Paragraph b above, must be limited to the direct cost of such fuel. The Contractor will not be entitled to any overhead and/or profit for such fuel costs. In order to receive payment for such fuel costs, the Contractor must present original invoices for the same. DDC reserves the right to furnish the required fuel.

I. RELATED ELECTRICAL WORK:

1. The Contractor must be responsible for providing the items set forth below and must include all expenses in connection with such items in its total Contract price. The Contractor must provide such items promptly when required and must in all respects coordinate its Work with the Work performed by trade subcontractors in order to facilitate the provision of Temporary Heat.

a. The Contractor must provide all labor, materials, equipment and power necessary and required to furnish and maintain any temporary or permanent electrical connections to all equipment specified to be connected as part of the work of the Contractor's Contract.

b. The Contractor must supply and pay for all power necessary and required for the operation of the system for the provision of Temporary Heat and/or the permanent heating system used for Temporary Heat. Such power must be provided by the Contractor for the duration the Contractor is required to provide Temporary Heat, as set forth in sub-section 3.5 D herein.

2. In providing the items set forth in Paragraph 1 above, the Contractor is advised that labor may be required seven (7) days a week and/or during non-regular working hours for the period of time required by seasonal weather conditions.

J. RELATED PLUMBING WORK:

1. The Contractor must be responsible for providing all labor, materials, and equipment necessary and required to furnish and maintain all temporary or permanent connections to all equipment or plumbing outlets specified to be provided as part of the Work of this Contract. The Contractor must include all expenses in connection with such items of Work in its total Contract price. The Contractor must provide such items of Work promptly when required and must in all respects coordinate its Work with the Work performed by trade subcontractors in order to facilitate the provision of Temporary Heat.

2. In the event portions of the permanent plumbing equipment furnished by the Contractor as part of the Work of this Contract are used for the provision of Temporary Heat either during construction or prior to acceptance by the City of the complete plumbing system, the Contractor will be responsible to provide such plumbing equipment to the City in near-perfect condition and must make any repairs required, other than for ordinary wear and tear on the equipment, at the Contractor's expense. The starting date for warranty and/or guarantee period for such plumbing equipment must be the date of Substantial Completion by the City.

3. For Projects requiring the installation of new and/or modified gas service, as well as associated meter installations, the Contractor must promptly perform all required filings and coordination with the utility companies in order to expedite the installation, testing, and approval of the gas service and associated meter(s).

3.6 STORM WATER CONTROL, DEWATERING FACILITIES AND DRAINS:

A. PUMPING:

1. Comply with requirements of authorities having jurisdiction. Maintain Project Site, excavations, and construction free of water. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rainfall.

2. Contractor must furnish and install all necessary automatically operated pumps of adequate capacity with all required piping to run-off agencies, so as to maintain the excavation, cellar floor, pits and exterior depressions and excavations free from accumulated water during the entire period of construction and up to the date of Final Acceptance of Work of the Contract.

3. All pumps must be maintained at all times in proper working order.

4. Dispose of rainwater in a lawful manner that will not result in flooding the Project or adjoining properties nor endanger permanent Work or temporary facilities.

5. Remove snow and ice as required to minimize accumulations.

3.7 TEMPORARY FIELD OFFICE FOR CONTRACTOR:

A. The Contractor must establish a temporary field office for its own use at the Site during the period of construction, at which readily available copies of all Contract Documents must be kept.

B. The field office must be located where it will not interfere with the progress of any part of the Work or with visibility of traffic control devices.

C. CONTRACTOR'S REPRESENTATIVE: There must be a responsible and competent representative of the Contractor in charge of the office who is duly authorized to receive orders and directions and to put them into effect.

D. Arrangements must be made by the Contractor whereby its representative may be readily available by telephone.

E. All temporary structures must be of substantial construction and neat appearance, and must be painted a uniform gray unless otherwise directed by the Commissioner.

F. CONTRACTOR'S SIGN: The Contractor must post and keep posted on the outside of its field office, office, exterior fence, or wall at Site of Work, a legible sign giving the full name of the company, address of the company and telephone number(s) of responsible representative(s) of the firm who can be reached in the event of an emergency at any time.

G. ADVERTISING PRIVILEGES: The City reserves the right to all advertising privileges. The Contractor must not cause any signs of any kind to be displayed at the Site unless specifically required herein or authorized by the Commissioner.

3.8 DDC FIELD OFFICE:

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 A

A. OFFICE SPACE IN EXISTING BUILDING:

1. The Resident Engineer will arrange for office space for sole use in the building where Work is in progress. The Contractor must provide and install a lockset for the door to secure the equipment in the room. The Contractor must provide two (2) keys to the Resident Engineer. After completion of the Project the Contractor must replace the original lockset on the door and ensure its proper operation.

2. In addition to equipment specified in sub-section 3.8 D, the Contractor must provide, for exclusive use of the DDC Field Office, the following:

a. Two (2) single pedestal desks, 42” x 32”; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two metal (2) lockers, single units, 15” x 18” x 78” overall including 6” legs. Lockers to have flat key locks with two (2) keys each, General Steel products or approved equal. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks, approximately 52”H x 28 ½”D x 18”W.

b. One (1) 9000 B.T.U air conditioner or as directed by Commissioner. Wiring for the air conditioner must be minimum No. 12 AWG fed from individual circuits in the fuse box.

c. One (1) folding conference table, 96" x 30" and ten (10) folding chairs.

d. Two (2) metal wastebaskets.

e. One (1) fire extinguisher, one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.

f. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Project as required.

3. The Contractor must provide one (1) telephone, where directed and must pay all costs for telephone service for calls within the New York City limits for the duration of the Project.

4. All furniture and equipment, except computer equipment specified in sub-section 3.8 D.3, must remain the property of the Contractor.

5. Computer workstation quantities must be provided as specified in sub-section 3.8 B 3-a for DDC Managed Projects, or sub-section 3.8 B 3-b for CM Managed Projects.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 B

B. DDC FIELD OFFICE TRAILER:

1. GENERAL: The Contractor must, for the time frame specified herein, provide and maintain at its own cost and expense a DDC Construction Field Office and all related items as specified herein [hereinafter collectively referred to as the "DDC Field Office"] for the exclusive use of the Resident Engineer. The DDC Field Office must be located at the Project Site and must be solely dedicated to the Project. Provision of the DDC Field Office must commence within thirty (30) Days from Notice to Proceed (NTP) and must continue through forty-five (45) Days after Substantial Completion of the required construction at the Project Site. The Contractor must remove the DDC Field Office forty-five (45) Days after Substantial Completion of the required construction, or as otherwise directed in writing by the Commissioner.

2. TRAILER: The Contractor must provide at its own cost and expense a mobile office trailer for use as the DDC Field Office. The Contractor must install and connect all utility services to the trailer within thirty (30) Days from NTP. The trailer must have equipment in compliance with the minimum requirements hereinafter specified. Any permits and fees required for the installation and use of said trailer must be borne by the Contractor. The trailer including furniture and equipment therein, except computer equipment specified in sub-section 3.8D.3 herein, must remain the property of the Contractor.

3. Trailer must be an office-type trailer of the size specified herein, with exterior stairs at entrance. Trailer construction must be minimum 2 x 4 wall construction fully insulated with paneled interior walls, pre-finished gypsum board ceilings and vinyl tile floors.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8.B.3a or SUB-SECTION 3.8.B.3b.

a. DDC Managed Project Trailer: DDC Field Office Trailer Size, Layout and Computer Workstation:

1) Overall length: 32 Feet
Overall width: 10 Feet
2) Interior Layout:
Provide one (1) general office/conference room area and one (1) private office at one end of the trailer. Provide equipment and amenities as specified in sub-section 3.8.B herein.

3) Computer Workstation: Provide one (1) complete computer workstation, as specified in sub-section 3.8.D herein, in the private office area as directed by the Resident Engineer.

b. CM Managed Project Trailer: DDC Field Office Trailer Size, Layout and Computer Workstation:

1) Overall length: 50 Feet
Overall width: 10 Feet
2) Interior Layout:
Provide one (1) large general office/conference room in the center of the trailer and two (2) private offices, one (1) each at either end of the trailer. Provide equipment and amenities as specified in sub-section 3.8.B herein.
3) Computer Workstation:

Provide three (3) complete computer workstations as specified in sub-section 3.8.D herein. Provide one (1) each complete computer workstation in each private office and one (1) complete computer workstation at the secretarial position as directed by the Resident Engineer.

4. The exterior of the trailer must be lettered with black block lettering of the following heights with white borders:

CITY OF NEW YORK	2-1/2"
DEPARTMENT OF DESIGN AND CONSTRUCTION	3-3/4"
DIVISION OF PUBLIC BUILDINGS	3-1/2"
DDC FIELD OFFICE	2-1/2"

NOTE: In lieu of painting letters on the trailer, the Contractor may substitute a sign constructed of a good quality weatherproof material with the same type and size of lettering above.

5. All windows and doors must have aluminum insect screens. Provide wire mesh protective guards at all windows.

6. The interior must be divided by partitions into general and private office areas as specified herein. Provide a washroom located adjacent to the private office and a built-in wardrobe closet opposite the washroom. Provide a built-in desk in the private office(s) with fixed overhead shelf and clearance below for two (2) file cabinets.

7. Provide a built-in drafting or reference table, located in the general office/conference room, at least sixty (60) inches long by thirty-six (36) inches wide with cabinet below and wall type plan rack at least forty-two (42) inches wide.

8. The washroom must be equipped with a flush toilet, wash basin with two (2) faucets, medicine cabinet, complete with supplies and a toilet roll tissue holder. Plumbing and fixtures must be

approved house type, with each appliance trapped and vented and a single discharge connection. Five (5) gallon capacity automatic electric heater for domestic hot water must be furnished.

9. HVAC: The trailer must be equipped with central heating and cooling adequate to maintain a temperature of seventy-two (72) degrees during the heating season and seventy-five (75) degrees during the cooling season when the outside temperature is five (5) degrees F. winter and eighty-nine (89) degrees F. summer.

10. Lighting must be provided via ceiling mounted fluorescent lighting fixtures to a minimum level of fifty (50) foot candles in the open and private office(s) along with sufficient lighting in the washroom. Broken and burned out lamps must be replaced by the Contractor. A minimum of four (4) duplex convenience outlets must be provided in the open office and two (2) each in the private office(s). These outlets must be in addition to special outlet requirements for computer stations, copiers, HVAC unit, etc.

11. Electrical service switch and panel must be adequately sized for the entire trailer load. Provide dedicated circuits for HVAC units, hot water heater, copiers and other equipment as required. All wiring and installation must conform to the New York City Electrical Code.

12. The following movable equipment must be furnished:

    a. Two (2) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks and two (2) full ball bearing two (2) drawer vertical legal filing cabinets in each private office located below built-in desk.

    b. One (1) folding conference table, 96” x 30” and ten (10) folding chairs.

    c. Three (3) metal wastebaskets.

    d. One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.

    e. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Contract as required.

13. TRAILER TEMPORARY SERVICE: Plumbing and electrical Work required for the trailer will be furnished and maintained as below.

    a. PLUMBING WORK: The Contractor must provide temporary water and drainage service connections to the DDC Field Office trailer for a complete installation. Provide all necessary soil, waste, vent and drainage piping.

       Contractor to frost-proof all water pipes to prevent freezing.

       1) REPAIRS, MAINTENANCE: The Contractor must provide repairs for the duration of the Project until the trailer is removed from the Site.

       2) DISPOSITION OF PLUMBING WORK: At the expiration of the time limit set forth in sub-section 3.8 B 1 herein, the temporary water and drainage connections and piping to the DDC Field Office trailer must be removed by the Contractor and must be plugged at the mains. All piping must become the property of the Contractor for plumbing Work and must be removed from the Site, all as directed. All repair Work due to these removals must be the responsibility of the Contractor.

    b. ELECTRICAL WORK:

       1) The Contractor must furnish, install and maintain a temporary electric feeder to the DDC Field Office trailer immediately after it is placed at the job Site.

       2) The temporary electrical feeder and service switch/fuse must be adequately sized

based on the trailer load and installed per the New York City Electrical Code and complying with utility requirements.

3) Make all arrangements and pay all costs to provide electric service.

4) The Contractor must pay all costs for current consumed and for maintenance of the system in operating condition, including the furnishing of the necessary bulb replacements lamps, etc., for the duration of the Project and for a period of forty-five (45) Days after the date of Substantial Completion.

5) Disposition of Electric Work: At the expiration of the time limit set forth, the temporary feeder, safety switch, etc., must be removed and disposed of as directed.

6) All repair Work due to these removals must be the responsibility of the Contractor.

c. MAINTENANCE

1) The Contractor must provide and pay all costs for regular weekly janitor service and furnish toilet paper, sanitary seat covers, cloth towels and soap and maintain the DDC Field Office in first-class condition, including all repairs, until the trailer is removed from the Site.

2) Supplies: The Contractor must be responsible for providing (1) all office supplies, including without limitation, pens, pencils, stationery, filtered drinking water and sanitary supplies, and (2) all supplies in connection with required computers and printers, including without limitation, an adequate supply of blank CD's/DVD's, storage boxes for blank CDs/DVDs, and paper and toner cartridges for the printer.

3) Risk of Loss: The entire risk of loss with respect to the DDC Field Office and equipment must remain solely and completely with the Contractor. The Contractor must be responsible for the cost of any insurance coverage determined by the Contractor to be necessary for the field office.

4) At forty-five (45) Days after the date of Substantial Completion, or sooner as directed by the Commissioner, the Contractors must have all services disconnected and capped to the satisfaction of the Commissioner. All repair Work due to these removals must be the responsibility of the Contractor.

d. TELEPHONE SERVICE: The Contractor must provide and pay all costs for the following telephone services for the DDC Field Office trailer:

1) Separate telephone lines for one (1) desk phone in each private office.

2) One (1) wall phone (with six (6) foot extension cord) at plan table.

3) Separate telephone lines for the fax machine and internet access in each private office. Telephone service must include voice mail. All electronic voicemail messages must be automatically forwarded as email attachments, to allow for the voicemails to be played remotely.

4) A remote bell located on outside of trailer

5) The telephone service must continue until the trailer is removed from the Site.

e. PERMITS: The Contractor must make the necessary arrangements and obtain all permits and pay all fees required for this Work.

C. RENTED SPACE: The Contractor has the option of providing, at its cost and expense, rented office or store space in lieu of trailer. Said space must be in the immediate area of the Project and have adequate plumbing, heating and electrical facilities. Space chosen by the Contractor for the DDC Field Office must be approved by the Commissioner before the area is rented. All insurance, maintenance and equipment,

including computer workstations specified in sub-section 3.8 D in quantities required as specified in sub-section 3.8 B 3 for the DDC Field Office trailer, must also apply to rented spaces.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.8 D

D. ADDITIONAL EQUIPMENT FOR THE DDC FIELD OFFICE:

1. Photocopying Machine: Stand-alone, heavy duty, electric, dry-process color photocopying type with color scan and send capability via email, a minimum production rate of seventy (70) pages per minute and an adequate supply of copy paper, toner, etc. The machine must be capable of duplex copying paper sizes of 8-1/2 x 11 inches, 8-1/2 x 14 inches and 11 x 17 inches, and have separate trays for each paper size. It must have a document feeder, collator, stapler, and the capability to reduce/enlarge copies between each paper size. The supply of each size copy paper, toner, etc. must be replenished and the machines must be maintained for the duration of the Contract by the Contractor as required by the Resident Engineer. Make and model can be Minolta, Canon, IBM, Epson, or an approved equivalent, and must be networked to the office computers for printing capability. Copier must remain at job Site until the DDC Field office trailer is removed from the Site.

2. The Contractor must furnish a fax machine and a telephone answering machine at commencement of the Project for the exclusive use of the DDC Field Office. All materials must be new, sealed in manufacturer's original packaging and must have manufacturers' warrantees. All items must remain the property of the City of New York at the completion of the Project.

3. COMPUTER WORKSTATION: The Contractor must provide one (1) complete computer workstation, in quantities specified in sub-section 3.8.B.3, as specified herein:

   a. Hardware/Software Specification:

      1) Computer Equipment: Computers must be provided for all Contracts that have a total Consecutive Calendar Days (CCD) for construction duration, as set forth in Schedule "A", of 180 CCD's or greater. Contracts of lesser duration must not require computers.

      2) Computers furnished by the Contractor for use by City Personnel for the duration of the Contract must be in accordance with the Specific Requirements contained herein, must remain the property of the City of New York at the completion of the Project, and must meet the following minimum requirements:

      3) Personal Computer(s) – Each Workstation Configuration.

a)	Make and Model:	Dell; HP; Gateway; Acer; or, an approved equivalent. (Note: an approved equivalent requires written approval of the DDC Assistant Commissioner of Information Technology Services (ITS)).
b)	Processor:	i5-2400 (6MB Cache, 3.1GHz) or faster computer - Single Processor.
c)	System RAM:	Minimum of 4GB (Gigabytes) Dual Channel DDR3 SDRAM at 1333MHz – 2 DIMMSs.
d)	Hard Disk Drive(s):	500 GB (Gigabytes) Serial ATA (7200RPM) w/DataBurst Cache, or larger.
e)	CD-RW:	Internal CD-RW, 48x Speed or faster.
f)	16xDVD+/-RW	DVD Burner (with double layer write capability) 16x Speed or faster.

g) I/O Ports: Must have at least one (1) Serial Port, one (1) Parallel Port, and three (3) USB Ports.

h) Video Display Card: HD Graphics (VGA, HDMI) with a minimum of 64 MB of RAM.

i) Monitor: 22" W, 23.0 Inch VIS, Widescreen, VGA/DVI LCD Monitor.

j) Available Exp. Slots: System as configured above must have at least two (2) full size PCI Slots available.

k) Network Interface: Integrated 10/100/1000 Ethernet card.

l) Other Peripherals: Optical scroll Mouse, 101 Key Keyboard, Mouse Pad and all necessary cables.

m) Software Requirement: Microsoft Windows 7 Professional SP1, 32 bit; Microsoft Office Professional 2010 or 2013; Microsoft Project 2010; Adobe Acrobat reader; Anti-Virus software package with 2 year updates subscription; and, either Auto Cad LT or Microsoft Visio Standard Edition, as directed by the Resident Engineer.

4) DDC Field Office Specs: DDC Field Offices requiring computers must be provided with the following:

a) One (1) broad-band internet service account. Wideband Internet connectivity at a minimum throughput of fifteen (15) Mbps download and five (5) Mbps upload is required at each field office location with 1-5 staffers. For larger field offices see table below for minimum required upload speeds. Telephone service should be bundled together with Internet connectivity. Because of throughput requirements Verizon FIOS is the preferred connectivity provider where available.

Office Personnel #	Upload Speeds (*Minimum*)
1 – 5	5 Mbps
6 – 10	10 Mbps
11 – 15	15 Mbps
16 – 20 …	20 Mbps

This account will be active for the life of the Project. The e-mail name for the account must be the DDC Field Office/Project Id (preferably Gmail or Outlook e.g. ABC1234@gmail.com).

b) One (1) 600 DPI HP Color Laser Jet Printer (twelve (12) pages per minute or faster) with one (1) Extra Paper (Legal Size) (Not required if photocopying machine prints in color).

c) All necessary cabling for equipment specified herein

d) Storage Boxes for Blank CD's

e) Printer Table

f) UPS/Surge Suppressor combo

g) Ten (10) USB Thumb (or Flash) Drives – sixteen (16) GB each

5) All computers required for use in the DDC Field Office must be delivered, installed, and

setup in the Field Office by the Contractor.

6) All Computer Hardware must come with a three (3) year warranty for on-site repair or replacement. Additionally, and notwithstanding any terms of the warranty to the contrary, the Contractor is responsible for rectifying all computer problems or equipment failures within one (1) business day.

7) An adequate supply of blank CDs/DVDs, and paper and toner cartridges for the printer must be provided by the Contractor and must be replenished by the Contractor as required by the Resident Engineer.

8) It is the Contractor's responsibility to ensure that electrical service and phone connections are also available at all times; that is, the Field Office Computer(s) is to be powered and turned on twenty-four (24) hours each Day.

9) Broadband connectivity is preferred at each field office location. Please take into consideration that an extra phone line dedicated to the modem must be ordered as part of the Contract unless Internet broadband connectivity, via Cable or DSL, is available at the planned field office location. Any questions regarding this policy should be directed to the Assistant Commissioner of ITS at 718-391-1761.

E. HEAD PROTECTION (HARD HATS):

1. The Contractor must provide a minimum of ten (10) standard protective helmets for the exclusive use of DDC personnel and their visitors. Helmets must be turned over to the Resident Engineer and kept in the DDC Field Office.

2. Upon completion of the Project, the helmets must become the property of the Contractor.

3.9 MATERIAL SHEDS:

A. Material sheds used by the Contractor for the storage of its materials must be kept at locations which will not interfere at any time with the progress of any part of the Work or with visibility of traffic control devices.

B. The Contractor must store combustible materials apart from the facility.

3.10 TEMPORARY ENCLOSURES:

A. The Contractor must provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.

B. Where heating or cooling is needed and Permanent Enclosure is not complete, the Contractor must insulate temporary enclosures.

3.11 TEMPORARY PARTITIONS:

A. The Contractor must provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied tenant areas from fumes and noise, including, but without limitation:

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.

2. Construct dustproof partitions with 2 layers of 3-mil (0.07-mm) polyethylene sheet on each side. Cover floor with two (2) layers of 3-mil (0.07-mm) polyethylene sheet, extending sheets eighteen (18) inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.

a. Construct vestibule and airlock at each entrance through temporary partition with not less than forty-eight (48) inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.

3. Insulate partitions to provide noise protection to occupied areas.

4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.

5. Protect air-handling equipment.

6. Weather strip openings.

7. Provide walk-off mats at each entrance through temporary partition.

3.12 TEMPORARY FIRE PROTECTION:

A. The Contractor must install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with National Fire Protection Association (NFPA) Standard 241.

B. Smoking in all areas is prohibited.

C. The Contractor must supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

D. The Contractor must develop and supervise an overall fire-prevention and protection program for personnel at Project Site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

E. The Contractor must provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.13

3.13 WORK FENCE ENCLOSURE:

A. The Contractor must furnish, erect and maintain a wood construction or chain-link fence to the extent shown on the Contract Drawings or required by the Work enclosing the entire Project on all sides. All materials used must be new. Any permit required for the installation and use of said fence and costs must be borne by the Contractor.

B. WOOD FENCE must be seven (7) feet high with framing construction of yellow pine, using 4" x 4" approved preservative-treated posts on not more than 6'-0" centers, with three (3) rails of at least 2" x 4" size to which must be secured minimum 1/2 inch thick exterior grade plywood. Posts must be firmly fixed in the ground at least 30" and thoroughly braced. Top edge of fence must be trimmed with a rabbeted edge mould. Provide on the street traffic sides of fence, observation openings as directed.

1. GATES: The Contractor must provide an adequate number of double gates, complete with hardware, located as approved by the Resident Engineer. Double gates must have a total clear opening of 14'-0" with two (2) 7'-0" hinged swinging sections. Hanging posts must be 6" x 6" and must extend high enough to receive and be provided with tension or sag rods for the swinging sections.

2. PAINTING: The fence and gates must be entirely painted on the street and public sides with one (1) coat of exterior primer and one (1) top coat of exterior grade acrylic-latex emulsion paint. Black stenciled signs reading "POST NO BILLS" must be painted on fence with three (3) inch high letters on twenty-five (25) foot spacing for the entire length of fence on street traffic sides. Signs must be stenciled five (5) feet above the sidewalk.

C. CHAIN-LINK FENCING must be minimum two (2) inch thick, galvanized steel, chain-link fabric fencing; eight (8) feet high with galvanized steel pipe posts; minimum 2-3/8-inch Outside Diameter (OD) line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Fence must be accurately aligned and plumb, adequately braced and complete with gates, locks and hardware as required. Under no condition must fencing be attached or anchored to existing construction or trees.

D. ADDITIONAL REQUIREMENTS:

1. It must be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
2. Should the fencing be required to be relocated during the course of the Contract, it must be done by the Contractor at no additional cost to the City.
3. Where sidewalks are used for "drive over" purposes for Contractor vehicles, a suitable wood mat or pad must be provided for protection of sidewalks and curbs.
4. Where required, make provision for fire hydrants, lampposts, etc.
5. REMOVAL: When directed by the Resident Engineer, the fence must be removed.

3.14 RODENT AND INSECT CONTROL:

A. DESCRIPTION: The Contractor must provide all labor, materials, plant and equipment, and incidentals required to survey and monitor rodent activity and to control any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the Project area. Special attention should be paid to the following conditions or areas:

1. Wet areas within the Project area, including all temporary structures.
2. All exterior and interior temporary toilet structures within the Project area.
3. All Field Offices and shanties within the Project area of all subcontractors and DDC.
4. Wherever there is evidence of food waste and/or discarded food or drink containers, in quantity, that would cause breeding of rodents or the insects herein specified.
5. Any other portion of the Site requiring such special attention.

B. MATERIALS:

1. All materials must be approved by the New York State Department of Environmental Conservation (DEC) and comply with the New York City Health Code, OSHA and the laws, ordinances and regulations of state and federal agencies pertaining to such chemical and/or materials.

C. PERSONNEL:

1. All pest control personnel must be supervised by an exterminator licensed in categories 7A and 8.

D. METHODS:

1. Application and dosage of all materials must be done in strict compliance with the manufacturer’s recommendations.
2. Any unsanitary conditions, such as uncollected garbage or debris, resulting from all Contractor’s activities, which will provide food and shelter to the resident rodent population must be corrected by the Contractor immediately after notification of such condition by the Resident Engineer.

E. RODENT CONTROL WORK:

1. In wetlands, woodlands, and areas adjacent to a stream, special precautions must be taken to protect water quality and to ensure the safety of other wildlife. To prevent poisoned bait from entering streams, no poisoned bait must be used in areas within seventy-five (75) feet of all stream banks.

Live traps must be used in these seventy-five (75) foot buffer zone areas and within wetland and woodland areas.

2. In areas outside the seventy-five (75) foot zone of protection adjacent to streams, and in areas outside wetlands and woodlands, tamper proof bait stations with poisoned bait must be placed during the period of construction and any consumed or decomposed bait must be replenished as directed.

3. At least one (1) month prior to initiation of the construction Work, and periodically thereafter, live traps and/or rodenticide bait in tamper proof bait stations, as directed above, must be placed at locations that do not allow access to pets, human beings, children and other non-target species, particularly wildlife (for example-birds) in the Project area.

4. The Contractor must be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper-proof bait stations. The Contractor must also be responsible for posting and maintaining signs announcing the baiting of each particular location.

5. The Contractor must be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalks within the Project area.

6. It is anticipated that public complaints will be addressed to the Commissioner. The Contractor, where directed by the Commissioner, must take appropriate actions, like baiting, trapping, proofing, etc., to remedy the source of complaint within the next six (6) hours of normal working time which is defined herein for the purposes of this section as 7 A.M. to 6 P.M. on Mondays through Saturdays.

7. Emergency service during the regular workday hours (Monday through Friday) must be rendered within twenty-four (24) hours, if requested by the Commissioner, at no additional cost to the City.

F. EDUCATION & NOTICES:

1. The Contractor must post notices on all Construction Bulletin Boards advising workers, employees, and residents to call the DDC Field Office to report any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the Project area. The Contractor must provide and distribute literature pertaining to Integrated Pest Management (IPM) techniques of rodent control to affected businesses and superintendents of nearby residential buildings to ensure their participation in maintaining their establishments free of unsanitary conditions, harborage removal and rodent proofing.

2. Prior to application of any chemicals, the Contractor must furnish to the Commissioner copies or sample labels for each pesticide, antidote information, and Material Data Safety Sheets (MSDS) for each chemical used.

G. RECORDS

1. The Contractor must keep a record of all rodent and waterbug infestation surveys conducted and make available, upon request, to the Commissioner. The findings of each survey must include, but not be limited to, recommended IPM techniques, like baiting, trapping, proofing, etc., proposed for rodent and waterbug pest control.

2. The Contractor must maintain records of all locations baited along with the type and quantity of rodenticide and insecticide bait used.

3.15 PLANT PEST CONTROL REQUIREMENTS AND TREE PROTECTION REQUIREMENTS:

A. Plant Pest Control Requirements: The Contractor and its subcontractors, including the Certified Arborist described below, must comply with all federal and New York State laws and regulations concerning Asian Longhorned Beetle (ALB) management, including protocols for ALB eradication and containment promulgated by the New York State Department of Agriculture and Markets (NYSDAM). The Contractor is referred to: (1) Part 139 of Title 1 NYCRR, Agriculture and Markets Law, Sections 18, 164 and 167, as amended, and (2) State Administrative Procedure Act, Section 202, as amended.

1. All tree Work performed within the quarantine areas must be performed by NYSDAM certified entities. Transportation of all host material, living, dead, cut or fallen, inclusive of nursery stock, logs, green lumber, stumps, roots, branches and debris of a half inch or more in diameter from the quarantine areas is prohibited unless the Contractor or its subcontractor performing tree Work has entered into a compliance agreement with NYSDAM. The terms of said compliance agreement must be strictly complied with. Any host material so removed must be delivered to a facility approved by NYSDAM. For the purpose of this Contract, host material must be ALL species of trees.

2. Any host material that is infested with the ALB must be immediately reported to NYSDAM for inspection and subsequent removal by either State or City contracts, at no cost to the Contractor.

3. Prior to commencement of tree Work, the Contractor must submit to the Commissioner a copy of a valid ALB compliance agreement entered into with NYSDAM and the Contractor or its subcontractor performing tree Work. If any host material is transported from the quarantine area the Contractor must immediately provide the Commissioner with a copy of the New York State 'Statement of Origin and Disposition' and a copy of the receipt issued by the NYSDAM approved facility to which the host materials are transported.

4. Quarantine areas, for the purpose of this Contract, must be defined as all five boroughs of the City of New York. In addition, prior to the start of any tree Work, the Contractor must contact the NYC Department of Parks & Recreation's (DPR) Director of Landscape Management at (718) 699-6724, to determine the limits of any additional quarantine areas that may be in effect at the time when tree Work is to be performed. The quarantine area may be expanded by federal and state authorities at any time and the Contractor is required to abide by any revisions to the quarantine legislation while working on this Contract. For further information please contact: NYSDAM (631) 288-1751.

B. Tree Protection Requirements: The Contractor must retain a Certified Arborist, as defined by DPR regulations, to provide the services described below.

1. Surveys and Reports: The Certified Arborist must, at the times indicated below, conduct a survey and prepare a plant material assessment report which includes: (1) identification, by species and pertinent measurements, of all plant material located on the Project Site, or in proximity to the Project Site, as described below, including all trees, significant shrubs and/or planting masses; (2) identification and plan for the containment of plant pests and pathogens, including the ALB, as described in paragraph A above; and (3) evaluation of the general health and condition of any infected plant material.

2. Frequency of Reports: The Certified Arborist must conduct a survey and provide a plant material assessment report at two (2) points in time: (1) prior to the commencement of construction Work; and (2) at the time of Substantial Completion. In addition, for projects exceeding twenty-four (24) months in duration, the Certified Arborist must conduct a survey and prepare a report at the midpoint of construction. Copies of each plant material assessment report must be submitted to the Resident Engineer within two (2) weeks of the survey.

3. Proximity to Project Site: Off-site trees, significant shrubs and/or planting masses must be considered to be located in proximity to the Project Site under the circumstances described below.

   a. The tree trunk, significant shrub, or primary cluster of stems in a planting mass is within fifty (50) feet of the project's Contract Limit Lines (CLLs) or Property Lines (PLs).

   b. Any part of the tree or shrub stands within fifty (50) feet of: (a) a path for Site access for vehicles and/or construction equipment; or (b) scaffolding to be erected for construction activity, including façade remediation projects.

   c. The Certified Arborist determines that the critical root zone (CRZ) of an off-site tree, significant shrub, or primary cluster of stems in a planting mass extends into the Project Site, whether or not that plant material is located within the fifty (50) foot inclusionary perimeter as outlined above.

4. Tree Protection Plan: The Certified Arborist must prepare, and the Contractor must implement, a Tree Protection Plan for all trees that may be affected by any construction Work, excavation or demolition activities, including without limitation: (1) on-site trees, (2) street trees, as defined below, (3) trees under DPR jurisdiction as determined by the NYC Department of Transportation, and (4) all trees that are located in proximity to the Project Site, as defined above. The Tree Protection Plan must comply with the DPR rules, regulations and specifications. The Contractor is referred to Chapter 5 of Title 56 of the Official Compilation of the Rules of the City of New York. Copies of the Tree Protection Plan must be submitted to the Resident Engineer prior to the commencement of construction. Implementation of the Tree Protection Plan for street trees and trees under DPR jurisdiction must be in addition to any tree protection requirements specified or required for the Project Site. For the purpose of this article, a "street tree" means the following: (1) a tree that stands in a sidewalk, whether paved or unpaved, between the curb lines or lateral lines of a roadway and the adjacent property lines of the Project Site, or (2) a tree that stands in a sidewalk and is located within fifty (50) feet of the intersection of the Project's Site's PL with the street frontage property line.

C. No Separate Payment: No separate payment must be made for compliance with Plant Pest Control Requirements or Tree Protection Requirements. The cost of compliance with Plant Pest Control Requirements and Tree Protection Requirements must be deemed included in the Contractor's bid for the Project.

3.16 PROJECT IDENTIFICATION SIGNAGE:

A. The Contractor must provide, install and maintain Project identification and other signs where indicated to inform public and individuals seeking entrance to the Project.

B. In order to properly convey notice to persons entering upon a City construction Site, the Contractor must furnish and install a sign at the entrance (gates) as follows:

NO TRESPASSING

AUTHORIZED PERSONNEL ONLY

C. If no construction fence exists at the Site, this notice must be conveyed by incorporating the above language into safety materials (barriers, tape, and signs).

D. Provide temporary, directional signs for construction personnel and visitors.

E. Maintain and touch up signs so that they are legible at all times.

3.17 PROJECT CONSTRUCTION SIGN AND RENDERING:

A. PROJECT SIGN:

1. Responsibility: The Contractor must produce and install one (1) Project sign which must be posted and maintained upon the Project Site at a place and in a position directed by the Commissioner. The Contractor must protect the sign from damage during the continuance of Work under the Contract and must do all patching of lettering, painting and bracing thereof necessary to maintain the sign in first class condition and in proper position. Prior to fabrication, the Contractor must submit an 8-1/2" x 11" color match print proof from the sign manufacturer of the completed sign for approval by the Commissioner.

2. Sign Quality: The Contractor must provide all materials required for the production of the sign as specified herein. Workmanship must be of the best quality, free from defects and must be produced in a timely manner.

3. Schedule: Upon Project mobilization, the Contractor must commence production and installation of the sign.

4. Removal: At the completion of all Work under the Contract, the Contractor must remove and dispose of the Project sign away from the Site.

5. Sign construction:

   a. Frame: The frame must be from quality dressed 2”x2” pine, fire retardant, pressure treated lumber, that surrounds the inside back edge of the sign. The sign must have one (1) intermediate vertical and two (2) diagonal supports, glued and screwed for rigidity. Frame must be painted white with two (2) coats of exterior enamel paint, prior to mounting of sign panel.

   b. Edging: U-shaped, twenty-two (22) gauge aluminum edging, with a white enameled finish to match sign background, must run around entire edging of sign panel and frame. Corners must be mitered for a tight fit. Channel dimensions must be 1” inch (overlap to sign panel face) x 1 3/4" (or as required across frame depth) x 1" (back overlap).

   c. Sign Panel: 4' x 8' panel must be constructed in one (1) piece of fourteen (14) gauge (.0785") 6061-T6 aluminum. This panel must be pre-finished both sides with a glossy white baked-on enamel finish and be flush with edge of 2" x 2" wood frame. Samples must be submitted for approval.

   d. Fastening: Fasten sign panel to wood frame using cadmium plated no. 8 sheet metal screws at ½" below edge of panel and 8" on center. The U-shaped aluminum channel must be applied over the wood frame edge and fastened with cadmium plated no. 8 sheet metal screws at 12" on center around the entire perimeter.

6. Sign Graphics:

   a. A digital file of the Project sign will be provided to the Contractor by the Commissioner’s representative for printing. The Commissioner’s representative must insert the Project name and names and titles of personnel (three (3) or more) and any other required information associated with the Project. All signs may include a second panel for a Project rendering as described in sub-section 3.17.B herein.

   b. The digital file must be reproduced at the Sign Panel size of 4’ x 8’ on 3M High Performance Vinyl or approved equal. The 3M High Performance Vinyl or equivalent must be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking. The sign manufacturer is required to maintain all specified Pantone Matching System (PMS) type and other composition elements represented in the digital file of the Project sign.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SETION 3.17 B

B. PROJECT RENDERING:

1. Responsibility: In addition to the Project sign, the Contractor must furnish and install one (1) sign showing a rendering of the Project. A digital file of the Project rendering will be provided to the Contractor by the Commissioner’s representative. From an approved image file provided by DDC, the Project rendering is to be sized, printed, and mounted in an identical manner as described in sub-section 3.17.A above for the Project sign. A color match print proof from the sign manufacturer of the rendering sign printed from the supplied file is to be submitted to DDC for approval before fabrication. The rendering sign is to be posted at the same height as the Project sign. Where possible, the rendering sign must be mounted with a perfect match of the short sides of the rectangle so that the rendering sign and the Project sign together will create one long rectangle.

2. Removal: At the completion of all Work under the Contract, the Contractor must remove and dispose of the Project rendering away from the Site.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.18

3.18 SECURITY GUARDS/FIRE GUARDS ON SITE:

A. SECURITY GUARDS (WATCHMEN):

1. The Contractor must provide a competent security guard service on the Site, beginning on the date on which the Contractor commences actual construction Work, or on such earlier date on which there is activity at the Site related to the Work, including without limitation, delivery of materials or construction set-up. The Contractor must continue to provide such security guard service until the date on which it completes all required Work at the Site, including all punch list Work, as certified in writing by the Resident Engineer, or earlier if so directed in writing by the Commissioner. Throughout the specified time period, there must be no less than one (1) security guard on duty every day, including Saturdays, Sunday and holidays, twenty-four (24) hours a day, except between the hours of 8:00 A.M. and 4:00 P.M. on any day which is a regular working day for a majority of the trade subcontractors. This exception during the working day must not apply after the finishing painting of the plaster Work is commenced; thereafter, not less than one (1) security guard must be on duty continuously, twenty-four (24) hours a day.

2. Every security guard must be required to hold a "Certificate of Fitness" issued by FDNY. Every security guard must, during his/her tour of duty, perform the duties of fire guard in addition to his/her security obligations.

3. Should the Commissioner find that any security guard is unsatisfactory, such guard must be replaced by the Contractor upon the written demand of the Commissioner.

4. Each security guard furnished by the Contractor must be instructed by the Contractor to include in his/her duties the entire construction Site including the Field Office, temporary structures, and equipment, materials, etc.

5. Should the Contractor or any other subcontractor consider the security requirements outlined above inadequate, the Contractor must provide such additional security as it thinks necessary, after obtaining the written consent of the Commissioner. The additional cost of such approved increased protection will be paid by the Contractor.

6. Nothing contained in this sub-section must diminish in any way the responsibility of the Contractor and each subcontractor for its own Work, materials, tools, equipment, nor for any of the other risks and obligations outlined hereinbefore in this Article.

B. COSTS: The Contractor must employ security guards/fire guards throughout the specified time period, except as otherwise modified by the detailed Specifications and as approved by the Commissioner, for the purpose of safeguarding and protecting the Site. All costs for security guards/fire guards must be borne by the Contractor.

C. RESPONSIBILITY: The Contractor and its subcontractors will be responsible for safeguarding and protecting their own work, materials, tools and equipment.

3.19 SAFETY:

A. The Contractor, in compliance with requirements of Section 01 35 26, SAFETY REQUIREMENTS PROCEDURES, must provide and maintain all necessary temporary closures, guard rails, and barricades to adequately protect all workers and the public from possible injury. Any removal of these items, during the progress of the Work, must be replaced by the Contractor at no additional cost to the City.

END OF SECTION 01 50 00

SECTION 01 54 11
TEMPORARY ELEVATORS AND HOISTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes the following:
   1. Temporary Use, Operation and Maintenance of Elevators during Construction
      a. For new buildings up to and including fifteen (15) stories
      b. For new buildings over fifteen (15) stories
      c. For existing buildings
   2. Temporary Construction Hoists and Hoistways (For Material and Personnel)

1.3 RELATED SECTIONS: include without limitation the following:

A. Section 01 10 00 SUMMARY

B. Section 01 42 00 REFERENCES

C. Section 01 50 00 TEMPORARY FACILITIES AND CONTROLS

D. Section 01 54 23 TEMPORARY SCAFFOLDS AND SWING STAGING

E. Section 01 77 00 CLOSE OUT PROCEDURES

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.1

3.1 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR NEW BUILDINGS UP TO AND INCLUDING FIFTEEN (15) STORIES:

A. INSTALLATION: The Contractor must install, complete, operate, and maintain in good working order, as indicated herein, one (1) selected main elevator for the transport of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. The Contractor must furnish, install, and maintain such elevator in good working order, including all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation, operation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith must be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.

B. RESPONSIBILITY: The Contractor must be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith.

C. COSTS: The Contractor must be responsible for all costs in connection with the temporary elevator, including without limitation:

1. Installing and operating the temporary elevator;
2. Maintaining the temporary elevator in clean and proper operating condition, including the cost of lubricants and/or parts for such maintenance;
3. Performing all Work in pits, shaft ways and machine rooms necessary for the operation of the temporary elevator;
4. Replacing the temporary elevator or any equipment or parts utilized in connection therewith, if required, due to damage, destruction, or excessive wear or corrosion, except for the replacement of hoisting ropes as set forth below;
5. Performing all required electrical Work in connection with the temporary elevator;
6. Providing all electric power required to operate the temporary elevator;
7. Providing all necessary conduit and wiring connections for the proper operation and signaling of the temporary elevator; and
8. Providing all labor for the operation and maintenance of the temporary elevator, including on an overtime basis if necessary.

The total Contract price must include all costs in connection with the temporary elevator, including without limitation, the costs specified herein.

D. COMMENCEMENT OF SERVICE: The Contractor must begin to provide temporary elevator service using the selected main passenger elevator no later than eight (8) weeks (forty (40) Days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed. No later than three (3) weeks (fifteen (15) Days) after the machine room roof slab has been placed, or that portion of it surrounding the elevator shaft, the following Work must be completed:

1. The shaft must be completely enclosed by either a permanent or temporary enclosure meeting all building code requirements.
2. The machine room must be completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, must be provided to enable the safe and practicable hoisting of the elevator machinery for installation.
3. On all floors at the shaft way entrances to the elevator, the Contractor must install solid substantial frames, either sliding or swing doors with substantial hardware and door locks, and any necessary approved wire mesh barricades for adjacent shaft ways.
4. The Contractor must furnish and install solid, substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at the top of car and a substantial temporary door or gate on the front of the elevator entrance.

E. ELECTRICAL INSTALLATION: The Contractor, no later than twenty (20) Days after the machine room roof slab or that portion of it surrounding the elevator has been placed, must furnish and install temporary or permanent power and light feeders as required for the elevator used for temporary service. Additionally, the Contractor must connect such feeders to the terminals on the starter panels or controllers in the machine room to the low voltage transformers and car light outlets in the center of the shaft way and for the car control and signal traveling cables. The Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

F. REMOVAL: As directed by the Commissioner and when elevators for permanent use have been installed and are in proper condition for service, the Contractor must remove the temporary enclosures and all temporary elevator equipment and promptly proceed with the installation of the permanent equipment as required under the Contract.

G. INSPECTION: Before temporary elevator equipment is removed, a joint inspection of the equipment must be made by the Contractor and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection deems it necessary, the Contractor must furnish and install new governor and compensating ropes, traveling cables, controller parts, etc. The car and counterweight safeties must be thoroughly cleaned of all dirt and all foreign matter, then properly lubricated and placed in good operating condition to the satisfaction of the Commissioner. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes must be installed and payment will be made in accordance with Article 26 of the Contract.

H. REPLACEMENT: The Contractor must furnish and install new equipment or parts for any equipment or parts of the temporary elevator installation that have been damaged, destroyed, or that indicate excessive wear or corrosion, except for the replacement of hoisting ropes. All shaft ways, pits, motor rooms and sheave spaces used for temporary operation of elevators must be thoroughly cleaned. Where lubricated rails are used they must be washed down. If roller guides are used, all rust, dirt, etc., must be moved from the rails. The full cost of parts replacement, cleaning, etc., must be borne by the Contractor except for the replacement of hoisting ropes.

I. LIMITATIONS ON USE: The temporary elevator must not be used during its operation for the hoisting of materials or the removal of rubbish, but must be limited only to the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of work at the Project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation. In the event of any damage to the temporary elevator, the Contractor must notify the Resident Engineer within twenty-four (24) hours after such damage has occurred. As indicated above, the Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.

J. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of one hundred dollars ($100) per Day for each Day it fails to provide the temporary elevator service described in this section beginning with the forty-first (41st) Day after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.2

3.2 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR NEW BUILDING OVER FIFTEEN (15) STORIES:

A. INSTALLATION: The Contractor must install, complete, operate, and maintain in good working order, as indicated herein, two (2) selected main elevators for the transport of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of work at the Project. The Contractor must furnish, install, and maintain such elevators in good working order, including all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation, operation, and maintenance of the temporary elevators and all equipment and/or parts utilized in connection therewith must be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use. The two (2) elevators must not be operated simultaneously.

B. RESPONSIBILITY: The Contractor must be responsible for any injury to persons or damage to property arising out of the temporary elevators and all equipment and/or parts utilized in connection therewith.

C. COSTS: The Contractor must be responsible for all costs in connection with the temporary elevators, including without limitation:

1. Installing and operating the temporary elevators;

2. Maintaining the temporary elevators in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance;

3. Performing all Work in pits, shaft ways and machine rooms necessary for the operation of the temporary elevators;

4. Replacing the temporary elevators or any equipment or parts utilized in connection therewith, if required due to damage, destruction, or excessive wear or corrosion, except for the replacement of hoisting ropes as set forth below;

5. Performing all required electrical Work in connection with the temporary elevators;

6. Providing all electric power required to operate the temporary elevators;

7. Providing all necessary conduit and wiring connections for the proper operation and signaling of the temporary elevators; and

8. Providing all labor for the operation and maintenance of the temporary elevators, including on an overtime basis if necessary.

The total Contract price must include all costs in connection with the temporary elevators, including without limitation, the costs specified herein.

D. LOW RISE ELEVATOR: The Contractor must begin to provide temporary elevator service using one (1) selected main passenger elevator no later than six (6) weeks (thirty (30) Days) after the twelfth (12th) floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. No later than one (1) week, (five (5) Days), after the twelfth (12th) floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped, the following Work must have been completed:

1. The shaft must be completely enclosed up to the twelfth (12th) floor by either the permanent or a temporary enclosure meeting the requirements of the law.

2. A temporary machine room enclosure must be provided at the eleventh (11th) floor and must be completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, must be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.

3. The Contractor must install on all floors up to and including the ninth (9th) floor at the shaft entrances to the elevator, solid substantial wood frames, either sliding or swing doors with substantial hardware and door locks, and any necessary approved wire mesh barricades for adjacent shaft ways.

4. The Contractor must furnish and install solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, except that the portion of the front at the elevator entrance must be provided with a substantial temporary door or gate.

E. ELECTRICAL INSTALLATION: The Contractor must, no later than ten (10) Days after the twelfth (12th) floor slab or that portion of it surrounding the elevator has been poured and stripped, furnish and install temporary or permanent power and light feeders as required for the elevator used for temporary service. The Contractor must connect such feeders to the terminals on the starter panels or controllers in the temporary machine room to the low voltage transformers, car light outlets in the center of the shaftway, and for the car control and signal traveling cables. The Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

F. HIGH RISE ELEVATOR: The Contractor must begin to provide temporary elevator service to all floors using a selected main passenger elevator no later than eight (8) weeks (forty (40) Days) after the machine room roof slab, or that portion of it surrounding the elevator shaft has been placed. No later than three (3) weeks (fifteen (15) Days) after the machine room roof slab, or that portion of it surrounding the elevator shaft has been placed, the following Work must have been completed:

1. The shaft must be completely enclosed by either the permanent or temporary enclosure, meeting the

requirements of the law.

2. The machine room must be completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, must be provided to enable the safe and practicable hoisting of the elevator machinery for installation.

3. The Contractor must install on all floors at the shaft way entrances to the elevator solid substantial frames, either sliding or swing doors with substantial hardware and door locks, and any necessary approved wire mesh barricades for adjacent shaft ways.

4. The Contractor must furnish and install solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, except that the portion of the front at the elevator entrance must be provided with a substantial temporary door or gate.

G. ELECTRICAL INSTALLATION: The Contractor must, not later than twenty (20) Days after the machine room slab or that portion of it surrounding the elevator shaft has been placed, furnish and install temporary or permanent power and light feeders as required for the high-rise elevator to be used for temporary service. The Contractor must connect such feeders to the terminals on the motor-generator starter panels, or controllers in the machine room, to the signal circuits low voltage transformers for the annunciators and car light outlets in the center of shaft way. The Contractor must make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer.

H. When the high-rise elevator is completed and ready for temporary operation, the low-rise temporary elevator must be shut down.

I. REMOVAL: When directed by the Commissioner and one (1) or more elevators for permanent use have been installed and are in condition for service, the Contractor must remove the temporary enclosures, all temporary elevator equipment, and promptly proceed with the installation of the permanent equipment as required under the Contract.

J. INSPECTION: Before temporary elevator equipment is removed, a joint inspection of the equipment must be made by the Contractor and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection determines it necessary, the Contractor must furnish and install new governor and compensating ropes, new traveling cables, new controller parts, etc. The car and counterweight safeties must be thoroughly cleaned of all dirt and all foreign matter, then properly lubricated and placed in good operating condition to the satisfaction of the Commissioner. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes must be installed and payment will be made in accordance with Article 26 of the Contract.

K. REPLACEMENT: The Contractor must furnish and install new equipment or parts for any equipment or parts of the temporary elevator installations that have been damaged, destroyed, or that indicate excessive wear or corrosion, except the replacement of hoisting ropes. All shaft ways, pits, motor rooms and sheaves spaces used for temporary operation of elevators must be thoroughly cleaned down. Where lubricated rails are used they must be washed down; if roller guides are used, all rust, dirt, etc., must be removed from the rails. The full cost of parts replacement cleaning, etc., must be borne by the Contractor except for the replacement of hoisting ropes.

L. LIMITATIONS ON USE: The temporary elevators must not be used during their operation for the hoisting of materials or the removal of rubbish, but must be limited only to the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation, but only after such times as all plastering has been completed from the second floor up. In the event of any damage to the temporary elevator, the Contractor must notify the Resident Engineer within twenty-four (24) hours after such damage has occurred. As indicated above, the Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.

M. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of one hundred dollars ($100) per Day for each Day it fails to provide the temporary elevator service described in this Section beginning with the thirty-first (31st) Day after the twelfth (12th) floor slab, or that portion of the twelfth (12th) floor slab surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 TEMPORARY USE, OPERATION AND MAINTENANCE OF ELEVATORS DURING CONSTRUCTION FOR EXISTING BUILDINGS:

A. The Contractor may use, at the Commissioner's discretion, one (1) selected elevator in the building for temporary operation by the Contractor for the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction over the Work at the Project. The operation of the temporary elevator and all equipment and/or parts utilized in connection therewith must be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.

B. RESPONSIBILITY: The Contractor must be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith.

C. REPLACEMENT: The Contractor must furnish and install new equipment or parts for any equipment or parts of the elevator for temporary operation that have been damaged, destroyed, or that indicate excessive wear or corrosion, except the replacement of hoisting ropes. All shaft ways, pits, motor rooms and sheave spaces used for temporary operation of elevators must be thoroughly cleaned down. Where lubricated rails are used they must be washed down, if roller guides are used, all rust, dirt, etc., must be moved from the rails. The full cost of parts replacement, cleaning, etc., must be borne by the Contractor except for the replacement of hoisting ropes. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes must be installed and payment will be made in accordance with Article 26 of the Contract.

D. LIMITATIONS ON USE: The temporary elevator must not be used during its operation for the hoisting of materials or the removal of rubbish, but must be limited only to the transportation of employees of the Contractor and/or its subcontractors, representatives of DDC, and other governmental agencies having jurisdiction of Work at the Project. However, the Resident Engineer may grant special permission at specified times to the Contractor and/or its subcontractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation. In the event of any damage to the temporary elevator, the Contractor must notify the Resident Engineer within twenty-four (24) hours after such damage has occurred. As indicated above, the Contractor must be responsible for the replacement of any equipment or parts of the temporary elevator that have been damaged.

E. LIQUIDATED DAMAGES: The Contractor will be charged at the rate of one hundred dollars ($100) per Day for each Day it fails to provide elevator services described in this section beginning with fifteen (15) Days from Notice to Proceed (NTP). This charge will be deducted from any amount due and owing to the Contractor.

3.4 TEMPORARY HOISTS AND HOISTWAYS (FOR MATERIAL AND PERSONNEL):

A. RESPONSIBILITY: The Contractor must provide adequate numbers of material hoists for the most expeditious performance of all parts of the Work including the Work of all its subcontractors.

B. LOCATIONS: No hoists must be constructed at such locations as to interfere with, or affect the construction of, floor arches or the Work of subcontractors. The hoists may be located at the exterior sides of the structure or in the courtyard and extend upward adjacent to the line of window openings. The hoists must be located a sufficient distance from the exterior walls and be so protected as to prevent any of the permanent Work from being damaged, stained or marred.

C. ELEVATOR SHAFT: Wherever possible, one or more of the permanent elevator shafts may be used as temporary hoistways, providing such use complies with the requirements of the Building Code of the City of New York, has been approved by the Commissioner, and does not interfere with the progress of the Work.

D. PROTECTION FOR INTERIOR HOISTS: All interior material hoistways must be enclosed on each floor and must be adequately protected with appropriate safety guards. In no event must the protection be less than that required by law.

END OF SECTION 01 54 11

(No Text on This Page)

SECTION 01 54 23
TEMPORARY SCAFFOLDING AND PLATFORMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

B. SECTION 01 35 26 SAFETY REQUIREMENTS PROCEDURES.

C. The Contractor must comply with the requirements of "*The City of New York Department of Design and Construction Safety Requirements".* This document is included in the Information for Bidders.

1.2 SUMMARY:

A. This Section includes administrative and general procedural requirements for Temporary Scaffolding and Platforms, including:

1. Conformance
2. Responsibility
3. Jobsite Documentation and Submittals
4. Inspections

B. This Section governs ALL scaffold used on DDC Project site(s), including but not limited to, Suspended Scaffold, Supported Scaffold, and Sidewalk Sheds.

1.3 CONFORMANCE:

A. Unless otherwise indicated, the Contractor is responsible for providing, erecting, installing, and maintaining all temporary scaffolding and platforms which must comply with requirements of Chapter 33 (Safeguards During Construction or Demolition) of the New York City (NYC) Building Code, NYC Local Law 52 of 2005, OSHA Construction Standard 1926 Subpart L, and furnishing the items and personnel set forth in this Section.

1.4 RESPONSIBILITY:

A. Jobsite Safety Coordinator: The Contractor must designate and employ a Jobsite Safety Coordinator, who must be a competent person, who must have a daily presence on the Project site during scaffold use. This designee must possess and maintain a valid New York City Department of Buildings (DOB) supported scaffold certificate of completion. An alternate must also be designated in the event that the Jobsite Safety Coordinator is absent. The Jobsite Safety Coordinator must:

1. Verify completeness of documentation and submittals (as described below);
2. Verify that inspections are performed, including pull tests (see below), reports are filed and reported deficiencies are corrected;
3. Monitor trades using scaffold;
4. Limit access to scaffold areas that are tagged for non-use;
5. Inform trades of scaffold load limitations;
6. Monitor loading of decks;
7. Verify that any ties that are temporarily removed are properly restored in the same shift;
8. Verify that outriggers and planks that are moved are properly set up and secured;
9. Verify that all scaffold decks in use have proper access/egress;
10. Verify that all open sides of decks in excess of 14 inches have proper guardrails and toe-boards;

11. Notify appropriate parties, including but not limited to the Resident Engineer, site safety coordinator / monitor, site safety consultant, scaffold users, contractor and the scaffold engineer, of misuses, non-conformances, hazards and accidents; and,
12. Keep a log of significant actions and events connected with the scaffolding.

B. The Contractor will be responsible for erecting, maintaining, and dismantling the scaffolding and/or sidewalk shed in conformance with requirements of the NYC Building Code, OSHA and the Contract Documents, including the Specifications. The Contractor must also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.

C. The Contractor must require the subcontractor responsible for erecting the scaffolding to engage a Scaffold Engineer, licensed as a professional engineer by the State of New York. The Scaffold Engineer will be responsible to ensure the following: (1) that the installation design is in compliance with requirements of the NYC Building Code and OSHA, (2) that the design comports with the capabilities of the components and the characteristics of the site, (3) that scaffold loads on the host building, including netting, have been properly considered, and (4) that the design documents provide accurate information for erectors and users.

D. Scaffold users are trade contractors assigned to work on the scaffold. Training certificates from a DOB-approved training provider are mandatory. These users have a duty to become familiar with the NYC Building Code and OSHA requirements germane to users, to obey the instructions of the Jobsite Safety Coordinator, and to inform the Jobsite Safety Coordinator of known hazards, non-conformances, or violations.

1.5 JOBSITE DOCUMENTATION AND SUBMITTALS:

The Contractor must prepare, obtain, and submit the following to the Resident Engineer:

A. NYC DOB permit(s) for scaffold and sidewalk sheds (as applicable) including filing applications signed and sealed by a Professional Engineer licensed in the State of New York;

B. Site logistics plan / site safety plan;

C. Installation drawing(s), design, and product data to be provided for **all** scaffold(s) and shed(s) must include, at a minimum:

1. Plan(s);
2. Elevation(s);
3. Duty load designation: “standard” (150 psf live load) or “heavy duty” (300 psf live load);
4. Details including base support, anchors and ties;
5. Notes and specifications including load limits, number of planked levels, tie spacing, netting, and sequence of installation and removal;
6. Anchorage into sound material;
7. Load limits based on pull tests;
8. Specifications for pull test(s), method, proof load and the number of trials;
9. Elevations, levels or heights, where anchorage is made into masonry;
10. Specifications for frames, planks, screw jacks, anchors, and any other ancillary hardware;
11. Samples for anchors, ties and netting;
12. Sequence of operations for erection and demolition;
13. Location plan, heights, widths, “jumps” over doorways and driveways;
14. Specify size, maximum span and maximum spacing of headers and stringers;
15. Specify legs, girts, braces, nailing and connections; and,
16. All sidewalk sheds must be designed, engineered, signed, and sealed by a Professional Engineer licensed in the State of New York;
    a. Generic (not job-specific) engineering drawings are satisfactory for standard sheds and arrangements.

b. Special engineering is required for custom sheds, site-specific problems or non-standard arrangements.

1.6 INSPECTIONS:

A. Signed inspection reports must be issued for each inspection and pull-test below, and must be logged and maintained on site by the Jobsite Safety Coordinator for the duration of the Project.

B. Pull testing will be required during design, and during or post erection, where anchorage is made into masonry. The Scaffold Engineer must specify the test method, proof load, and the number of trials.

C. Sidewalk sheds must be inspected after initial installation, major modification, or damage and thence every three months. Inspections must be by a Scaffold Engineer for custom sheds and by a Competent Person employed by the Contractor for standard sheds.

D. Scaffolds must be inspected by the Scaffold Engineer during erection, post-erection, and prior to use and thence every three (3) months. The Scaffold Engineer must repeat inspections after major alteration/ modification, and/or damage.

E. A Qualified Person assigned by the Contractor must inspect: the progress of erection and dismantling; and, the condition and integrity of the sidewalk sheds after high winds, major storms, and at least once per month during usage.

F. A Qualified Person assigned by the Contractor must inspect: the progress of erection and dismantling at least weekly; and, the condition and integrity of the scaffold after high winds, major storms, and at least once per month during usage.

G. Scaffolds and Sidewalk Sheds must be inspected daily by the Jobsite Safety Coordinator or alternate, prior to use by scaffold users. The inspection results must be recorded in the maintenance log and must always be available on-site.

H. At the completion of the Project, submit all inspection documents as Miscellaneous Record Documents in accordance with SECTION 01 78 39 CONTRACT RECORD DOCUMENTS.

1.7 LADDERS AND STAIRS:

A. The Contractor must provide and maintain ladders or temporary stairs extending from the street to the first story, and to and from every floor and roof level of the Project.

1.8 ACCESS AND EXITS:

A. The ladders or temporary stairs must be of acceptable size, number and location, so that proper and convenient access may be had by those required to proceed to and from all parts of the Project.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 54 23

(No Text on This Page)

SECTION 01 73 00
EXECUTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section includes general procedural requirements governing execution of the Work including without limitation the following:

1. Delivery of Materials
2. Contractor's Superintendent
3. Surveys
4. Borings
5. Examination
6. Environmental Assessment
7. Preparation
8. Deferred Construction
9. Installation
10. Permits
11. Transportation
12. Sleeves and Hangers
13. Sleeve and Hanger Drawings
14. Cutting and Patching
15. Location of Partitions
16. Furniture and Equipment
17. Removal of Rubbish and Surplus Material
18. Cleaning
19. Security and Protection of Work Site
20. Maintenance of Site and Adjoining Property
21. Maintenance of Project Site
22. Safety Precautions for Control Circuits
23. Obstructions in Drainage Lines
24. Payment for Allowances

1.3 RELATED SECTIONS: Include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
C. Section 01 33 00 SUBMITTAL PROCEDURES
D. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT & DISPOSAL
E. Section 01 77 00 CLOSEOUT PROCEDURES
F. Section 01 78 39 CONTRACT RECORD DOCUMENTS

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	Definition
Design Consultant	The entity responsible for providing design services for the Project, including, without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 QUALITY ASSURANCE:

A. Land Surveyor Qualifications: A professional land surveyor who is licensed in the State of New York and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 DELIVERY OF MATERIALS:

A. Material Orders: The Contractor must furnish to the Commissioner a copy of each material order, indicating date of order and quantity of material, and must also notify the Commissioner when materials have been delivered to the Site and in what quantities.

B. Ample Quantities: The Contractor must deliver materials in ample quantities to ensure the most prompt and uninterrupted progress of the Work so as to complete the Work within the Contract time.

C. Containers: The manufacturer's containers must be delivered with unbroken seals and must bear proper labels.

D. Deliveries: The Contractor must coordinate deliveries in order to avoid delaying or impeding the progress of the Work.

E. Handling: The Contractor must provide equipment and personnel to handle products by methods to prevent soiling or damage.

1. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.

2. Promptly return damaged shipments or incorrect orders to manufacturer.

3. For materials or equipment to be reused or salvaged, use special care in removal, storage and reinstallation to insure proper function in completed Work.

F. Storage: Store products in accordance with provisions of Article 3.1 of the Standard Construction Contract, and periodically inspect to assure that stored products are undamaged and are maintained under required conditions.

G. Stacking: All materials must be properly stacked in convenient places adjacent to the Site, or where directed, and protected in a satisfactory manner. Stacked materials must be arranged so as to not interfere with visibility of traffic control devices.

H. Overloading: If the Commissioner permits the storage of materials in any part of the Project area, they must be so stored as to cause no overloading.

I. No Interference: If it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the Work or interfering with the Work to be done by any trade subcontractor, the Contractor must remove and restack such materials at no additional cost to the City.

3.2 CONTRACTOR'S CONSTRUCTION SUPERINTENDENT:

A. Contractor's Construction Superintendent: The Contractor must devote its time and personal attention to the Work and must employ and retain at the Project Site, from commencement until Final Acceptance, a Contractor's Construction Superintendent. The Contractor's Construction Superintendent must be registered with the New York City Department of Buildings (DOB) in compliance with the Construction Superintendent Rule of the City of New York, be competent and capable of maintaining proper supervision and care of the Work, and be acceptable to the Commissioner. The Construction Superintendent, in the absence of the Contractor, and irrespective of any superintendent or foreman employed by any subcontractor, must see that the instructions of the Commissioner are carried out.

B. Replacement: The Contractor's Construction Superintendent on the job must not be changed or removed without the consent of the Commissioner.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.3

3.3 SURVEYS:

A. Line and Grade: The City will establish a baseline and bench mark near the Site of the Work for use by the Contractor in connection with the performance of the Work.

B. Responsibility: The Contractor must establish all other lines and elevations required for the Work and must be solely responsible for the accuracy thereof.

C. Safeguard All Points: The Contractor must safeguard all points, stakes, grade marks and bench marks made or established by the Contractor on the Work. The Contractor must re-establish same if disturbed, and bear the entire expense of rectifying the Work if improperly installed due to not maintaining, protecting or removing without authorization from the Commissioner such established points, stakes, or marks.

D. City Monuments and Markers: No Work must be performed near City monuments or markers so as to disturb them until the said monuments or markers have been referenced or reset or otherwise disposed of by the relevant Agency or party who installed them.

E. Foundations: The Contractor must furnish certification from a licensed Surveyor that all portions of the foundation Work are located in accordance with the Contract Drawings and at the elevations required thereby. This certification must show the actual locations and the actual elevations of all the Work in relation to the locations and elevations shown on the Contract Drawings, including, but not restricted to the following:

1. The locations and elevations of all piles, if any.
2. Elevations of tops of all spread footings, tops of pile caps, and tops of all foundation walls, elevator pit walls and ramp walls.
3. Location of all footing centers and pier centers including those for exterior wall columns.
4. Location of all foundation walls including wall columns, elevator pit walls and ramp walls.

F. Wall Lines: After the first courses of masonry or stone have been laid, the Contractor must establish the permanent lines of exterior walls. The Contractor must promptly furnish certification from a licensed Surveyor in the form of signed original drawings showing the exact location of such wall lines of all portions

of all structures. Except at its own risk, the Contractor must not proceed further with the erection of walls until the Surveyor's certification has been submitted and verified for correct location of wall lines.

G. Surveyor: The Surveyor selected for any of the purposes mentioned in Paragraph E and Paragraph F above, and Paragraph I below, must be a land Surveyor licensed in the State of New York and must be subject to the approval of the Commissioner. The Surveyor must not be a regular employee of the Contractor, nor must the Surveyor have any interest in the Contract. The Surveyor's certification must represent an independent and disinterested verification of all layout. The Surveyor must report to the Department of Design and Construction's (DDC) Resident Engineer each time upon arrival to and departure from the Site and review with the Resident Engineer the data required for the Project.

H. Final Certification: Final certification must be submitted upon completion of the Work or upon completion of any subdivision of the Work as directed by the Commissioner. Any exceptions or deviations from the Contract Drawings must be noted on the final certificate and must include any maps, plates, notes, pertinent documents and data necessary, in the opinion of the Commissioner, to constitute a full and complete report.

I. Final Survey: The Contractor must submit to DDC for submission to DOB a final Survey by the licensed Surveyor showing the location of the new Work, before completion of the Work. This Survey must show the location of the first tier of beams or of the first floor; the finish grades of the open spaces on the plot; the established curb level and the location of all other Work on the plan, together with the location and boundaries of the lot or plot upon which the Work is constructed, curb cuts, all yard dimensions, etc.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.4

3.4 BORINGS:

A. The work of this article must be the responsibility of the Contractor unless otherwise indicated.

B. Reference Drawings: The boring drawings as listed on the title sheet are for information to the bidder and are to be used under the conditions as follows:

1. Boring logs: shown on the boring drawings, record information obtained under engineering supervision in the course of exploration carried out by or under the direction of DDC at the Site.

2. Soils and Rock Samples: All inferences are drawn from the indications observed as made by engineering and scientific personnel. All such inferences and all records of the Work, including soil samples and rock cores, if any, are available to bidders for inspection.

3. Certification of Samples: The City certifies that the Work was carried out as stated, and that the soil samples and rock cores were actually taken from the site at the times, places, and in the manner indicated on the boring drawings. The samples are available for inspection in DDC’s Subsurface Exploration Unit.

4. Bidder’s Responsibility: The bidder, however, is responsible for any conclusions to be drawn from the Work. If the bidder accepts those of the City, it must do so at its own risk. If the bidder prefers not to assume such risk, the bidder is under the obligation of employing its own experts to analyze the available information and must be responsible for any consequences of acting on their conclusions.

5. Continuity Not Guarantee: The City does not guarantee continuity of conditions shown at actual boring locations over the entire Site. Where possible, borings are located to avoid all obstructions and previous construction which can be found by inspection of the surface. The bidder is required to estimate the influence of such features from its own inspection of the Site.

3.5 EXAMINATION:

A. Existing Conditions: The existence and location of Site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning the Work, the Contractor must investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, the Contractor must verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground utilities and other construction indicated as existing are not guaranteed. Before beginning Site Work, the Contractor must investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, the Contractor must verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water-service piping, and underground electrical services.
2. The Contractor must furnish location data for Work related to the Project that must be performed by public utilities serving the Project Site.

C. Acceptance of Conditions: Examine all existing substrates, areas, and conditions, with the subcontractor responsible for installation or application, for compliance with requirements for installation tolerances and other conditions affecting performance. The Contractor must record observations of these examinations:

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.6 ENVIRONMENTAL ASSESSMENTS:

A. City Responsibilities: An Environmental Assessment and survey is performed by DDC and its findings are included in the Contract Documents. In accordance with the NYC Administrative Code Title 15 Chapter 1, an asbestos survey is required to be performed by an Asbestos Investigator certified by the NYC Department of Environmental Protection (DEP) to identify the presence of asbestos containing material (ACM) prior to any alteration, renovation, or demolition activity. The findings of such survey are required for the submission of approvals and permits issued by DOB. When the findings indicate that asbestos containing material is present and will be disturbed during the alteration, renovation, or demolition activity, then abatement design specifications will be incorporated into the Contract Documents. The Contractor must comply with all federal, state and local asbestos regulations affecting the work for this Contract.

B. Contractor Responsibility: The Contractor must comply with all federal, state and local environmental regulations, including without limitation, United States Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) regulations, which require the Contractor to assess if lead-based paint will be disturbed during the Work in order to protect the Contractor's workers and the building occupants from migration of lead dust into the air. The Contractor must comply with all federal, state and local environmental waste disposal regulations which may be required during the Work. The Contractor is required to hire licensed abatement and disposal companies for the requisite Work.

3.7 PREPARATION:

A. Field Measurements: The Contractor must verify all dimensions and conditions on the Site so that all Work will properly join the existing conditions.

B. Before commencing the Work, the Contractor must examine all adjoining materials on which its Work is in any way dependent on good workmanship in accordance to the intent of the Specifications and the Contract Drawings. The Contractor must report to the Commissioner any condition that will prevent it from performing Work that conforms to the required Specifications.

C. Existing Utility Information: The Contractor must furnish information to the Commissioner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Additionally, the Contractor must coordinate with authorities having jurisdiction.

D. Space Requirements: The Contractor must verify space requirements and dimensions of items shown diagrammatically on the Contract Drawings.

3.8 DEFERRED CONSTRUCTION:

A. In order to permit the installation of any item or items of equipment required to be furnished and installed within the time allowed for completing the Work of the Contract, the Contractor must defer construction Work limited to adequate areas as approved and certified by the Commissioner.

B. The Contractor must confer with the affected trade subcontractors and ascertain arrangements, time, and facilities necessary to be made by the Contractor in order to execute the provisions specified herein.

3.9 INSTALLATION:

A. General: The Contractor must locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical Work plumb and make horizontal Work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated on the Contract Drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory-prepared and field-installed. Check shop drawings of other work and work of trade subcontractors to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Design Consultant.

2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral

anchors that are to be embedded in concrete or masonry. Deliver such items to Project Site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.10 PERMITS:

A. The Contractor must comply with all local, state and federal laws, rules, and regulations affecting the Work of this Project, including, without limitation, (1) obtaining all necessary permits for the performance of the Work prior to commencement thereof, and (2) complying with all requirements for the disposal of demolition and/or construction debris, waste, etc., including disposal in City landfills. The Contractor must be responsible for all costs in connection with such regulatory compliance, unless otherwise specified in the Contract.

3.11 TRANSPORTATION:

A. Availability: The Contractor must determine the availability of transportation facilities and dockage for the use of its employees, equipment, and materials, and the conditions under which such use will be permitted.

B. Costs: If transportation facilities and dockage are available and are permitted to be used by the governmental agency having jurisdiction, the Contractor must pay all necessary costs and expenses, and abide by all rules and regulations promulgated in connection therewith.

C. Vehicles: With respect to the use of vehicles on highways and bridges, the Contractor's attention is directed to the limitations set forth in the Rules of the City of New York, Title 34, Chapter 4, Section 4-15.

D. Continued Use: It is understood that the Commissioner makes no warranty as to the continued use by the Contractor of such facilities.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.12

3.12 SLEEVES AND HANGERS:

A. Coordinate with Progress Schedule: The Contractor must promptly furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment that is to be built into the Work in conformity with the requirements of the Project.

B. Cooperation of Subcontractors: All subcontractors must fully cooperate with each other in connection with the performance of the above Work as "cutting in" new work is neither contemplated nor will it be tolerated.

C. Timeliness: To avoid delay, in the event that timely delivery of sleeves and other materials cannot be made, the Contractor may arrange to have boxes or other forms set at the locations where the piping or other material is to pass through or into the slabs, walls or other Work. Upon the subsequent installation of the sleeves or other material, the Contractor must fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in must be borne by the Contractor.

D. Inserts: The Contractor is to install strip inserts four (4) foot on center and perpendicular to beams in ceiling slabs of boiler, machine, and mechanical equipment rooms. Inserts are to be installed for strippable concrete slabs only.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.13

3.13 SLEEVE AND PENETRATION DRAWINGS:

A. As soon as practicable after the commencement of Work, and when the order in which concrete for the first slabs, walls, etc. to be poured is determined, the Contractor must submit to DDC a sketch indicating the location and size of all penetrations for sleeves, ducts, etc. which will be required to accommodate the mechanical trades in order to determine if such penetrations will materially weaken the Project's structure.

The sketch must be stamped and returned if approved and/or comments will be transmitted. The Contractor must continue to submit sketches as the pouring schedule and the concrete Work progresses and until approvals for the penetration sketches have been given. The Contractor must not predicate its layout Work on unapproved sketches.

3.14 CUTTING AND PATCHING:

A. Responsibility: The Contractor must do all cutting, patching, and restoration required by its Work, unless otherwise particularly specified in the Specifications.

B. Restore Work: The Contractor must restore any Work damaged during the performance of the Work.

C. Competent Workers: All restoration Work must be done to the satisfaction of the Commissioner by competent workers skilled in the trade required by such restoration. If, in the judgment of the Commissioner, workers engaged in restoration Work are incompetent, they must be replaced immediately by competent workers.

D. Structural Elements: Do not cut and patch structural elements without the prior approval, in writing, of the Resident Engineer.

E. Operational Elements: Do not cut and patch operating elements and related components.

F. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Commissioner's opinion, reduce the building's aesthetic qualities. The Contractor must remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

G. Existing Warranties: The Contractor must remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

H. Removals: The Contractor must remove from the premises all demolished materials of every nature or description resulting from cutting, patching, and restoration work, in accordance with the requirements hereinafter stipulated under Sub-Section 3.17 herein and as further required in Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 3.15

3.15 LOCATION OF PARTITIONS:

A. Within three (3) weeks after the concrete slabs have been poured on each floor level, the Contractor must immediately locate accurately all of the partitions, including the door openings, on the floor slabs in a manner approved by the Resident Engineer.

3.16 FURNITURE AND EQUIPMENT:

A. Responsibility: The Contractor is responsible for moving all loose furniture and/or equipment in all areas where the location of such furniture and/or equipment interferes with the proper performance of its Work.

B. Protection: All such furniture and/or equipment must be adequately protected with dust cloths and returned to their original locations when directed to do so by the Resident Engineer.

3.17 REMOVAL OF RUBBISH AND SURPLUS MATERIALS:

A. Of the waste that is generated during demolition, as many of the waste materials as economically feasible must be reused, salvaged, or recycled. Waste disposal in landfills must be minimized. Comply with requirements of Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

B. Rubbish: Rubbish must not be thrown from the windows or other parts of the Project. Mason's rubbish, dirt and other dust-producing material must be wetted down periodically.

C. Location: The Contractor must clean the Project Site and Work area daily, sweep up, and deposit at a location designated on each floor, all of its rubbish, debris, and waste materials as it accumulates or more frequently when directed by the Resident Engineer. Wood crating must be broken up, neatly bundled, tied, and stacked ready for removal and be deposited at a location designated on each floor.

1. Comply with requirements in NYC Fire Department for removal of combustible waste materials and debris.

2. Do not hold materials more than seven (7) Days during normal weather or three (3) Days if the temperature is expected to rise above 80 degrees F (27 degrees C).

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

D. Laborers: Since the Contractor is responsible for the removal of all rubbish, etc., from the Site, the Contractor must employ and keep engaged for this purpose an adequate number of laborers.

E. Surplus Materials: The Contractor must remove from the Site all surplus materials when there is no further use for same.

F. Tools and Materials: At the conclusion of the Work, all erection plant, tools, temporary structures and materials belonging to the Contractor must be promptly removed.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

3.18 CLEANING:

A. The Contractor must thoroughly clean all equipment and materials furnished and installed, and must deliver such materials and equipment undamaged in a clean and new appearing condition up to date of Final Acceptance.

B. Site: Maintain Project Site free of waste materials and debris.

C. Installed Work: Keep installed Work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of the product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration up to date of Final Acceptance.

F. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration up to date of Final Acceptance.

3.19 SECURITY AND PROTECTION OF WORK SITE:

A. Provide protection of installed Work, including appropriate protective coverings, and maintain conditions that ensure installed Work is without damage or deterioration up to date of Final Acceptance.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

C. Secure and protect Work and Work Site against damage, loss, injury, theft and/or vandalism.

D. Maintain daily sign-in sheets of workers and visitors and make the sheets available to the Commissioner.

3.20 MAINTENANCE OF SITE AND ADJOINING PROPERTY:

A. The Contractor must take over and maintain the Project Site, after order to start Work.

B. The Contractor must be responsible for the safety of the adjoining property, including sidewalks, paving, fences, sewers, water, gas, electric and other mains, pipes and conduits etc. until the date of Final Acceptance. The Contractor must, at its own expense, except as otherwise specified, protect same and maintain them in at least as good a condition as that in which the Contractor finds them.

C. All pavements, sidewalks, roads and approaches to fire hydrants must be kept clear at all times, maintained and repaired to serviceable condition with materials to match existing.

D. Provide and keep in good repair all bridging and decking necessary to maintain vehicular and pedestrian traffic.

E. The Contractor must also remove all snow and ice as it accumulates on the sidewalks within the Contract Limits Lines.

3.21 MAINTENANCE OF PROJECT SITE:

A. The Contractor must take over and maintain all Project areas, after order to start Work.

B. Until the date of Final Acceptance, the Contractor must be responsible for the safety of all Project areas, including water, gas, electric and other mains and pipes and conduits and must, at the Contractor's own expense, except as otherwise specified, protect same and maintain them in at least as good condition as that in which the Contractor finds them.

C. All pavements, sidewalks, roads and approaches to fire hydrants must be kept clear at all times, maintained, and if damaged, repaired to serviceable conditions with materials to match existing.

D. The Contractor must keep the space for the Resident Engineer in a clean condition.

3.22 SAFETY PRECAUTIONS FOR CONTROL CIRCUITS:

A. Control circuits, the failure of which will cause a hazard to life and property, must comply with DOB Bureau of Electrical Control requirements.

3.23 OBSTRUCTIONS IN DRAINAGE LINES:

A. The Contractor must be responsible for all obstructions occurring in all drainage lines, fittings, and fixtures after the installations and cleaning of these drainage lines, fittings, and fixtures, as certified by the Resident Engineer. Roof drains must be kept clear of any and all debris. Any stoppage must be repaired immediately at the expense of the Contractor.

3.24 PAYMENT OF ALLOWANCES:

A. Unless otherwise called for in the Specifications, the following requirements apply to the payment and execution of Allowances established for the Contractor:

1. Allowances are to be utilized when ordered and authorized in writing by the Commissioner.

2. The Contractor will be paid on a time and materials (T&M) basis under the Allowance. Labor will be paid based on the Contractor's Certified Payrolls, all other expenses will be paid on an invoice basis. A markup of twelve percent (12%) for overhead and ten percent (10%) for profit will be allowed, except that no markup will be allowed on Payroll Taxes or on the premium portion of overtime pay or on sales and personal property taxes.

END OF SECTION 01 73 00

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes administrative and procedural requirements for the management and disposal of construction waste and includes the following requirements:
   1. Waste Management Goals
   2. Waste Management Plan
   3. Progress Reports
   4. Progress Meetings
   5. Management Plan Implementation

B. This section includes:
   1. Definitions
   2. Waste Management Performance Requirements
   3. Reference Resources
   4. Submittals
   5. Quality Assurance
   6. Waste Plan Implementation
   7. Additional Demolition and Salvage Requirements
   8. Disposal

1.3 RELATED SECTIONS: Include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
D. Section 01 73 00 EXECUTION
E. Section 01 77 00 CLOSEOUT PROCEDURES
F. Section 01 78 39 CONTRACT RECORD DOCUMENTS
G. Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's LEED Rating System, as specified in Section 01 81 13.03 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS" or Section 01 81 13.04 "SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS".

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	**Definition**
Alternative Daily Cover (ADC)	Material other than earthen material placed on the surface of the active face of a municipal solid Waste landfill at the end of each Work Day to control vectors, fires, odors, blowing litter and scavenging.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Clean	Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.
Construction and Demolition (C&D) Waste	Solid Wastes typically including building materials, trash debris and rubble resulting from remodeling, repair and demolition operations. Hazardous materials and land clearing Waste are not included.
Diversion from Landfill	Material removal from the Site for Recycling, Reuse or Salvage that might otherwise be sent to a landfill.
Recyclable	The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
Recycle (recycling)	To sort, separate, process, treat or reconstitute solid Waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying Waste.
Return	To give back Reusable items or unused products to vendors.
Reuse	To reuse excess or discarded construction material in some manner on the Project Site.
Salvage	To remove a Waste material from the Project Site for resale or reuse.
Waste	Extra material or material that has reached the end of its useful life in its intended use. Waste includes Salvageable, Returnable, Recyclable and Reusable material.
Waste Management Plan	A Project-related plan for the collection, transportation and disposal of Waste generated at the construction Site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.
Waste-to-Energy	The conversion of non-Recyclable Waste materials into usable heat, electricity or fuel through a variety of processes, including combustion, gasification, pyrolization, anaerobic digestion and landfill gas recovery.

1.5 WASTE MANAGEMENT PERFORMANCE REQUIREMENTS:

A. The City of New York has established that this Project must generate the least amount of Waste possible and employ processes that ensure the generation of as little Waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors.

B. Of the Waste that is generated during demolition, as many of the Waste materials as economically feasible, and as stated here, must be Reused, Salvaged, or Recycled. Waste disposal in landfills must be minimized.

REFER TO THE ADDENDUM FOR THE APPLICABILITY OF SUB-SECTION 1.5 C

C. LEED CERTIFICATION: The City of New York will seek Leadership in Energy and Environmental Design (LEED) certification for this Project as indicated in the Addendum to the General Conditions from the U.S. Green Building Council. The documentation required here will be used for this purpose. LEED awards points for a variety of sustainable design measures on a project, one of which is the Reuse and Recycling of project Waste.

D. DIVERSION REQUIREMENTS. With the exception of LEED v4 projects with demolition ADC Waste, a minimum of seventy-five percent (75%) of total Project demolition and construction Waste (by weight) must be diverted from landfill. LEED v4 projects with demolition ADC Waste must divert a minimum of fifty percent (50%) of total Project demolition and construction Waste (by weight) from landfill. The following Waste categories are likely candidates to be included in the diversion plan as applicable for this Project:

1. Concrete;
2. Bricks;
3. Concrete masonry units (CMU);
4. Asphalt;
5. Metals (e.g. banding, stud trim, ceiling grid, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, brass, bronze);
6. Clean dimensional wood;
7. Carpet and pad;
8. Drywall;
9. Ceiling tiles;
10. Cardboard, paper and packaging; and
11. Reuse items indicated on the Contract Drawings and/or elsewhere in the Specification.

E. All fluorescent lamps, High Intensity Discharge lamps and mercury-containing thermostats removed from the Site must be Recycled. Do not use bulb crusher on Site.

F. Recycling on the job, subject to the Commissioner’s approval, is encouraged on the Site itself, such as the crushing and reuse of removed sound concrete and stone. Include these categories in the Waste Management Plan.

G. Land-clearing debris is not considered construction, demolition or renovation Waste and is not to be included as contribution to Waste diversion.

H. A minimum of five (5) material types, both structural and nonstructural, are to be identified in the Construction Waste Management Plan for diversion.

I. For LEED v4 projects, material to be used as ADC does not qualify as material diverted from disposal.

1.6 REFERENCES, RESOURCES:

A. DDC encourages its contractors to seek information from websites and experts in Salvage or Recycling in order to minimize disposal costs. There are numerous opportunities to sell, Salvage, or to donate materials and accrue tax benefits (which would accrue to the Contractor); there are also outlets that will pick up, and in some cases, buy Recyclable materials. Examples of information resources are as follows:

1. DDC's Sustainable Design website: https://www1.nyc.gov/site/ddc/about/sustainable-design.page. A standard Construction and Demolition (C&D) Waste Management Log form is included at the end of this section.
2. Web Resources (information only; no warranty or endorsement is implied):
    a. www.wastematch.org – Website of New York Waste Match, a materials exchange database and service.
    b. www.bignyc.org – Website of Build It Green NYC, a non-profit outlet for Salvaged and surplus building materials.
    c. www.usgbc.org – Website of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D Waste Recycling.
    d. http://www.epa.gov/epawaste/index.htm – Website of the U.S. Environmental Protection Agency (EPA) that discusses C&D Waste issues, and links to other resources.
3. Waste-to-Energy Facilities that need to comply with European Standard (EN) for Waste management and emissions into air, soil, surface water and groundwater:
    a. www.ec.europa.eu/environment/waste/framework/index.htm – European Commission Waste Framework Directive 2008/98/EC.
    b. http://www.europa.eu/legislation_summaries/environment/waste_management – European Commission Waste Incineration Directive 2000/76/EC.
    c. www.cen.eu/cen/Products – EN Standards 303-1, 303-2, 303-3, 303-4, 303-5, 303-6, 303-7.

1.7 SUBMITTALS:

A. The Contractor must refer to Section 01 33 00 SUBMITTAL PROCEDURES for submittal requirements.

B. The Contractor must be responsible for the development and implementation of a Waste Management Plan for the Project. The Contractor's subcontractors must assist in the development of that Plan, and collect and deposit their Waste and Recyclable materials in accordance with the approved Plan.

C. Draft Waste Management Plan: Within fifteen (15) Days after receipt of the Notice to Proceed (NTP), or prior to any Waste removal, whichever occurs sooner, the Contractor must submit to the Commissioner a Draft Waste Management Plan. Include separate sections for C&D Waste. The Plan must demonstrate how the performance goals will be met, and contain the following:

1. List of materials targeted for Reuse, Salvage, or Recycling, and names, addresses, and phone numbers of receiving facilities/companies that will be purchasing or accepting each material.

2. Description of on-Site and/or off-Site sorting methods for all materials to be removed from Site.
3. If mixed C&D Waste is to be sorted off-Site, provide a letter from the processor stating the average percentage of mixed C&D Waste they Recycle.
4. Landfill information: Names of landfills where non-Recyclable/reusable/salvageable Waste will be disposed, and list of applicable tipping fees.
5. Material handling procedures: Specify whether materials must be separated or commingled and describe the planned diversion strategies. Describe expected amount of each material type, where materials must be taken and how the Recycling facility must process the material. Provide a description of the means by which any Recyclable, Salvaged, or Reused materials will be protected from contamination and collected in a manner that will meet the requirements for acceptance by the designated Recycling processors.
6. Transportation: A description of the means of transportation and destination for Recycled materials.
7. Meetings: Regular meetings must be held monthly, or as directed by the Commissioner, and the Contractor must provide a description of these meetings to address Waste management.
8. Sample spreadsheet and description of how the implementation of the Plan will be documented and submitted on a monthly basis.

D. Final Waste Management Plan: Within fifteen (15) Days of Commissioner's approval of the Draft Waste Management Plan, the Contractor must submit a Final Waste Management Plan.

E. Progress Reports: The Contractor must submit a monthly Waste Management Progress Report, containing the following information:

1. Project title, name of company completing report, and dates of period covered by the report.
2. Report on the disposal of all Project Site Waste. A DDC C&D Waste Management Log form is included at the end of this section. For each shipment of material removed from the Site, provide the following:
   a. Date and ticket number of removal;
   b. Identity of material hauler;
   c. Material category;
   d. Total quantity of Waste, in tons/cubic yards, by type;
   e. Quantity of Waste Salvaged, Recycled and/or Reused, by type;
   f. Total quantity of Waste diverted from landfill (Recycled, Salvaged, Reused) as a percentage of total Waste; and
   g. Recipient of each material type.
3. Provide monthly and cumulative Project totals of Waste, quantity diverted, and percentage diverted.
4. Note that the unit of measurement may be either tons or cubic yards, but must be consistent for all shipments and all materials throughout the Project. Reports with inconsistent or mixed units will not be reviewed and will be Returned for re-submission.

5. Include legible copies of on-Site logs, weight tickets and receipts. Receipts must be from charitable organizations, Recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, Recycling or disposal. Contractor must save such original documents for the life of the Project plus seven (7) years.

F. LEED Submittal: For LEED-designated projects, submit final LEED construction Waste report signed by the Contractor, tabulating total Waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met. Waste report must include:

1. At least four (4) material streams for diverted materials;
2. Documentation of Recycling rates for commingled facilities; and
3. For Waste-to-Energy strategy, submit documentation of facility adherence to relevant EN standards, and justification for the strategy.

G. Refrigerant Recovery: Where refrigerant is recovered, submit statement of refrigerant recovery, which must include:

1. Name, address, qualification data and signature of the refrigerant recovery technician responsible for recovering refrigerant;
2. Statement that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations; and
3. Date refrigerant was recovered.

1.8 QUALITY ASSURANCE:

A. The Contractor must designate a Construction Waste Management Representative to ensure compliance with this section. The Representative must be present at the Project Site full-time and for the duration of the Project.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Waste Management Plans, documentation, and implementation must be discussed at the following meetings:

1. Pre-demolition kick-off meeting;
2. Pre-construction kick-off meeting;
3. Regular job-site meetings; and
4. Contractor toolbox meetings.

E. For LEED v4 projects, Waste-to-Energy Facilities: Comply with EN standards for Waste management and emissions into air, soil, surface water, and groundwater.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION

3.1 WASTE PLAN IMPLEMENTATION:

A. Prior to the demolition and construction start, the Contractor must implement the Waste Management Plan, coordinate the Plan with all affected trades, and designate one individual as the Construction Waste Management Representative. The Representative will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis and for assembling the required LEED documentation.

B. The Contractor must be responsible for the provision of containers and the removal of all Waste, non-Returned surplus materials and rubbish from the Site in accordance with the approved Waste Management Plan. The Contractor must oversee and document the results of the Plan. Monies received for Salvaged materials must remain with the Contractor, except the monies for those items specifically identified elsewhere in the specifications or indicated on the Contract Drawings as belonging to others.

C. Responsibilities of subcontractors: Each subcontractor must be responsible for collecting its Waste, non-Returned surplus materials and rubbish, in accordance with the Waste Management Plan.

D. Distribution: The Contractor must distribute copies of the Waste Management Plan to each subcontractor, Resident Engineer, Construction Manager, and the Commissioner.

E. Instruction: The Contractor must provide on-Site instruction of proper Waste management procedures to be used by all parties at appropriate stages of the Project.

F. Procedures: Conduct Waste management operations to ensure minimum interference with Site vegetation, roads, streets, walkways and other adjacent, occupied, and used facilities. The waste management operations include, but are not limited to:

1. Collect commingled Waste and/or separate all Recyclable Waste in accordance with the Plan. Specific areas on the Project Site are to be designated, and appropriate containers and bins clearly marked with acceptable and unacceptable materials.
2. Inspect containers and bins for contamination and remove contaminated materials if found.
3. Comply with the General Conditions for controlling dust and dirt, environmental protection, and noise control.

3.2 ADDITIONAL DEMOLITION AND SALVAGE REQUIREMENTS:

A. Demolition and Salvage of additional items indicated in other sections of the Project Specifications require special attention as part of the overall seventy-five percent (75%) Diversion from Landfill. Specific requirements for special attention are designated in other sections of the Project Specifications.

3.3 DISPOSAL:

A. General: Except for items or material to be Salvaged, Recycled, or otherwise Reused, remove Waste material from the Project Site and legally dispose of them in a manner acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow Waste materials that are to be disposed of to accumulate on Site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn Waste materials.

C. Disposal: Transport Waste materials off Project Site and legally dispose of them.

END OF SECTION 01 74 19

Department of Design and Construction

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT LOG

Project Name: _____
Project I.D.: _____

Contractor: _____
Prepared by: _____
For Month: _____

Haul Date	Ticket #	Hauling Company	*Material Category[2]	Material Quantity (tons or cubic yards)[1]				*Material Recipient
				*Total Weight	Excluded Material[3]	*Diverted Material[4]	*Landfilled Material	
				*Total		*Diverted	*Landfilled	
			Monthly Totals					
			% Diverted this Month*					
			Cumulative Totals					
			% Diverted to Date					

Notes:

1. Volume (cubic yards) may be used instead of weight if used for ALL amounts and ALL materials.
2. Includes concrete; bricks; concrete masonry units (CMU); asphalt; metals; clean dimensional wood; carpet and pad; drywall; ceiling tiles; cardboard, paper, and packaging; and any other Reuse items indicated on the Contract Drawings and/or elsewhere in the Specifications.
3. Excluded material includes soil or land clearing debris and for LEED v4 projects, Alternative Daily Cover (ADC) such as screen fines and 6” minus.
4. Diverted material includes Recycled and Reused material diverted from landfill. Recycled material is reprocessed into new products. Reused material is reclaimed, Salvaged or otherwise used in its original form, either on-site or off-site.

* These items must be listed in order to receive LEED credit.

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes administrative and general procedural requirements for Closeout Procedures, including, without limitation, the following:

1. Definitions
2. Substantial Completion
3. Final Acceptance
4. Warranties
5. Final Cleaning
6. Repair of the Work

B. LEED: Refer to the Addendum to identify whether this Project is designed to comply with a Certification Level according to the U.S. Green Building Council's (USGBC) Leadership in Energy & Environmental Design (LEED) Rating System, as specified in Section 01 81 13.03 “SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS” or Section 01 81 13.04 “SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS”.

C. COMMISSIONING: Refer to the Addendum to identify whether this Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED- NC procedures, as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS. The Contractor must cooperate with the commissioning agent and provide whatever assistance is required.

1.3 RELATED SECTIONS: include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 33 00 SUBMITTAL PROCEDURES
C. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT & DISPOSAL
D. Section 01 78 39 CONTRACT RECORD DOCUMENTS
E. Section 01 79 00 DEMONSTRATION AND OWNER’S PRE-ACCEPTANCE ORIENTATION

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	Definition
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBSTANTIAL COMPLETION:

A. Preliminary Procedures: Before requesting inspection to determine the date of Substantial Completion, the Contractor must complete and supply all items required by the Contract Specifications, General Conditions, Addendum to the General Conditions, change orders or other directives from the Commissioner's representatives. The required items will include all Contract requirements for Substantial Completion, including, but not limited to, items related to releases, regulatory approvals, warranties and guarantees, record documents, testing, demonstration and orientation, final clean up and repairs, and all specific checklist of items by the Resident Engineer. (See Attachment "A" at the end of this section for sample requirements for Substantial Completion).

B. The Contractor must prepare and submit a list to the Resident Engineer of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

C. Inspection: The Contractor must submit to the Resident Engineer a written request for inspection for Substantial Completion. Within ten (10) Days of receipt of the request, the Resident Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. The Resident Engineer may request the services, as required, of the Design Consultant, client agency representative and/or other entities having involvement with the Work to assist in the inspection of the Work. If the Resident Engineer makes a determination that the Work is Substantially Complete and approves the Final Approved Punch List and the date for Final Acceptance, he/she will so advise the Commissioner and recommend issuance of the Certificate of Substantial Completion. If the Resident Engineer determines that the Work is not substantially complete, he/she will notify the Contractor of those items that must be completed or corrected before the Certificate of Substantial Completion will be issued.

1 Re-inspection: Contractor must request re-inspection when the Work identified in previous inspections as incomplete are completed or corrected.
2 Results of completed inspection will form the basis of the requirements for Final Acceptance.

1.6 FINAL ACCEPTANCE:

A. Preliminary Procedures: Before requesting final inspection for Final Acceptance of the Work, the Contractor must complete the following. (Note that the following are to be completed, submitted as appropriate, and approved by the Commissioner, as applicable, prior to the final inspection and are not to be submitted for approval or otherwise at the final inspection unless specifically indicated). List exceptions in the request.

1. Verify that all required submittals have been provided to the Commissioner including, but not limited to, the following:

   a. Manufacturer's cleaning instructions;

   b. Posted instructions;

   c. As-built Contract Documents (Drawings, Specifications, and product data) as described in Section 01 78 39, CONTRACT RECORD DOCUMENTS, incorporating any changes required

by the Commissioner as a result of the review of the submission prior to the pre-final inspection;

d. Operation and maintenance manuals, including preventive maintenance, special tools, repair requirements, parts list, spare parts list, and operating instructions;

e. Completion of required demonstration and orientation, as applicable, of designated personnel in operation and maintenance of systems, sub-systems and equipment;

f. Applicable LEED Building submittals as described in Section 01 81 13.03, SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS; and

g. Construction progress photographs as described in Section 01 32 33, PHOTOGRAPHIC DOCUMENTATION.

2. Submit a certified copy of the Final Approved Punch List of items to be completed or corrected. The certified copy of the Punch List must state that each item has been completed or otherwise resolved for acceptance, and must be endorsed and dated by the Contractor.

3. Submit pest-control final inspection report and survey as required in Section 01 50 00, TEMPORARY FACILITIES AND CONTROLS.

4. Submit record documents and similar final record information.

5. Deliver tools, spare parts, extra stock and similar items.

6. Complete final clean-up requirements including touch-up painting of marred surfaces.

7. Submit final meter readings for utilities, as applicable, a measured record of stored fuel, and similar data as of the date when the City took possession of and assumed responsibility for corresponding elements of the Work.

B. Final Inspection: The Contractor must submit to the Resident Engineer a written request for inspection for Final Acceptance of the Work. Within ten (10) Days of receipt of the request, the Resident Engineer will either proceed with inspection or notify the Contractor of unfulfilled requirements. The Resident Engineer may request the services, as required, of the Design Consultant, client agency representative and/or other entities having involvement with the Work to assist in the inspection of the Work. If the Resident Engineer finds that all items on the Final Approved Punch List are complete and no further Work remains to be done, he/she will so advise the Commissioner and recommend the issuance of the determination of Final Acceptance. If the Resident Engineer determines that the Work is not complete, he/she will notify the Contractor of those items that must be completed or corrected before the determination of Final Acceptance will be issued.

C. Final Acceptance: The Work will be accepted as final and complete as of the date of the Resident Engineer's inspection if, upon such inspection, the Resident Engineer finds that all items on the Final Approved Punch List are complete and no further Work remains to be done. The Commissioner will then issue a written determination of Final Acceptance.

1.7 WARRANTIES:

A. Schedule B of the Addendum lists the items of materials and/or equipment for which manufacturer warranties are required. For each item of material and/or equipment listed in Schedule B, the Contractor must obtain a written warranty from the manufacturer. Such warranty must provide that the material or equipment is free from defects for the period set forth in Schedule B and will be replaced or repaired within such specified period. The Contractor must deliver all required warranties to the Commissioner.

B. Unless indicated otherwise, warranties are to take effect on the date of Substantial Completion.

C. Submittal Time: Submit written warranties on request of the Commissioner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

D. Partial Occupancy: Submit properly executed warranties to the Commissioner within fifteen (15) Days of completion of designated portions of the Work that are completed and occupied or used by the City.

E. Organize the warranty documents into an orderly sequence based on the Project Specification Divisions and Section Numbers.

1. Bind warranties in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES"; name and location of Project; Capitol Budget Project Number (FMS ID); and Contractor's and applicable subcontractor's name and address.
3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation.
4. Provide a typed description of each product or installation being warranted, including the name of the product, and the name, address, and telephone number of the installer.

F. When warranted materials and/or equipment require operation and maintenance manuals, provide additional copies of each required warranty in each required manual. Refer to Section 01 78 39, CONTRACT RECORD DOCUMENTS, for requirements of operation and maintenance manuals.

PART II – PRODUCTS

2.1 MATERIALS:

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART III – EXECUTION

3.1 FINAL CLEANING:

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations, as applicable, before requesting inspection for Final Acceptance of the Work for the entire Project or for a portion of the Project:

a. Clean Project Site, yard, and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project Site.

e. Remove snow and ice to provide safe access to building.

f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

h. Sweep concrete floors broom clean in unoccupied spaces.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Replace parts subject to unusual operating conditions.

o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean ducts, blowers, and coils if units were operated without filters during construction.

r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

t. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests, as required in Section 01 50 00, TEMPORARY FACILITIES,SERVICES AND CONTROLS. Prepare and submit a pest control report to the Commissioner.

D. Comply with all applicable safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on City's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project Site and dispose of lawfully.

3.2 REPAIR OF THE WORK:

A. Subject to the terms of the Contract, the Contractor must complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Contractor must repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 77 00

ATTACHMENT 'A'

The following list is a general sample of Substantial Completion requirements, including, but not limited to:

1. Prepare and submit a list to the Resident Engineer of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
2. Obtain and submit any necessary releases enabling the City unrestricted use of the Project and access to services and utilities.
3. Regulatory Approvals: Submit all required documentation from applicable governing authorities, including, but not limited to, the New York City Department of Buildings (DOB); Department of Transportation (DOT); Department of Environmental Protection (DEP); Fire Department (FDNY); etc. Documentation includes, but is not limited to, the following:
    a. Building permits, applications and sign-offs;
    b. Permits and sign-off for construction fences; sidewalk bridges; scaffolds, cranes and derricks; utilities; etc.;
    c. Certificates of inspections and sign-offs;
    d. Required certificates and use permits; and
    e. Certificate of Occupancy (C.O.), Temporary Certificate of Occupancy (T.C.O.) or Letter of Completion as applicable.
4. Submit specific warranties required by the Specifications, final certifications, and similar documents.
5. Prepare and submit Contract Documents as described in Section 01 78 39, CONTRACT RECORD DOCUMENTS, including but not limited to:
    a. Approved documentation from governing authorities;
    b. As-built record drawings and Specifications; product data; operation and maintenance manuals;
    c. Final Completion construction photographs;
    d. Damage or settlement surveys;
    e. Final property surveys; and
    f. Similar final record information.
    g. The Resident Engineer will review the submission and provide appropriate comments. If comments are significant, the initial submission will be returned to the Contractor for correction and re-submission incorporating the comments prior to the Final Inspection.
6. Record Waste Management Progress Report: Submit Construction & Demolition (C&D) Waste Management logs, with legible copies of weight tickets and receipts required in accordance with Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
7. If applicable submit LEED letter template in accordance with the requirements of Section 01 81 13.03, SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.

8. Schedule applicable demonstration and orientation required in other sections of the Project Specifications and as described in Section 01 79 00, DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.
9. Deliver tools, spare parts, extra materials, and similar items to location designated by Resident Engineer. Label with manufacturer's name and model number where applicable.
10. Make final changeover of permanent locks and deliver keys to the Resident Engineer. Advise Commissioner of changeover in security provisions.
11. Complete startup testing of systems as applicable.
12. Submit approved test/adjust/balance records.
13. Terminate and remove temporary facilities from Project Site, along with mockups, construction tools, and similar elements as directed by the Resident Engineer.
14. If applicable, complete Commissioning requirements as defined in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS and/ or Section 01 91 15, BUILDING ENCLOSURE COMMISSIONNING REQUIREMENTS.
15. Complete final cleaning requirements, including touchup painting.
16. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

SECTION 01 78 39
CONTRACT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes administrative and general procedural requirements for Contract Record Documents, including:

1. Contract Record Drawings
2. Record Specifications, Addenda and Change Orders
3. Record Product Data
4. Record Sample Submittal
5. Construction Record Photographs
6. Operating and Maintenance Manuals
7. Final Site Survey
8. Demonstration and Orientation DVD
9. Guarantees and Warranties
10. Waste Disposal Documentation
11. LEED Materials and Matrix
12. Miscellaneous Record Submittals

B. The Department of Design and Construction (DDC), at the start of construction (kick-off meeting), will furnish to the Contractor, at no cost, a complete set of Contract Record Drawings Mylars (reproducible) pertaining to the Work to be performed under the Contract. It is the responsibility of the Contractor to modify the Contract Drawings to indicate all changes and corrections, if any, occurring in the Work as actually installed. The Contractor is required to furnish all other Mylar (reproducible) drawings, if necessary, such as Addenda Drawings and Supplementary Drawings as may be necessary to indicate all Work in detail as actually completed. All professional seals must be blocked out. Title box complete with Project title and Design Consultants' names will remain.

C. Maintenance of Documents and Samples: The Contractor must maintain, during the progress of the Work, an accurate record of the Work as actually installed, on Contract Record Drawings Mylars in ink (reproducible). Store Contract Record Documents and samples in the field office apart from the Contract Documents used for construction. Do not use Contract Record Documents for construction purposes. Maintain Contract Record Documents in good order and in a clean, dry, legible condition. Make documents and samples available at all times for the Resident Engineer's inspections.

1. The Contractor's attention is particularly directed to the necessity of keeping accurate records of all subsurface and concealed Work, so that the Contract Record Drawings contain this information in exact detail and location. Contract Record Drawings must also show all connections, valves, gates, switches, cut-outs and similar operating equipment.

2. For projects designated to achieve a Leadership in Energy and Environmental Design (LEED) rating, the Contractor will receive a copy of the Project's LEED scorecard for the purpose of monitoring compliance with the target objectives and to facilitate coordination with the LEED Consultant. The Contractor will receive periodic updates of this scorecard and is required to submit the final version of the Scorecard at Substantial Completion with other Project Record Documents.

1.3 RELATED SECTIONS: include without limitation the following:

A.	Section 01 10 00	SUMMARY
B.	Section 01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
C.	Section 01 32 33	PHOTOGRAPHIC DOCUMENTATION
D.	Section 01 33 00	SUBMITTAL PROCEDURES
E.	Section 01 77 00	PROJECT CLOSEOUT PROCEDURES

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	**Definition**
Commissioning Authority / Commissioning Agent (CxA)	The entity responsible for providing commissioning services for the Project. The entity serving as the CxA may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
LEED Consultant	The entity responsible for providing LEED sustainability services for the Project. The entity serving as the LEED Consultant may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

A. As-Built Contract Record Drawings: The Contractor must comply with the following:

1. Progress Submission: As directed by the Resident Engineer, submit progress as-built Contract Record Drawings at the fifty percent (50%) construction completion stage.

2. Final Submission: Before Substantial Completion payment, the Contractor must furnish to the Commissioner one (1) complete set of marked-up Mylar (reproducible) as-built Contract Record Drawings, in ink indicating all of the Work and locations as actually installed, plus one (1) set of paper prints which will be furnished to the sponsoring agency by DDC.

3. As-built Contract Record Drawings must be of the same size as that of the Contract Drawings, with a one (1) inch margin on three (3) sides and a two (2) inch margin on the left side for binding.

4. Each as-built Contract Record Drawing must bear the legend "AS-BUILT CONTRACT RECORD DRAWING" in heavy block lettering, one half (l/2) inch high, and contain the following data:

AS-BUILT CONTRACT RECORD DRAWING

Contractor's Name		_____
Contractor's Address		_____
Subcontractor's Name (where applicable)		_____
Subcontractor's Address		_____
Made by:	Date	_____
Checked by:	Date	_____

Commissioner's Representatives	
(Resident Engineer)	DDC
(Plumbing Inspector)	DDC
(Heating & Ventilating Inspector)	DDC
(Electrical Inspector)	DDC

5. Contract Record Drawing Title Sheet: The Contractor must prepare a title sheet, the same size as the Contract Record Drawings, which must contain the following:

   a. Heading:
      The City of New York
      Department of Design and Construction
      Division of Public Buildings
   b. Capital Budget Project Number (FMS ID)
   c. Name and Location of Project
   d. Contractor's Name and Address
   e. Subcontractor's Name and Address (where applicable)
   f. Record of changes (a caption description of work affected, and the date and number of change order or other authorization)
   g. List of Record Drawings

B. Record Specifications, Addenda and Change Order: Submit to the Commissioner two (2) copies each of marked-up Record Specifications, Addenda and change orders.

C. Record Product Data: Submit to the Commissioner two (2) sets of Record Product Data.

D. Record Construction Photographs: Submit to the Commissioner final as-built construction photographs and negatives of the completed Work as described in Section 01 32 33, PHOTOGRAPHIC DOCUMENTATION.

E. Operating and Maintenance Manuals:

1. Submit three (3) copies each of preliminary manuals to the Resident Engineer for review and approval. The Contractor must make such corrections, changes and/or additions to the manual until deemed satisfactory by the Resident Engineer. Deliver three (3) copies of the final approved manuals to the Resident Engineer for distribution.

2. Commissioning: Comply with the requirements of Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS, as well as the requirements set forth in sections of the Project Specifications, for projects designated for commissioning. Submit four (4) copies each of data designated to be included in the commissioning operation and maintenance manual to the Resident Engineer. The Resident Engineer will forward such data to the Commissioning Authority/Agent (CxA) for review and comment. The Contractor must make such corrections, changes and/or additions to the data until deemed satisfactory and deliver four (4) copies of the final data to the Resident Engineer for use by the CxA to prepare the commissioning operation and maintenance manual.

   a. Non-Commissioning Data: All remaining data not designated for commissioning and required as part of maintenance and operation manual must be prepared and assembled in accordance with the requirements of this section for operating and maintenance manuals.

F. Final Site Survey: Submit Final Site survey as described in Section 01 73 00, EXECUTION, in quantities requested by the Commissioner, signed and sealed by a Land Surveyor licensed in the State of New York.

G. Guarantees and Warranties.

H. Waste Disposal Documents and Miscellaneous Record Documents.

PART II – PRODUCTS

2.1 CONTRACT RECORD DRAWINGS:

A. Record Prints: The Contractor must maintain one (1) set of blue- or black-line white prints as applicable of the Contract Record Drawings and Shop Drawings. If applicable, the Contract Record Drawings and Shop Drawings must incorporate the arrangement of the Work based on the accepted master coordination drawing(s) as described in Section 01 33 00, SUBMITTAL PROCEDURES.

1. Preparation: The Contractor must mark record drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Change Orders: All changes from Contract Drawings must be distinctly encircled and identified by change order number correlating to changes listed on the "Title Sheet." The Contractor must show within the encircled areas the work as actually installed.

B. Content: Types of items requiring marking include, but are not limited to, the following:

1. Dimensional changes to Contract Record Drawings;
2. Revisions to details shown on Contract Record Drawings;
3. Depths of foundations below first floor;
4. Locations and depths of underground utilities;
5. Revisions to routing of piping and conduits;
6. Revisions to electrical circuitry;
7. Actual equipment locations;
8. Duct size and routing;
9. Locations of concealed internal utilities;
10. Changes made by change order;
11. Changes made following Commissioner’s written orders;
12. Details not on the original Contract Drawings;
13. Field records for variable and concealed conditions; and
14. Record information on the Work that is shown only schematically.

C. Progress Record Mylar’s (reproducible): As directed by the Resident Engineer, at fifty percent (50%) construction completion, review marked-up Record Prints with the Resident Engineer and the Design Consultant. When directed by the Resident Engineer, transfer progress mark-ups to a full set of Mylar’s (reproducible) and submit one (1) blue line or black line record copy to the Resident Engineer. The marked-up Mylar’s (reproducible) must be retained by the Contractor for completion of mark-up and final submission.

D. Final Contract Record Mylar’s (reproducible): Immediately before final inspection for the Certificate of Substantial Completion, review marked-up record prints with the Resident Engineer and the Design

Consultant. When authorized, complete mark-up of a full set of corrected Mylar drawings (reproducible) of the Contract Drawings.

1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
2. Refer instances of uncertainty to Resident Engineer for resolution.
3. Print the as-built Contract Record Drawings and Shop Drawings for use as record transparencies as described in Sub-Section 1.5.

2.2 RECORD SPECIFICATIONS, ADDENDA AND CHANGE ORDERS:

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, Addenda, and Contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record product data has been submitted in operation and maintenance manuals instead of submitted as record product data.
5. Note related change orders and Contract Record Drawings where applicable.
6. Upon completion of mark-up, submit two (2) complete copies of the marked-up record Specifications to the Commissioner.

2.3 RECORD PRODUCT DATA:

A. Preparation: Mark product data to indicate the actual product installation where installation varies substantially from that indicated in product data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project Site and changes in manufacturer's written instructions for installation.
3. If possible, a change order proposal should include resubmitting updated product data. This eliminates the need to mark up the previous submittal.
4. Note related change orders and Contract Record Drawings where applicable.
5. Upon completion of mark-up, submit to the Commissioner two (2) sets of the marked-up record product data.
6. Where record product data is required as part of maintenance manuals, submit marked-up product data as an insert in the manual instead of submittal as record product data.

2.4 RECORD SAMPLE SUBMITTAL:

A. Prior to the date of Substantial Completion, the Contractor must meet with the Resident Engineer at the Site to determine which of the samples maintained during the construction period must be transmitted to the Commissioner for record purposes.

B. Comply with the Resident Engineer's instructions for packaging, identification marking, and delivery to DDC. Dispose of other samples as specified for disposal of surplus and waste material.

2.5 CONSTRUCTION RECORD PHOTOGRAPHS:

A. The Contractor must submit the final completion construction photographs, in compliance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION.

2.6 OPERATING AND MAINTENANCE MANUALS:

A. The Contractor must provide preliminary and final versions of operating and maintenance manuals required for those systems, equipment, and materials listed in other Sections of the Project Specifications.

B. Format: Prepare and assemble operation and maintenance manuals in heavy-duty, 3-ring, hardback loose leaf binders in the form of an instructional manual. All binders for each discipline must be the same color. When multiple binders are used, correlate data into related consistent groupings. Binder front must contain permanently attached labels displaying the following:

1. Heading:
   The City of New York
   Department of Design and Construction
   Division of Public Buildings
2. Capital Budget Project Number (FMS ID)
3. Name and Location of Project
4. Contractor's Name and Address
5. Subcontractor's Name and Address (where applicable)
6. Dates of the Work covered by the contents of the Project Manual.
7. Binder spine must display Project Number (FMS ID) and date of completion.

C. Organization: Include a section in the directory for each of the following:

1. List of documents
2. List of systems
3. List of equipment
4. Table of contents

D. Each manual must contain the following materials, in the order listed:

1. Title page
2. Table of contents
3. Manual contents

E. Arrange contents alphabetically by system, subsystem, and equipment. Cross-reference Specification Section numbers. Provide tabbed flyleaf for each separate product, equipment and/or system/subsystem with typed description of product and major component parts of equipment.

F. Safety warnings or cautions must be visibly highlighted within each maintenance procedure. Use of such highlights must be limited to only critical items and must not be used in an excessive manner which would reduce their effectiveness.

G. For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts. Vendors and supplier listings are to include names, addresses and telephone numbers, including nearest field service telephone numbers.

H. Where contents of the manual include any manufacturer's catalog pages, clearly indicate the precise items and options included in the installation and delete all manufacturers' data regarding products not included in the installation.

I. All material within manuals must be new. Copies used for prior submittals or used in construction must not be used.

J. Submit preliminary and final manual editions to the Commissioner according to the approved progress schedule.

K. Manuals must present all technical material to the greatest extent possible, with respect to text, tabular matter and illustrations. Illustrations must preferably consist of line drawings. All applicable drawings must be included. If available, color photograph prints may be included.

L. Preliminary manual editions must be as technically complete as the final manual edition. All illustrations must be in final forms.

M. Final manual editions must be technically accurate and complete and must represent all "as-built" systems, pieces of equipment, or materials, which have been accepted by the Commissioner. All illustrations, text and tabular material must be in final form. All shop drawings must be included as specified in individual Specification Sections.

N. Building products, applied materials, and finishes: Include product data, with catalog number, size, composition, and color texture designations. Where applicable, provide information for re-ordering custom manufactured products.

O. Instructions for care and maintenance: Include manufacturers' recommendations for cleaning agents and methods, and recommended schedule for cleaning and maintenance.

P. Moisture protection and weather exposed products: Include product data listing applicable reference standards, chemical compositions, and details of installation. Provide recommendations for inspections, maintenance, and repair.

Q. Additional requirements: Specified in individual Specification Sections.

2.7 FINAL SITE SURVEY

A. The Contractor must submit the final certification and final survey in compliance with Section 01 73 00 EXECUTION.

2.8 DEMONSTRATION AND ORIENTATION DVD:

A. The Contractor must submit a final version of applicable demonstration and training DVD recordings in compliance with Section 01 79 00, DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION.

2.9 GUARANTEES AND WARRANTIES:

B. SCHEDULE B: Requirements for guarantees and warranties for the Project are set forth in Schedule B, which is included as part of the Addendum.

C. FORM: For all guaranty requirements set forth in Schedule B, the Contractor must provide a written guaranty, in the form set forth herein.

D. Submit fully executed and signed manufacturers' warranties as listed in the Project Specifications and outlined in Schedule B of the Addendum. Refer to Section 01 77 00, CLOSEOUT PROCEDURES for submittal requirements.

GUARANTY

DDC PROJECT # _____

PROJECT DESCRIPTION _____

_____

CONTRACT # _____

SPECIFICATION SECTION # AND TITLE _____

_____

GUARANTY TO BE IN EFFECT FROM _____

TO _____

The Contractor hereby guarantees that the Work specified under the above section of the aforesaid Contract will be free from defects of material and/or workmanship, for the period indicated above.

The Contractor also guarantees that it will promptly repair, restore, rebuild or replace whichever may be deemed necessary by the City, any or all defective material or workmanship of the aforementioned section, that may appear within the guaranty period and any finished Work to which damage may occur because of such defects, to the satisfaction of the City and without any cost or expense to the City.

The Contractor hereby agrees to pay to the City the cost of the repairs or replacements should the City make the same because of the failure of the Contractor to do so.

Contractor: _____

By: _____
Signature of Partner or Corporate Officer

Print Name: _____

Subscribed and sworn to before me this
day of _____ , year _____

_____
Notary Public

2.10 WASTE DISPOSAL DOCUMENTATION:

A. Certify and deliver to the Commissioner all documentation including reports, receipts, certificates, records etc. for the collection, handling, storage, classification, testing, transportation, recycling and/or disposal of all Non-Hazardous Construction Waste as required by Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, and Hazardous Waste as required by other Project Specification Sections. Certify compliance with all applicable governing laws, codes, rules and regulations.

2.11 LEED MATERIALS AND MATRIX:

A. Certify and deliver to the Commissioner all documentation including reports, receipts, certificates, records etc. for the collection, handling, storage, classification, testing, transportation, recycling and/or disposal of all Non-Hazardous Construction Waste as required by Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, and Hazardous Waste as required by other Project Specification Sections. Certify compliance with all applicable governing laws, codes, rules and regulations.

2.12 MISCELLANEOUS RECORD DOCUMENTS:

A. Refer to other Project Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Prior to Final Acceptance, complete miscellaneous records and place in good order, properly identified and bound or otherwise organized to allow for use and reference.

B. Submit three (3) copies of each document to the Commissioner or as otherwise directed by the Commissioner.

PART III – EXECUTION

3.1 RECORDING AND MAINTENANCE:

A. Recording: Maintain one (1) copy of each submittal during the construction period for Contract Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of the Project.

B. Maintenance of Record Documents and Samples: Store Contract Record Documents and samples in the field office apart from the Contract Documents used for construction. Do not use Contract Record Documents for construction purposes. Maintain Contract Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to the Contract Record Documents for the Resident Engineer's reference during normal working hours.

END OF SECTION 01 78 39

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SECTION 01 79 00
DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 79 00

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This section includes administrative and procedural requirements, when set forth in sections of the Project Specifications, for instructing the facility's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Owner's pre-acceptance orientation in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and orientation video recordings.

B. The Contractor must provide the services of orientation specialists from the Contractor's equipment manufacturers. The specialists must be experienced in the type of equipment to be demonstrated.

C. Separate orientation sessions must be conducted for mechanical operations and maintenance personnel and for electronic and electrical maintenance personnel.

D. Commissioning: Refer to the Addendum to identify whether this project is to be commissioned. For commissioned projects, the Contractor must provide demonstration and orientation as described in this section and cooperate with the Commissioning Authority/Agent (CxA) to implement commissioning requirements as described in Section 01 91 13, GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS, and/ or Section 01 91 15 BUILDING ENCLOSURE COMMISSIONNING REQUIREMENTS.

1.3 RELATED SECTIONS: include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 33 00 SUBMITTAL PROCEDURES
C. Section 01 77 00 CLOSEOUT PROCEDURES
D. Section 01 78 39 CONTRACT RECORD DOCUMENTS
E. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS
F. Section 01 91 15 BUILDING ENCLOSURE COMMISSIONNING REQUIREMENTS
G. Specific requirements for demonstration and orientation indicated in other sections of the Project Specifications.

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Term	**Definition**
Commissioning Authority / Commissioning Agent (CxA)	The entity responsible for providing commissioning services for the Project. The entity serving as the CxA may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the Design Consultant may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

1.5 SUBMITTALS:

A. Instruction Program: Submit three (3) copies of an outline of the instructional program for demonstration and orientation, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each orientation module to the Commissioner for approval no less than thirty (30) Days prior to the date the proposed orientation is to take place. Include learning objectives and outline for each orientation module.

1. At completion of orientation, submit three (3) complete training manual(s) and three (3) applicable video recording(s) to the Commissioner for the facility's and City's use.

B. Qualification Data: For facilitator, instructor and videographer.

C. Attendance Record: For each orientation module, submit a list of participants and length of instruction time.

D. Evaluations: For each participant and for each orientation module, submit results and documentation of performance-based test.

E. Submit all final orientation materials to the Resident Engineer a minimum of fourteen (14) Days prior to the scheduled orientation.

F. Demonstration and Orientation Recordings:

1. All Projects:

a. The Contractor must submit to the Commissioner three (3) copies of demonstration and orientation video recordings within seven (7) Days of end of each orientation module.

b. Identification: On each copy, provide an applied label with the following information:

1) Project Contract I.D. Number
2) Project Contract Name
3) Name of Contractor
4) Name of Subcontractor as applicable
5) Name of Design Consultant
6) Name of Construction Manager as applicable
7) Date recorded
8) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

9) Table of Contents including list of systems covered.

c. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding DVD recording. Include name of Project and date of recording on each page.

d. Commissioned Projects: The Contractor must submit one (1) additional copy of the demonstration and orientation video recording to the CxA through the Resident Engineer who will include the approved recording in the commissioning report.

1.6 QUALITY ASSURANCE:

A. Facilitator Qualifications: A firm or individual experienced in orientation or educating maintenance personnel in an orientation program similar in content and extent to that indicated for this Project.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00, QUALITY REQUIREMENTS, experienced in operation and maintenance procedures and orientation.

C. Videographer Qualifications: A professional videographer who has experience with orientation and construction projects.

D. Pre-Instruction Conference: Schedule with the Resident Engineer a conference at Project Site in accordance with Section 01 31 00, PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to demonstration and orientation including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3. Review required content of instruction.

4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.7 COORDINATION:

A. Coordinate instruction schedule with the Resident Engineer and facility’s operations. Adjust schedule as required to minimize disrupting facility’s operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of orientation modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the Commissioner.

PART II – PRODUCTS

2.1 INSTRUCTION PROGRAM:

A. Program Structure: Develop an instruction program that includes individual orientation modules for each system and equipment not part of a system, as specified and required by individual Specification Sections.

B. Orientation Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. For basis of system design, operational requirements, and criteria, include the following:
   a. System, subsystem, and equipment descriptions;
   b. Performance and design criteria if Contractor is delegated design responsibility;
   c. Operating standards;
   d. Regulatory requirements;
   e. Equipment function including auxiliary equipment and systems;
   f. Operating characteristics;
   g. Limiting conditions; and
   h. Performance curves.
2. For documentation, review the following items in detail:
   a. Emergency manuals;
   b. Operations manuals;
   c. Maintenance manuals;
   d. Project Record Documents;
   e. Identification systems; and
   f. Warranties.
3. For emergencies, include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages;
   b. Instructions on stopping;
   c. Shutdown instructions for each type of emergency;
   d. Operating instructions for conditions outside of normal operating limits;
   e. Sequences for electric or electronic systems; and
   f. Special operating instructions and procedures.
4. For operations, include the following, as applicable:
   a. Startup procedures;
   b. Equipment or system break-in procedures;
   c. Routine and normal operating instructions;
   d. Regulation and control procedures;
   e. Control sequences;
   f. Safety procedures;
   g. Instructions on stopping;
   h. Normal shutdown instructions;
   i. Operating procedures for emergencies;
   j. Operating procedures for system, subsystem, or equipment failure;
   k. Seasonal and weekend operating instructions;
   l. Required sequences for electric or electronic systems; and
   m. Special operating instructions and procedures.
5. For adjustments, include the following:
   a. Alignments;
   b. Checking adjustments;
   c. Noise and vibration adjustments; and
   d. Economy and efficiency adjustments.
6. For troubleshooting, include the following:
   a. Diagnostic instructions; and
   b. Test and inspection procedures.

7. For maintenance, include the following:
   a. Inspection procedures;
   b. Types of cleaning agents to be used and methods of cleaning;
   c. List of cleaning agents and methods of cleaning detrimental to product;
   d. Procedures for routine cleaning;
   e. Procedures for preventive maintenance;
   f. Procedures for routine maintenance;
   g. Instruction on use of special tools; and
   h. Housekeeping practices.
8. For repairs, include the following:
   a. Diagnosis instructions;
   b. Repair instructions;
   c. Disassembly, component removal, repair, and replacement; and reassembly instructions;
   d. Instructions for identifying parts and components; and
   e. Review of spare parts needed for operation and maintenance.

PART III – EXECUTION

3.1 INSTRUCTION:

A. Facilitator: Engage a qualified facilitator to prepare the instruction program and orientation modules, to coordinate instructors, and to coordinate between Contractor and the Resident Engineer for the number of participants, instruction times, and location.

B. The Contractor must engage qualified instructors to instruct the facility's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Schedule instruction with the Resident Engineer at mutually agreed upon times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.

   1. Schedule orientation with the Resident Engineer with at least fourteen (14) Days advance notice.

D. Evaluation: At the conclusion of each orientation module, assess and document each participant's mastery of module(s) by use of an oral or written demonstration performance-based test.

E. Cleanup: Collect and remove used and leftover educational materials from Project Site. Remove instructional equipment. Restore systems and equipment to condition existing before initial orientation use.

3.2 DEMONSTRATION AND ORIENTATION VIDEO RECORDINGS:

A. All projects:

   1. The Contractor must engage a qualified commercial videographer to video record demonstration and orientation sessions. Record each orientation module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

   2. At the beginning of each orientation module, record each chart containing learning objective and lesson outline.

   3. All recordings must be close-captioned.

   4. Recording Format: Provide high-quality video recording on USB drive or other electronic media as requested by the Commissioner.

   5. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and orientation. Display continuous running time.

6. Narration: Describe scenes on the recording by audio narration by microphone while recording or by dubbing audio narration off-site after. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

7. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from opposite the corresponding narration segment.

B. Commissioned Projects: Refer to the Addendum to determine if the project is to be commissioned.

1. The Commissioning Authority/Agent (CxA) under separate contract with the City of New York will assess and comment on the adequacy of the orientation instruction sessions by reviewing the orientation and instruction program and agenda provided by the Contractor. The provider of the orientation program will video record the sessions and provide a copy to the CxA for final review and comments. If necessary, Contractor must edit the recording per CxA comments.

END OF SECTION 01 79 00

SECTION 01 81 13.03
SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.03

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. LEED BUILDING - GENERAL REQUIREMENTS**:**

The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED™ Green Building rating. Specific project requirements related to this goal are listed in the applicable paragraphs of this section of the General Conditions. The Contractor must ensure that these requirements, as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, will not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. This Section includes:

1. Definitions
2. LEED Provisions
3. LEED Building Submittals
4. LEED Building Submittal Requirements
5. LEED Action Plan

1.3 RELATED SECTIONS: Include without limitation the following:

A.	Section 01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
B.	Section 01 81 13.13	VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS
C.	Section 01 81 19	INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS
D.	Section 01 91 13	GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS
E.	Section 01 91 15	GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Agrifiber Products	Means products derived from recovered agricultural waste fiber from sources such as cereal straw, sugarcane bagasse, sunflower husk, walnut shells, coconut husks, and agricultural prunings, processed and mixed with resins to produce panels with characteristics similar to composite wood.
Composite Wood	Means products composed of wood or plant particles or fibers bonded by a synthetic resin or binder to produce panels such as plywood, particleboard, and medium density fiberboard (MDF). Does not include hardboard, structural panels, glued laminated timber, prefabricated wood I-joists, or finger-jointed lumber.
Design Consultant	Means the entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Forest Stewardship Council (FSC) Certified Wood	Means wood-based materials and products certified in accordance with the Forest Stewardship Council's principles and criteria.
LEED	Means the Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council.
Rapidly Renewable Materials	Means materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.
Regionally Manufactured Materials	Means materials that are manufactured within a radius of 500 miles from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
Regionally Extracted, Harvested, or Recovered Materials	Means materials which are extracted, harvested, or recovered and manufactured within a radius of 500 miles from the Project site.
Recycled Content	Means The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer). Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials. "Pre-consumer" may also be referred to as "post-industrial".
Solar Reflectance Index (SRI)	A measure of a material's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is equal to 0, and a standard white (reflectance 0.80, emittance of 0.90) is equal to 100.

Volatile Organic Compound (VOC)	Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.

1.5 LEED PROVISIONS:

A. Refer to the Addendum for the LEED rating to be achieved for this project. The provisions to achieve this LEED rating are integrated within the project construction documents and specifications. The Contractor is specifically directed to the "LEED BUILDING Performance Criteria" and "LEED BUILDING Submittals" sections within the contract specification. Additional LEED requirements are met through aspects of the project design, including material and equipment selections, which may not be specifically identified as LEED BUILDING requirements. Compliance with the requirements needed to obtain LEED prerequisites and credits will be used as one criterion to evaluate substitution requests.

1.**6 LEED BUILDING SUBMITTALS:**

A. Scope: LEED BUILDING submittals are required for all installed materials included in General Construction work. LEED BUILDING Submittals are only required for field-applied adhesives, sealants, paints and coatings included in Plumbing, Mechanical and Electrical work. Submit all required LEED BUILDING submittals in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.

B. Applicability: The extent of the LEED BUILDING Submittals varies depending on the specification section. Applicable LEED BUILDING Submittals are listed under the "LEED BUILDING Submittals" heading in each specification section. The detailed requirements for the LEED BUILDING Submittals are defined in Item C below.

C. Detailed Requirements: Sub-Sections 1.6 C.1through 1.6 C.3 below defines the information and documents to be provided for each type of LEED BUILDING Submittal as identified in the LEED Submittal Requirements of each specification section:

1. ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM (EBMCF)[GHI]: Information to be supplied for this form (blank sample copy attached at end of this Section to be modified as appropriate to the project) must include some or all of the following items, as identified in the LEED Submittal Requirements of each specification section:

   a. Cost breakdowns for the materials included in the contractor or sub-contractor's scope of work. Cost reporting must include itemized material costs (excluding the contractor's labor, equipment, overhead and profit).

   b. The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).

      1) For each product with recycled content, also indicate the total recycled content value (1/2 x pre-consumer percentage x product value + 1 x post-consumer percentage x product value = total recycled content value).
      2) See additional requirements for concrete below.

   c. Identification (Yes/No) of materials manufactured within 500 miles of the project site AND containing raw materials harvested or extracted within 500 miles of the project site.

      1) Indicate the percentage by weight, relative to the total weight of the product that meets these criteria.
      2) Indicate the point of harvest/extraction/recovery of regional raw materials, the point of final assembly of regional manufactured products, and the distance from each point to the project site.

d. Volatile Organic Compound (VOC) content of all field-applied adhesives, sealants, paints, and coatings, listed in grams/liter or lbs./gallon, less water.

1) For detailed requirements refer to Section 01 81 13.13 VOC LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS.

e. The amount of “Forest Stewardship Council (FSC) Certified” wood products if used in the Project.

1) Record only new FSC-certified wood products. Do not record reclaimed, salvaged, or recycled FSC-certified wood products.
2) Reclaimed, salvaged, or recycled FSC-certified wood may be recorded as post-consumer recycled content.

f. The amount of Rapidly Renewable materials if used in the Project.

1) Indicate the type of rapidly renewable material used, and the percentage by weight, relative to the total weight of the product, that consists of rapidly renewable material.

g. The percentage (by weight), relative to the total weight of cementitious materials, of supplementary cementitious materials or pozzolans such as fly ash used in each concrete mix used in the Project.

1) For each concrete mix, provide a complete breakdown of all components, by weight and by cost.

h. Identification (Yes/No) of composite wood or agrifiber products used in the project that are free of added urea-added formaldehyde resins.

i. Identification (Yes/No) of flooring products used in the project that have Carpet and Rug Institute (CRI) Green Label or Green Label Plus certification, or Resilient Floor Covering Institute FloorScore certification.

1) Untreated solid wood flooring, and mineral-based flooring products such as tile, masonry, terrazzo, and cut stone that have no organic-based coatings or sealants, are excluded from this requirement.

j. The EBMCF must record the above information only for those materials or products permanently installed in the project. The EBMCF must record VOC content, composite and agrifiber products, and CRI or FloorScore ratings only for those materials or products permanently installed within the weather barrier of the LEED building.

2. EBMCF BACK-UP DOCUMENTATION: These documents are used to validate the information provided on the EBMCF (except cost data). For each material listed on the EBMCF, provide documentation to certify the material’s LEED BUILDING attributes, as applicable:

a. RECYCLED CONTENT: Provide published product literature or letter of certification on the manufacturer’s letterhead certifying the amounts of post-consumer and/or post-industrial content.

b. REGIONAL MANUFACTURING **AND** REGIONAL RAW MATERIALS (WITHIN 500 MILES): Provide published product literature or letter of certification on the manufacturer’s letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered and the distance in miles from the project site.

1) If only some of the raw materials for a particular product or assembly originate within 500 miles of the project site, provide the percentage (by weight) that these materials comprise in the complete product.

c. VOC CONTENT: Provide Material Safety Data Sheets (MSDS) certifying the Volatile Organic Compound (VOC) content of the adhesive, sealant, paint, or coating products. VOC content is to be reported in grams/liter or lbs./gallon, less water. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification from the product manufacturer on the manufacturer's letterhead.

d. RAPIDLY RENEWABLE MATERIALS: If used in the project, provide published literature or letter of certification on the manufacturer's letterhead certifying the percentage of each product that is rapidly renewable (by weight).

3. PRODUCT CUT SHEETS: Provide product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.

4. CRI GREEN LABEL PLUS CERTIFICATION: For carpets and carpet cushions, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the "Green Label Plus" IAQ testing program of the Carpet and Rug Institute of Dalton, GA.

5. CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER RESINS: For all composite wood, engineered wood and agrifiber products (including plywood, particleboard, and medium density fiberboard), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the products do not contain added urea-formaldehyde resins.

6. CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER LAMINATING ADHESIVES: For all laminating adhesives used with composite wood, engineered wood and agrifiber products (e.g., adhesives used to laminate wood veneers to an engineered wood substrate), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the adhesive products do not contain urea-formaldehyde.

7. FSC-CERTIFIED WOOD:

   a. If used in the project, provide chain of custody documents and copies of invoices regarding wood products, including whether or not such wood product is FSC-certified.

   b. If used in the project, for assemblies, provide the percentage (by cost and by weight) of the assembly that is FSC-certified wood.

   c. If used in the project, for assemblies, provide published product literature or letter from the manufacturer(on the manufacturer's letterhead) verifying the percentage that is FSC-certified wood.

8. GREEN SEAL COMPLIANCE: Provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the following product types comply with the VOC limits and chemical component restrictions developed by the Green Seal organization of Washington, DC:

   a. Interior Architectural Paints and Coatings: refer to Green Seal standard GS-11 (1st edition, May 1993)

   b. Anti-corrosive and Anti-rust paints: refer to Green Seal standard GC-03 (2nd Edition, January 1997)

   c. Aerosol Adhesives: refer to Green Seal standard GS-36 (1st edition, October 2000)

9. HIGH ALBEDO PAVING AND WALKWAY MATERIALS: For paving and walkway materials made from concrete or brick provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum Solar Reflectance Index (SRI) value of 29. SRI

values will be calculated according to ASTM E 1980. Reflectance will be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance will be measured according to ASTM E 408 or ASTM C 1371.

10. HIGH ALBEDO ROOFING MATERIALS: For exposed roofing membranes, pavers, and ballast products, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values:

    a. 78 for low-sloped roofing applications (slope ≤ 2:12)

    b. 29 for steep-sloped roofing applications (slope > 2:12)

    SRI values will be calculated according to ASTM E 1980. Reflectance will be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance will be measured according to ASTM E 408 or ASTM C 1371.

    Vegetated roof surfaces are exempt from the SRI criteria.

11. LOW MERCURY LAMPS: For all fluorescent, compact fluorescent, and HID lamps installed in the project, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying:

    a. The mercury content or content range per lamp in milligrams or picograms;

    b. The design light output per lamp (light at 40% of a lamp's useful life) in lumens; and

    c. The rated average life of the lamp in hours.

    In addition, provide the total number of each lamp type installed in the project.

12. FLOORSCORE CERTIFICATION: For all hard surface flooring, including vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, and wall base, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the current FloorScore standard requirements.

13. CONCRETE: Provide concrete mix design for each mix, designated by a distinct identifying code or number and signed by a Professional Engineer licensed in the state in which the concrete manufacturer or supplier is located.

14. INTERIOR LIGHTING FIXTURES: For each lighting fixture type installed within the building's weather barrier, provide manufacturer's cut sheets indicating the following:

    a. Fixture power in watts.

    b. Initial lamp lumens.

    c. Photometric distribution data.

    d. Dimming capability, in range of percentages.

15. EXTERIOR LIGHTING FIXTURES: For each lighting fixture type installed on site, provide manufacturer's cut sheets indicating the following:

    a. Fixture power in watts.

    b. Initial lamp lumens.

    c. Photometric distribution data.

    d. Range of field adjustability, if any.

    e. Warranty of suitability for exterior use.

16. ALTERNATIVE TRANSPORTATION: Provide manufacturer's cut sheets and/or shop drawings for the following items installed on site:
    a. Bike racks, including total number of bicycle slots provided.
    b. Signage indicating parking spaces reserved for electric or low-emitting vehicles and for carpools/vanpools, including total number of signs.
17. WATER CONSERVING FIXTURES: For all water consuming plumbing fixtures and fittings, provide manufacturer's cut sheets showing maximum flow rates and/or flush rates.
18. ENERGY SAVING APPLIANCES: Provide manufacturer's cut sheets and published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the product's rating under the U.S. EPA/DOE Energy Star program, for all of the following:
    a. Appliances (i.e., refrigerators, dishwashers, microwave ovens, televisions, clothes washers, clothes dryers, chilled water dispensers).
    b. Office equipment (i.e., copy machines, fax machines, plotters/printers, scanners, binding and publishing equipment).
    c. Electronics (i.e., servers, desktop computers, computer monitor displays, laptop computers, network equipment).
    d. Commercial food service equipment
19. GLAZING: For glazing in any windows, doors, storefront and window wall systems, curtainwall systems, skylights, and partitions, provide manufacturer's cut sheets indicating the following:
    a. Glazed area.
    b. Visible light transmittance.
    c. Solar heat gain coefficient.
    d. Fenestration assembly u-factor.
20. VENTILATION: Provide manufacturer's cut sheets for the following:
    a. Carbon dioxide monitoring systems, if any, installed to measure outside air delivery.
    b. Air filters: for detailed requirements refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS.
21. REFRIGERATION: For all refrigeration equipment, provide manufacturer's cut sheets indicating the following:
    a. Equipment type.
    b. Equipment life. Default values specified by the 2007 ASHRAE Applications Handbook will be used unless otherwise demonstrated by the manufacturer's guarantee and an equivalent long-term service contract.
    c. Refrigerant type.
    d. Refrigerant charge in pounds of refrigerant per ton of gross cooling capacity.
    e. Tested refrigerant leakage rate, in percent per year. A default rate of 2% will be used unless otherwise demonstrated by test data.
    f. Tested end-of-life refrigerant loss, in percent. A default rate of 10% will be used unless otherwise demonstrated by test data.

1.7 LEED BUILDING SUBMITTAL REQUIREMENTS:

A. The LEED BUILDING Submittal information must be assembled into one package per contract specification section(s) (or per subcontractor), and submitted in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. Incomplete or inaccurate LEED BUILDING submittals may be used as the basis for the rejection of products or assemblies. Incomplete or inaccurate LEED BUILDING Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.8 LEED ACTION PLANS:

A. Construction Waste Management Plan- Refer to Section 01 74 19, Construction Waste Management and Disposal for detailed submittal requirements.

B. Construction IAQ Management Plan- Refer to Section 01 81 19, Indoor Air Quality Requirements for LEED Buildings, for detailed submittal requirements.

C. Erosion and Sedimentation Control Plan:

1. The Plan must be in accordance with the New York State Department of Environmental Conservation (NYSDEC) or the 2003 EPA Construction General Permit, whichever is more stringent.

2. The Plan must be submitted in accordance with Section 01 33 00, SUBMITTAL PROCEEDURES.

3. Detailed requirements: ESC Plan

   a. Include the Stormwater Pollution Prevention Plan, if required.

   b. Identify the party responsible for Plan monitoring and documentation. The party must be regularly on site.

   c. Describe all site work that will be implemented on the project.

   d. Provide site plan with location of ESC measures, including, but not limited to, stormwater quantity controls, stormwater quality controls, stabilized construction entrances, washdown areas, and inlet/catch basin protection.

   e. Describe the inspection and maintenance of the ESC measures. Provide a construction schedule indicating weekly site review.

   f. Describe reporting and documentation measures.

4. Detailed requirements: ESC Measures

5. Submittal requirements: ESC Tracking Log

   a. Note date of major rain events, describe damage, describe any repairs or maintenance performed, and note responsible party.

   b. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party.

   c. Submit monthly.

6. Implementation

   a. The Contractor must implement the ESC Plan, coordinate the Plan with all affected trades, and designate one individual as the Erosion and Sedimentation Control Representative, who will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis, and for assembling the required LEED documentation.

b. The Contractor must be responsible for the provision, maintenance, and repair of all ESC measures.

c. Demonstration. The Contractor must provide on-site instruction of proper construction practices required to prevent erosion and sedimentation.

d. Meetings. Urgent or ongoing ESC issues will be discussed at weekly on-site job meetings.

1.9 QUALITY ASSURANCE:

A. The Contractor must implement all LEED Action Plans, coordinate the Plans and LEED Building Submittals with all affected trades, and designate one individual as the Sustainable Construction Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of LEED activities with the Commissioner on a regular basis, and for assembling the required LEED documentation.

B. Responsibilities of Contractor's Subcontractors: The Contractor is responsible for his/her subcontractors complying with the LEED Action Plans and for providing required LEED documentation as required for the project.

C. Distribution and Compilation: The Contractor is responsible for distributing the EBMCF and any other forms or templates required for the subcontractors to record LEED documentation. The Contractor also be responsible for collecting and compiling EBMCF information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.

D. Meetings: Sustainable design and construction issues must be discussed at the following meetings:

1. Demolition kick-off meeting
2. Construction kick-off meeting
3. Construction kick-off meeting for LEED (independent meeting)
4. Weekly job-site progress and coordination meetings
5. Closeout meeting

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 13.03

ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM

Contractor Name: _____
Contractor Contact: _____
Telephone Number: _____

Project Name: _____
Project I.D.: _____

Product/Manufacturer	Material Cost[1]	Recycled Content			Regional[4]			Rapidly Renewable[7]		VOC content[8]		Flooring[9]	Wood	
		Pre-Consumer (% by wt)[2]	Post-Consumer (% by wt)[3]	Total % (½ Pre + Post)	Location & Distance to Extraction[5]	Location & Distance to Manufacture[6]	Extracted & Manuf. (% by wt)	Material	% by wt	*VOC content listed	*VOC content allowed	*Green Label or FloorScore	*Added urea formaldehyde (Yes/No) [10]	FSC Certified[11] (% by wt)

[1] Material Cost: As it appears on the manufacturer's or distributor's invoice to the contractor or subcontractor. Does not include labor or equipment costs associated with installation.

[2] Pre-Consumer Recycled Content: Industrial/manufacturing waste material (e.g., fly-ash and synthetic gypsum, both waste products from coal burning electricity plants) diverted from landfill and incorporated into a finished product. Scrap raw materials that can be reused in the same manufacturing process from which they are recovered are not considered Pre-Consumer Recycled Content.

[3] Post-Consumer Recycled Content: Material or product that has served its intended consumer use (e.g., an empty plastic bottle) and has been diverted from landfill and incorporated into a finished product.

[4] Regional: Refers to a material/product that is BOTH extracted AND manufactured within 500 miles of the Project site. Record this information ONLY for materials/products meeting BOTH of these criteria.

[5] Extraction: Refers to the location from which the raw resources used in a building product are extracted, harvested, or recovered.

[6] Manufacture: Refers to the location of the final assembly of components into a building product that is furnished and installed by the Contractor.

[7] Rapidly Renewable: Refers to materials/products derived from agricultural products that are typically harvested within a ten-year or shorter cycle.

[8] VOC Content: The quantity of volatile organic compounds contained in adhesives, sealants. paints and architectural coatings. Reported in grams/liter or lbs/gallon, less water.

[9] Flooring: For carpet, indicate Carpet and Rug Institute (CRI) Green Label Plus certification. For carpet cushion, indicate CRI Green Label certification. For all flooring except unfinished/untreated wood and mineral-based flooring (tile, masonry, terrazzo, cut stone) without organic-based coatings or sealants, indicate Resilient Floor Covering Institute FloorScore rating. VOC limits for adhesives, sealants, etc. still apply.

[10] Added Urea Formaldehyde: Applies to composite wood and agrifiber products only (plywood, particleboard, MDF, OSB, wheatboard, strawboard). Resins or binders with added urea formaldehyde are prohibited.

[11] FSC Certified: Certification from the Forest Stewardship Council. This column is only applicable to wood products.

* Applies only to materials/products installed within the weather barrier.

Contractor Certification:

I, _____ a duly authorized representative of_____ (the Contractor) hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by the Contractor as components of the final building construction. Furthermore, I understand that any change in such qualifications during the purchasing period will require prior written approval from the Commissioner.

Signature of Authorized Representative: _____ Date: _____

SECTION 01 81 13.04
SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.04

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. LEED BUILDING - GENERAL REQUIREMENTS**:**

The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED™ Green Building rating. Specific Project requirements related to this goal are listed in the applicable paragraphs of this section of the General Conditions. The Contractor shall ensure that these requirements as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

B. This Section includes:

1. Definitions
2. LEED Provisions
3. LEED Building Submittals
4. LEED Building Submittal Requirements
5. LEED Action Plan
6. VOC Requirements for Interior Adhesives and Sealants
7. VOC Requirements for Interior Paints and Coatings
8. Low-Emitting Materials, Flooring
9. Low-Emitting Materials, Composite Wood
10. Low-Emitting Materials, Ceilings, Walls, Thermals and Acoustic Insulation
11. Low-Emitting Materials, Furniture
12. Low-Emitting Materials, Exterior Applied Products
13. Low-Emitting Materials, Additional Low-Emitting Requirements

C. This Section includes requirements for Volatile Organic Compound (VOC) emissions and content in specific materials used within the Project.

D. All sections in the Project Specifications with adhesives, sealant or sealant primer applications, paints, coatings, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, furniture, and for healthcare and schools, exterior applied products, shall follow all requirements of this section. In the event of any conflict or inconsistency between this section and the Specifications regarding adhesives, sealant or sealant applications, paints, coatings, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, furniture, and for healthcare and schools, exterior applied products, the requirements set forth in this Section shall prevail.

1.3 RELATED SECTIONS: Include without limitation the following:

A.	Section 01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
B.	Section 01 81 19	INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS
C.	Section 01 91 13	GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS
D.	Section 01 91 15	GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Adhesive	Any substance used to bond one surface to another by attachment. Includes adhesive primers and adhesive bonding primers.
Aerosol Adhesive	Any adhesive packaged as an aerosol with a spray mechanism permanently housed in a non-refillable can designed for hand-held application without the need for ancillary equipment
Agrifiber Products	Products derived from recovered agricultural waste fiber from sources such as cereal straw, sugarcane bagasse, sunflower husk, walnut shells, coconut husks and agricultural prunings, processed and mixed with resins to produce panels with characteristics similar to composite wood.
Bio-based materials	Composed in whole or in significant part of biological products, renewable agricultural materials or forestry materials, and must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material.
Building Exterior	A structure's primary and secondary weatherproofing system, including waterproofing membranes and air- and water-resistant barrier materials, and all building elements outside that system.
Building Interior	Everything inside a structure's weatherproofing membrane.
Carcinogen	A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer

	(IARC) (Groups 1, 2A, and 2B), the National Toxicology Program (NTP) (Groups 1 and 2), the U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) (weight-of-evidence classifications A, B1, B2, and C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or the Occupational Safety and Health Administration (OSHA).
Certified Wood	See Forest Stewardship Council (FSC) Certified Wood.
Clear Wood Finish	Clear/semi-transparent coating applied to wood substrates to provide a transparent or translucent solid film.
Coating	Liquid, liquefiable or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer; and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics; and is intended for on-site application to interior or exterior surfaces of buildings. Does not include stains, clear finishes, recycled latex paint, specialty (industrial, marine or automotive) coatings or paint sold in aerosol cans.
Composite Wood	Products composed of wood or plant particles or fibers bonded by a synthetic resin or binder to produce panels such as plywood, particleboard, and medium density fiberboard (MDF). Does not include hardboard, structural panels, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber.
Cradle-to-Gate Assessment	Analysis of a product's partial life cycle, from resource extraction to the factory gate, before it is transported for distribution and sale.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

Enclosure	The exterior plus semi-exterior portions of the building. Exterior consists of the elements of a building that separate conditioned spaces from the outside (i.e., the wall assembly). Semi-exterior consists of the elements of a building that separate conditioned space from unconditioned space or that encloses semi-heated space through which thermal energy may be transferred to or from the exterior or conditioned or unconditioned spaces (e.g., attic, crawl space, basement).
Environmental Product Declaration (EPD)	A statement that the item meets the environmental requirements of, ISO 14025, 14040 and EN 15804, or ISO 21930 and have at least a cradle-to-gate scope.
Extended Producer Responsibility	A. A waste management strategy, also known as closed-loop program or product take-back, where the manufacturer's responsibility for a product is extended to the post-consumer stage of the product's life-cycle.
Floor Coating	Opaque coating applied to flooring. Excludes industrial maintenance coatings.
Forest Stewardship Council (FSC) Certified Wood	Wood-based materials and products certified in accordance with the Forest Stewardship Council's principles and criteria.
Hazardous Air Pollutant	Any compound listed by the U.S. EPA in the Clean Air Act Section 112(b)(1) as a hazardous air pollutant.
Inherently Non-Emitting Materials	Products that are inherently non-emitting sources of VOCs, including stone, ceramic, powder-coated metals, plated or anodized metals, lass, concrete, clay brick, unfinished solid wood, untreated solid wood. These materials are considered compliant without VOC testing if they do not include integral organic-based surface coatings, binders or sealants.
Lacquer	Clear/semi-transparent coating formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and provide a solid, protective film.

LEED	The Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council (USGBC).
Life-Cycle Assessment	An evaluation of the environmental effects of a product from cradle to grave, as defined by ISO 14040-2006 and ISO 14044-2006.
Mutagen	A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarding as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification of Chemicals Which Cause Mutations in Germ Cells (United Nations Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).
Ozone-Depleting Compounds	A compound with an ozone-depletion potential greater than 0.1 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.
Paint	A pigmented coating. For the purposes of this specification, paint primers are considered to be paints. A. Flat Coating or Paint: Has a gloss of less than 15 (using an 85-degree meter) or less than 5 (using a 60-degree meter). B. Non-Flat Coating or Paint: Has a gloss of greater than or equal to 15 (using an 85-degree meter) or greater than or equal to 5 (using a 60-degree meter). C. Non-Flat High-Gloss Coating or Paint: Has a gloss of greater than or equal to 70 (using a 60-degree meter). Anti-Corrosive / Rust Preventative Paint: Coating formulated and recommended for use in preventing the corrosion of ferrous metal substrates.
Permanently Installed Building Product	See Product.
Primer	A. Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent

	harm to a subsequent coating from materials in the substrate; or to provide a smooth surface for application of a subsequent coating.
Product	A. An item that arrives on the Project site either as a finished element ready for installation or as a component to another item assembled on-site. The product unit is defined by the functional requirement for use in the Project; this includes the physical components and services needed to serve the intended function of the permanently installed building product. Similar products within a specification shall each contribute as a separate product.
Product-Specific Declaration	A. Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle-to-gate scope.
Recycled Content	A. The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer) or after consumer use (post-consumer). Recycled content claims for products must conform to the definition in ISO 14021-1999, Environmental Labels and Declarations, Self-Declared Environmental Claims (Type II Environmental Labeling). Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

	"Pre-consumer" may also be referred to as "post-industrial".
Regionally Manufactured Materials	Materials that are manufactured, distributed and purchased within a radius of 100 miles from the Project location. Manufacturing refers to all points of manufacture for an assembly of components.
Regionally Extracted, Harvested, or Recovered Materials	Materials which are extracted, harvested or recovered, manufactured, distributed and purchased within a radius of 100 miles from the Project site.
Reproductive Toxin	A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq.).
Sanding Sealer	Clear/semi-transparent coating formulated to seal bare wood. Can be abraded to create a smooth surface for subsequent coatings. Does not include sanding sealers that are lacquers (see Clear Wood Finish above).
Sealant	Any material with adhesive properties, formulated primarily to fill, seal, or waterproof gaps or joints between surfaces. Includes sealant primers and caulks.
Shellac	Clear or pigmented coating formulated solely with the resinous secretions of the lac beetle, thinned with alcohol and formulated to dry by evaporation without chemical reaction. Excludes floor applications.
Solar Reflectance Index (SRI)	A measure of a material's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is equal to 0, and a standard white (reflectance 0.80, emittance of 0.90) is equal to 100.
Stain	Clear semi-transparent/opaque coating formulated to change the color but not conceal the grain pattern or texture of the substrate.
Varnish	Clear/semi-transparent coating, excluding lacquers and shellacs, formulated to dry by chemical

	reaction on exposure to air. May contain small amounts of pigment.
Volatile Aromatic Compound	Any hydrocarbon compound containing one or more 6-carbone benzene rings, and having an initial boiling point less than or equal to 280 degrees Celsius measured at standard conditions of temperature and pressure.
Volatile Organic Compound (VOC)	Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.Waterproofing Sealer: A coating that prevents the penetration of water into porous substrates.

1.5 LEED PROVISIONS:

A. Refer to the Addendum for the LEED rating to be achieved for this Project. The provisions to achieve this LEED rating are integrated within the Project construction documents and specifications. Additional LEED requirements are met through aspects of the Project design, including material and equipment selections, which may not be specifically identified as LEED Building requirements. Compliance with the requirements needed to obtain LEED prerequisites and credits will be used as one criterion to evaluate substitution requests.

1.**6 LEED BUILDING SUBMITTALS:**

A. Scope: LEED Building Submittals are required for all permanently installed materials included in General Construction work. For Plumbing, Mechanical and Electrical work, LEED Building Submittals are only required for field-applied adhesives, sealants, paints and coatings. Voluntary inclusion of system components such as piping, pipe insulation, ducts, conduits, plumbing fixtures, faucets and lamp housings shall be consistently applied to the Project's LEED credits. Submit all required LEED Building Submittals in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

B. Applicability: The extent of the LEED Building Submittals varies depending on the specification section. Applicable LEED Building Submittals are listed under the "LEED Building Submittals" heading in each specification section. The detailed requirements for the LEED Building Submittals are defined in Sub-Section 1.6 C below.

C. Detailed Requirements: Sub-Sections 1.6 C.1 through 1.6 C.18 below define the information and documents to be submitted for each type of LEED Building Submittal as identified in the LEED Building Submittals heading in each specification section:

1. LEED v4 Material and Resources (MR) Credits Calculator for Building Product Disclosure and Optimization (Disclosure and Optimization Calculator): With each submittal of a product permanently installed in the Project, the Contractor shall be responsible for the completion of the Disclosure and Optimization Calculator, which can be found on USGBC's website. The Contractor shall maintain an updated Disclosure and Optimization Calculator for all applicable products throughout the Project duration and submit the updated calculator on a monthly basis.

    a. The Disclosure and Optimization Calculator shall record the information outlined in Items b.-c. below for all permanently installed products, the information outlined in Item d. below for all permanently installed concrete mixes, and the information outlined in Items e.-i. below for all permanently installed products that have the content, disclosure or optimization characteristics described herein:
    b. Cost breakdowns for the materials included in the contractor or sub-contractor's scope of work. Cost reporting shall include itemized material costs (excluding the contractor's labor, equipment, overhead and profit).
    c. The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).
        1) For each product with recycled content, also indicate the total recycled content value (1/2 x pre-consumer percentage x product value + 1 x post-consumer percentage x product value = total recycled content value).
        2) See additional requirements for concrete in section 1.6.C.1.d below.
    d. The percentage (by weight), relative to the total weight of cementitious materials, of supplementary cementitious materials or pozzolans such as fly ash used in each concrete mix used in the Project.
        1) For each concrete mix, submit a complete breakdown of all components, by weight and by cost.
    e. Identification (Yes/No) of materials manufactured, distributed and purchased within 100 miles of the Project site AND containing raw materials harvested or extracted within 100 miles of the Project site, if used in the Project, as well as the following information:
        1) Indicate the percentage by weight, relative to the total weight of the product that meets these criteria.
        2) Indicate the point of harvest/extraction/recovery of regional raw materials, the point of final assembly of regional manufactured products, and the distance from each point to the Project site.
    f. The percentage (by cost) of "Forest Stewardship Council (FSC) Certified" wood products, if used in the Project.
        1) Record all new wood products, indicating which are FSC-certified. Do not record reclaimed, salvaged, or recycled FSC-certified wood products.
        2) Reclaimed, salvaged, or recycled FSC-certified wood may be recorded as post-consumer recycled content.
    g. The number or percentage of products with Environmental Product Declarations (EPD), with fractional or multiplied values as indicated below. If a product used in the Project has an EPD Declaration, submit one of the following:
        1) EPD:
            i. Product-Specific Declaration: Valued as one quarter (1/4) of a product
            ii. Industry-Wide (Generic) EPD: Valued as one half (1/2) of a product
            iii. Product-Specific Type III EPD: Valued as one whole product
        2) Documentation of third-party certification of impact reduction below industry average for at least three of the following categories, valued at 100%:
            i. Global warming potential (greenhouse gases), in CO_2e;
            ii. Depletion of the stratospheric ozone layer, in kg CFC-11;
            iii. Acidification of land and water sources, in moles H+ or kg SO_2;
            iv. Eutrophication, in kg nitrogen or kg phosphate;

v. Formation of tropospheric ozone, in kg NOx or kg ethene; and depletion of nonrenewable energy resources, in MJ.

3) For 1) and 2) above, if a product is also sourced (extracted, manufactured, purchased) within 100 miles of the site, it is valued as two times the whole product.

4) For 1) and 2) above, structure and enclosure materials may not constitute more than 30% of the value of compliant building products.

h. The number or percentage of products for which Sourcing of Raw Materials has been documented, with fractional or multiplied values as indicated below. If a product used in the Project has documented Sourcing of Raw Materials, submit one of the following:

1) Corporate sustainability report (CSR). Submit one of the following:
   i. Manufacturer's self-declared report: valued as half of a product
   ii. Third-party verified CSR which include environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain: valued as one whole product:
      1. Global Reporting Initiative (GRI) Sustainability Report
      2. Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
      3. U.N. Global Compact: Communication of Progress
      4. ISO 26000: 2010 Guidance on Social Responsibility
      5. Other USGBC approved programs meeting the CSR criteria

2) Documentation of at least one of the responsible extraction criteria below:
   i. Extended producer responsibility program, valued as half of a product
   ii. Bio-based materials, valued as one whole product
   iii. Certified Wood: Wood-based materials include all materials made from wood, including engineered wood products and wood-based panel products, valued as one whole product
   iv. Material Reuse: Materials may be salvaged, refurbished, or reused, valued as one whole product.
   v. Recycled content. The sum of post-consumer recycled content plus one-half the pre-consumer recycled content, based on cost, valued as one whole product.
   vi. Other USGBC approved programs meeting leadership extraction criteria

3) For 1) and 2) above, if a product is also sourced (extracted, manufactured, purchased) within 100 miles of the site: valued as two times the whole product.

4) For 1) and 2) above, structure and enclosure materials may not constitute more than 30% of the value of compliant building products. Products meeting multiple criteria may only be counted once.

i. The number or percentage of products for which Material Ingredients have been disclosed, with fractional or multiplied values as indicated below. If a product used in the Project discloses its Material Ingredients, submit one of the following:

1) Chemical inventory of the product to at least 0.1% (1000 ppm), documented by one of the following:
   i. Manufacturer Inventory
   ii. Health Product Declarations (HPDs)
   iii. Cradle to Cradle (C2C) certifications
   iv. Declare product labels

v. ANSI/BIFMA e3 Furniture Sustainability Standard (Furniture may be included, providing it is included consistently in all MR Credits.)

2) Documentation of compliance with one of the following material ingredient optimization criteria programs:
   i. GreenScreen benchmarks
   ii. Cradle to Cradle certifications
   iii. REACH optimizations
   iv. Other USGBC approved programs meeting building product optimization criteria

3) Documentation that the product is sourced from a manufacturer that meets all of the below supply chain optimization criteria:
   i. Manufacturer engages in validated and robust safety, health, hazard and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material
   ii. Manufacturer provides independent third party verification of the following conditions for their supply chain, at a minimum:
      1. Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
      2. Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
      3. Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
      4. Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
      5. Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
      6. Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain

4) For 2) and 3) above, if a product is also sourced (extracted, manufactured, purchased) within 100 miles of the site: valued as two times the whole product. Products compliant with both 2) and 3) may only be counted once.

5) For 1), 2), and 3) above, structure and enclosure materials may not constitute more than 30% of the value of compliant building products.

2. LEED v4 Indoor Environmental Quality Credit Low-Emitting Materials Calculator (EQ Calculator). With each relevant product submittal, the Contractor shall be responsible for the completion of the EQ Calculator, which can be found on USGBC's website. The Contractor shall maintain an updated EQ Calculator throughout the Project duration for all applicable products and submit the updated calculator on a monthly basis.

   a. The EQ Calculator shall record information for all relevant products as outlined below. Include the following documentation. Detailed requirements are listed in b. – j. below.
      1) VOC content of all field-applied interior adhesives, sealants, paints, and coatings, listed in grams/liter or lbs./gallon, less water.
      2) General Emissions Evaluation for more than 90 percent of all field-applied interior paints, coatings, adhesives, and sealants, by volume, and for 100 percent of all flooring, ceilings, walls, and thermal and acoustic insulation.
      3) Composite Wood Evaluation for all composite wood not covered by other categories.

4) Furniture Evaluation for 90% of all furniture, by cost.
5) For schools/healthcare only: Exterior-Applied Products Evaluation for 90% of all exterior applied materials, measured by volume. All batt insulation products shall contain no added formaldehyde.

b. VOC REQUIREMENTS, GENERAL: The following materials must meet the listed compliance requirements for emissions and content standards, for all applicable categories. All products shall comply with each applicable threshold requirement. Refer to LEED BD+C Reference Guide, EQ Credit Low-Emitting Materials for additional guidance.

1) General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health (CDPH), Standard Method v1.1-2010, using the applicable exposure scenario, and stating the range of total VOCs (TVOC) after 14 days measured as specified in the CDPH Standard Method v1.1 as follows:
   i. 0.5mg/m3 or less;
   ii. between 0.5 and 5.0 mg/m3; or,
   iii. 0.50 mg/m3 or more
2) No product shall contain any ingredients that are carcinogens, mutagens, reproductive toxins, persistent bioacculmulative compounds, hazardous air pollutants, or ozone-depleting compounds. An exception shall be made for titanium dioxide and, for products that are pre-tinted by the manufacturer, carbon black, which shall be less than or equal to 1% by weight of the product.
3) No product shall contain the following:
   i. methylene chloride
   ii. 1,1,1-trichloroethane
   iii. benzene
   iv. toluene
   v. ethylbenzene
   vi. vinyl chloride
   vii. naphthalene
   viii. 1,2-dichlorobenzene
   ix. di (2-ethylhexyl) phthalate
   x. butyl benzyl phthalate
   xi. di-n-butyl phthalate
   xii. di-n-octyl phthalate
   xiii. diethyl phthalate
   xiv. dimethyl phthalate
   xv. isophorone
   xvi. antimony
   xvii. cadmium
   xviii. hexavalent chromium
   xix. lead
   xx. mercury
   xxi. formaldehyde
   xxii. methyl ethyl ketone
   xxiii. methyl isobutyl ketone
   xxiv. acrolein
   xxv. acrylonitrile
4) No product shall contain more than 1.0% by weight of sum total of volatile aromatic compounds.

c. VOC REQUIREMENTS FOR INTERIOR ADHESIVES AND SEALANTS:
1) For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the following limits for VOC content when calculated

according to South Coast Air Quality Management District (SCAQMD) Rule #1168 requirements in effect on July 1, 2005, and rule amendment date January 7, 2005:

	Allowable VOC Content (g/L):
Architectural Applications:	
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
Specialty Applications:	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Computer diskette manufacturing	350
Contact adhesive	80
Special purpose contact adhesive	250
Tire retread	100
Adhesive primer for traffic marking tape	150
Structural wood member adhesive	140
Sheet applied rubber lining operations specialty	850
Top and Trim adhesive	250
Substrate Specific Applications:	
Metal to metal substrate specific adhesives	30
Plastic foam substrate specific adhesives	50
Porous material (except wood) substrate specific adhesives	50
Wood substrate specific adhesives	30
Fiberglass substrate specific adhesives	80
Sealants:	
Architectural sealant	250
Marine deck sealant	760
Nonmember roof sealant	300
Roadway sealant	250
Single-ply roof membrane sealant	450
Other sealant	420
Sealant Primers:	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775

Modified bituminous sealant primer	500
Marine deck sealant primer	760
Other sealant primer	750
Other	
Other adhesives, adhesive bonding primers, adhesive primers or any other primers	250

2) For field applications that are inside the weatherproofing system, a minimum of 90 percent of adhesives and sealants, by volume, shall comply with the requirements of the CDPH "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

d. VOC REQUIREMENTS FOR INTERIOR PAINTS AND COATINGS:

1) For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the SCAQMD Rule #1113, effective June 3, 2011.

Product Type:	Allowable VOC Content (g/L):
Bond Breaker	350
Clear wood finishes - Varnish	275
Clear wood finishes – Sanding Sealer	275
Clear wood finishes - Lacquer	275
Colorant – Architectural Coatings, excluding IM coatings	50
Colorant – Solvent Based IM	600
Colorant - Waterborne IM	50
Concrete – Curing compounds	100
Concrete – Curing compounds for roadways & bridges	350
Concrete surface retarder	50
Driveway Sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings – Decorative Coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings – Trowel applied coatings	50
Fire-proof coatings	150
Flats	50
Floor coatings	50
Form release compounds	100
Graphic arts (sign) coatings	150
Industrial maintenance coatings	100
Industrial maintenance coatings – High temperature IM coatings	420
Industrial maintenance coatings – Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings – Zinc rich IM primers	100

Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-color coatings	250
Non-flat coatings	50
Pre-treatment wash primers	420
Primers, sealers and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Roof coatings, aluminum	100
Roof primers, bituminous	350
Rust preventative coatings	100
Stone consolidant	450
Sacrificial anti-graffiti coatings	50
Shellac- Clear	730
Shellac – Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Swimming pool coatings – repair	340
Swimming pool coatings – other	340
Traffic Coatings	100
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood preservatives	350
Low solids coatings	120

2) For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

e. LOW-EMITTING MATERIALS, FLOORING: Flooring shall comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

f. LOW-EMITTING MATERIALS, COMPOSITE WOOD: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde (ULEF) resins as defined in the CARB's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

g. LOW-EMITTING MATERIALS, CEILINGS, WALLS, THERMAL, AND ACOUSTIC INSULATION: Ceilings, walls, and thermal and acoustic insulation shall comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

h. LOW-EMITTING MATERIALS, FURNITURE: At least 90 percent of furniture, measured by cost, shall be tested in accordance with ANSI/BIFMA Standard Method M7.1-2011; comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach; and model the test results using the open plan, private office, or seating scenario in ANSI/BIFMA M7.1, as appropriate.

i. LOW-EMITTING MATERIALS, EXTERIOR APPLIED MATERIALS (HEALTHCARE/ SCHOOLS ONLY): At least 90 percent of exterior applied materials, measured by volume,

shall comply with the requirements of the CDPH's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1) The following materials are prohibited and do not count toward total percentage compliance:
   a) Hot-mopped asphalt for roofing.
   b) Coal tar sealants for parking lots and other paved surfaces.

j. LOW-EMITTING MATERIALS, ADDITIONAL LOW-EMITTING REQUIREMENTS: If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.

1) If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

2) Methylene chloride and perchloroethylene may not be intentionally added in adhesives, sealants, paints or coatings.

3. BACK-UP DOCUMENTATION: For each material listed in the Disclosure and Optimization Calculator or the EQ Calculator, provide and submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, including but not limited to the documentation to certify the material's LEED Building attributes, as applicable:

   a. RECYCLED CONTENT: Submit published product literature or letter of certification on the manufacturer's letterhead certifying the amounts of post-consumer and/or post-industrial content.
   b. REGIONAL SOURCING (WITHIN 100 MILES): Submit published product literature or letter of certification on the manufacturer's letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered, manufactured, distributed and the distance in miles from the Project site.
      1) If only some of the raw materials for a particular product or assembly originate within 100 miles of the Project site, provide the percentage (by weight) that these materials comprise in the complete product.
   c. BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION: Submit published third-party or manufacturer's product literature or letter of certification, on the third-party or manufacturer's letterhead, certifying the documented disclosure and optimization information.
   d. VOC EMISSIONS AND CONTENT: Submit Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings, flooring, composite wood, ceilings, walls, thermal and acoustic insulation, furniture, and for healthcare and schools, exterior applied products. MSDS shall indicate the VOC emissions and content of products submitted. (If an MSDS does not include a product's VOC emissions and content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer shall be submitted in addition to the MSDS to indicate the VOC emissions and content). Submit product third-party certificates and test reports, stating the testing methodology and the model, to include units that are consistent with those required. For wet-applied products, the manufacturer's documentation must state each product's classification and application according to the referenced standard's definition.

4. PRODUCT CUT SHEETS: Submit product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.

5. FSC-CERTIFIED WOOD: If FSC-Certified Wood is used in the Project, submit:

a. Copies of vendor's invoices itemizing all new wood purchases, showing the cost for each line item.
b. For FSC-certified products, the vendor invoice shall list product's FSC content percent and its Chain-of-Custody (CoC) certification number.
c. For FSC-certified products, submit the product and producer's CoC certificates.
d. For FSC-certified products modified on-site, submit on-site installer's CoC certification.
e. For assemblies, submit the percentage (by cost and by weight) of the assembly that is FSC-certified wood and published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the percentage that is FSC-certified wood.

6. HIGH ALBEDO PAVING AND WALKWAY MATERIALS: For paving and walkway materials made from concrete or brick, submit published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying a minimum 3-year aged Solar Reflectance (SR) value of 0.28. If 3-year aged value information is not available, submit published product literature or letter verifying an initial SR value of at least 0.33 at installation.

7. HIGH ALBEDO ROOFING MATERIALS: For exposed roofing membranes, pavers, and ballast products, submit published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values, calculated according to ASTM E 1980. Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance shall be measured according to ASTM E 408 or ASTM C 1371. Vegetated roof surfaces are exempt from the SRI criteria.

   a. 82 for initial SRI, or 64 for 3-year aged SRI for low-sloped roofing applications (slope ≤ 2:12)
   b. 39 for initial SRI or 32 for 3-year aged SRI for steep-sloped roofing applications (slope > 2:12)

8. LOW MERCURY LAMPS: For all fluorescent, compact fluorescent and HID lamps installed in the Project, submit the total number of each lamp type and submit published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following information. Preheat, T-9, T-10 and T-12 fluorescents or mercury vapor high-intensity discharge (HID) lamps shall not be installed in the Project. For healthcare projects only, probe-start metal halide HID lamps shall not be installed in any interior spaces.

   a. The mercury content or content range per lamp in milligrams or picograms, meeting the following criteria;

Lamp	Maximum Mercury Content (milligram)
T-8 fluorescent, eight-foot	10 mg
T-8 fluorescent, four-foot	3.5 mg
T-8 fluorescent, U-bent	6 mg
T-5 fluorescent, linear	2.5 mg
T-5 fluorescent, circular	9 mg
Compact fluorescent, nonintegral ballast	3.5 mg
Compact fluorescent, integral ballast	3.5 mg, ENERGY STAR qualified
High-pressure sodium, up to 400 watts	10 mg
High-pressure sodium, above 400 watts	32 mg

   b. The design light output per lamp (light at 40% of a lamp's useful life) in lumens; and
   c. The rated average life of the lamp in hours.

9. EXIT SIGNS: Illuminated exit signs shall not contain mercury, and shall use less than 5 watts of electricity.

10. CONCRETE: Submit concrete mix design for each mix, designated by a distinct identifying code or number and signed by a Professional Engineer licensed in the state of New York.

11. INTERIOR LIGHTING FIXTURES: For each lighting fixture type installed within the building's weather barrier, submit manufacturer's cut sheets indicating the following:

    a. Fixture power in watts.
    b. Initial lamp lumens.
    c. Photometric distribution data.
    d. Dimming capability, in range of percentages.

12. EXTERIOR LIGHTING FIXTURES: For each lighting fixture type installed on site, submit manufacturer's cut sheets indicating the following:

    a. Fixture power in watts.
    b. Initial lamp lumens.
    c. Photometric distribution data.
    d. Range of field adjustability, if any.
    e. Warranty of suitability for exterior use.

13. ALTERNATIVE TRANSPORTATION: Submit manufacturer's cut sheets and/or shop drawings for the following items installed on site:

    a. Bike racks, including total number of bicycle slots provided.
    b. Signage indicating parking spaces reserved for electric or low-emitting vehicles and for carpools/vanpools, including total number of signs.

14. WATER CONSERVING FIXTURES: For all water consuming plumbing fixtures and fittings, submit manufacturer's cut sheets showing maximum flow rates and/or flush rates.

15. ENERGY SAVING APPLIANCES: Submit manufacturer's cut sheets and published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the product's rating under the U.S. EPA/DOE Energy Star program, for all of the following:

    a. Appliances (i.e., refrigerators, dishwashers, microwave ovens, televisions, clothes washers, clothes dryers, chilled water dispensers).
    b. Office equipment (i.e., copy machines, fax machines, plotters/printers, scanners, binding and publishing equipment).
    c. Electronics (i.e., servers, desktop computers, computer monitor displays, laptop computers, network equipment).
    d. Commercial food service equipment.

16. GLAZING: For glazing in any windows, doors, storefront and window wall systems, curtainwall systems, skylights, and partitions, submit manufacturer's cut sheets indicating the following:

    a. Glazed area.
    b. Visible light transmittance.
    c. Solar heat gain coefficient.
    d. Fenestration assembly u-factor.

17. VENTILATION: Submit manufacturer's cut sheets for the following:

    a. Carbon dioxide monitoring systems, if any, installed to measure outside air delivery.
    b. Air filters: for detailed requirements refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS.

18. REFRIGERATION: For all refrigeration equipment, submit manufacturer's cut sheets indicating the following:

    a. Equipment type.

b. Equipment life. Default values specified by the 2007 ASHRAE Applications Handbook will be used unless otherwise demonstrated by the manufacturer's guarantee and an equivalent long-term service contract.
c. Refrigerant type.
d. Refrigerant charge in pounds of refrigerant per ton of gross cooling capacity.
e. Tested refrigerant leakage rate, in percent per year. A default rate of 2% will be used unless otherwise demonstrated by test data.
f. Tested end-of-life refrigerant loss, in percent. A default rate of 10% will be used unless otherwise demonstrated by test data.

1.7 LEED BUILDING SUBMITTAL REQUIREMENTS:

A. The LEED Building Submittal information shall be assembled into one package per contract specification section(s) (or per subcontractor), and submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Incomplete or inaccurate LEED Building Submittals may be used as the basis for the rejection of products or assemblies.

B. All final LEED Building Submittal information with back-up documentation shall be submitted within two (2) months of the Project's substantial completion. If in the Project's LEED review, the USGBC or their third party reviewer requires additional documentation as it relates to the LEED Building Submittals, the Contractor shall provide the requested documentation within two (2) weeks.

1.8 LEED ACTION PLANS:

A. Construction Waste Management Plan- Refer to Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for detailed requirements.

B. Construction IAQ Management Plan- Refer to Section 01 81 19 INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS for detailed requirements.

C. Erosion and Sedimentation Control (ESC) Plan:
1. The Plan shall be in accordance with the New York State Department of Environmental Conservation (NYSDEC)'s New York State Standards and Specifications for Erosion and Sediment Control (Blue Book) or the 2012 EPA Construction General Permit, whichever is more stringent.
2. The Plan shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
3. Detailed requirements: ESC Plan
    a. Include the Stormwater Pollution Prevention Plan, if required.
    b. Identify the party responsible for Plan monitoring and documentation. The party must be regularly on site.
    c. Describe all site work that will be implemented on the Project and include timing of implementation.
    d. Submit site plan with location of ESC measures, including, but not limited to, stormwater quantity controls, stormwater quality controls, stabilized construction entrances, washdown areas, inlet/catch basin protection and perimeter controls.
    e. Establish and clearly delineate construction buffer zones to avoid soil compaction and other construction damage to greenfields.
    f. Describe the inspection and maintenance protocols of the ESC measures. Submit a construction schedule indicating weekly site review.
    g. Describe reporting and documentation measures.
4. Detailed requirements: ESC Tracking Log

a. Note date of major rain events, describe damage, describe any repairs or maintenance of specific control measures performed, and note responsible party.
b. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party. Submit date-stamped photographs, inspection reports or other recording processes.
c. Submit monthly.

5. Implementation
   a. Before Demolition and/or Construction begins, the Contractor shall implement the ESC Plan, coordinate the Plan with all affected trades, and designate one individual as the Erosion and Sedimentation Control Representative, who will be responsible for communicating the progress of the Plan with the Commissioner monthly, and for assembling the required LEED documentation.
   b. The Contractor shall be responsible for the provision, maintenance, and repair of all ESC measures. Any problems identified in site inspections shall be resolved in a timely manner.
   c. Demonstration. The Contractor shall provide on-site instruction of proper construction practices required to prevent erosion and sedimentation.
   d. All sub-contractors shall promptly notify the ESC Representative if damage to an ESC measure is observed.
   e. Meetings. Urgent or ongoing ESC issues shall be discussed at weekly on-site job meetings.
6. All projects, including zero lot line buildings and projects that cause minimal or even no exterior site disturbance, must have ESC Plan that meets requirements.
7. Contractor shall save such original documents for the life of the Project plus seven (7) years.

1.9 QUALITY ASSURANCE:

A. The Contractor shall implement all LEED Action Plans, coordinate the Plans and LEED Building Submittals with all affected trades, and designate one individual as the Sustainable Construction Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of LEED activities with the Commissioner monthly, and for assembling the required LEED documentation. The Contractor shall facilitate measurements taken by authorized parties on site for LEED compliance verification purposes.

B. Responsibilities of Contractor's Subcontractors: The Contractor shall be responsible for his/her subcontractors complying with the LEED Action Plans and for providing required LEED documentation as required for the Project.

C. Distribution and Compilation: The Contractor shall be responsible for distributing the LEED v4 MR Credits Calculator for Building Product Disclosure and Optimization, the LEED v4 EQ Credit Low-Emitting Materials Calculator, and any other forms or templates required for the subcontractors to record LEED documentation. The Contractor shall also be responsible for collecting and compiling Building Product Disclosure and Optimization and Low-Emitting Materials information into packages as described in Section 01 33 00 SUBMITTAL PROCEDURES.

D. Meetings: Sustainable design and construction issues shall be discussed at the following meetings in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION:
   1. Demolition kick-off meeting
   2. Construction kick-off meeting
   3. Construction kick-off meeting for LEED (independent meeting)
   4. Weekly job-site progress and coordination meetings
   5. Closeout meeting

1.10 REFERENCES:

A. New York State Standards and Specifications for Erosion and Sediment Control, amended November 2016: http://www.dec.ny.gov/docs/water_pdf/2016nysstanec.pdf

B. 2012 EPA Construction General Permit: https://www.epa.gov/npdes/epas-2012-construction-general-permit-cgp-and-related-documents

C. South Coast Air Quality Management District (SCAQMD), Rule 1168: www.aqmd.gov

D. South Coast Air Quality Management District (SCAQMD), Rule 1113: www.aqmd.gov

E. CDPH Standard Method v1.1-2010: www.cal-iaq.org

F. ISO 17025: www.iso.org

G. ISO Guide 65: www.iso.org

H. CARB 93120 ATCM: arb.ca.gov/toxics/compwood/compwood.htm

I. ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating: bifma.org

J. ANSI/BIFMA e3-2011 Furniture Sustainability Standard: bifma.org

K. ISO 14021–1999, Environmental labels and declarations—Self Declared Claims (Type II Environmental Labeling): iso.org

L. ISO 14025–2006, Environmental labels and declarations (Type III Environmental

M. Declarations—Principles and Procedures): iso.org

N. ISO 14040–2006, Environmental management, Life cycle assessment principles, and frameworks: iso.org

O. ISO 14044–2006, Environmental management, Life cycle assessment requirements, and guidelines: iso.org

P. International Standard ISO 21930–2007 Sustainability in building construction—Environmental declaration of building products: iso.org

Q. Federal Trade Commission, Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e): ftc.gov/bcp/grnrule/guides980427.htm

R. Global Reporting Initiative (GRI) Sustainability Report: globalreporting.org/

S. Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational

T. Enterprises: oecd.org/daf/internationalinvestment/guidelinesformultinationalenterprises/

U. U.N. Global Compact, Communication of Progress: unglobalcompact.org/cop/

V. ISO 26000—2010 Guidance on Social Responsibility: iso.org/iso/home/standards/iso26000.htm

W. Forest Stewardship Council: ic.fsc.org

X. Sustainable Agriculture Network: sanstandards.org

Y. The Rainforest Alliance: rainforest-alliance.org/

Z. ASTM Test Method D6866: astm.org/Standards/D6866.htm

AA. Chemical Abstracts Service: cas.org/

BB. Health Product Declaration: hpdcollaborative.org/

CC. Cradle-to-Cradle CertifiedCM Product Standard: c2ccertified.org/product_certification

DD. Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): echa.europa.eu/support/guidance-on-reach-and-clp-implementation

EE. GreenScreen: https://www.greenscreenchemicals.org/method/greenscreen-list-translator

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 13.04

SECTION 01 81 13.13

VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 13.13

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY:

A. This Section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for the project.

B. All sections in the Project Specifications with adhesives, sealant or sealant primer applications, paints and coatings will follow all requirements of this section. In the event of any conflict or inconsistency between this section and the Specifications regarding adhesives, sealant or sealant applications, paints and coatings, the requirements set forth in this Section will prevail.

C. This Section includes:

1. General Requirements
2. References
3. VOC Requirements for Interior Adhesives
4. VOC Requirements for Interior Sealants
5. VOC requirements for Interior Paints
6. VOC requirements for Interior Coatings
7. Submittals

1.3 RELATED SECTIONS: Include without limitation the following:

A. Section 01 10 00 SUMMARY
B. Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION
C. Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
D. Section 01 33 00 SUBMITTAL PROCEDURES
E. Section 01 73 00 EXECUTION
F. Section 01 77 00 CLOSEOUT PROCEDURES
G. Section 01 78 39 CONTRACT RECORD DOCUMENTS
H. Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS
I. Section 01 81 19 INDOOR AIR QUALITY FOR LEED BUILDINGS

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

ADHESIVE	Any substance used to bond one surface to another by attachment. Includes adhesive primers and adhesive bonding primers. A. Aerosol Adhesive: Any adhesive packaged as an aerosol with a spray mechanism permanently housed in a non-refillable can designed for hand-held application without the need for ancillary equipment.
CARCINOGEN	A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (IARC) (Groups 1, 2A, and 2B), the National Toxicology Program (NTP) (Groups 1 and 2), the U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS) (weight-of-evidence classifications A, B1, B2, and C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or the Occupational Safety and Health Administration (OSHA).
CLEAR WOOD FINISH	Clear/semi-transparent coating applied to wood substrates to provide a transparent or translucent solid film. A. Lacquer: Clear/semi-transparent coating formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and provide a solid, protective film. B. Sanding Sealer: A sanding sealer that also meets the definition of a lacquer. C. Varnish: Clear/semi-transparent coating, excluding lacquers and shellacs, formulated to dry by chemical reaction on exposure to air. May contain small amounts of pigment.
COATING	Liquid, liquefiable, or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer; and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics; and is intended for on-site application to interior or exterior surfaces of buildings. Does not include stains, clear finishes, recycled latex paint, specialty (industrial, marine or automotive) coatings or paint sold in aerosol cans.
FLOOR COATING	Opaque coating applied to flooring. Excludes industrial maintenance coatings.
HAZARDOUS AIR POLLUTANT	Any compound listed by the U.S. EPA in the Clean Air Act, Section 112(b)(1) as a hazardous air pollutant.

MUTAGEN	A. A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarding as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification of Chemicals Which Cause Mutations in Germ Cells (United Nations Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).
OZONE-DEPLETING COMPOUNDS	A. A compound with an ozone-depletion potential greater than 0.1 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.
PAINT	A. A pigmented coating. For the purposes of this specification, paint primers are considered to be paints. 1. Flat Coating or Paint: Has a gloss of less than 15 (using an 85-degree meter) or less than 5 (using a 60-degree meter). 2. Non-Flat Coating or Paint: Has a gloss of greater than or equal to 15 (using an 85-degree meter) or greater than or equal to 5 (using a 60-degree meter). 3. Non-Flat High-Gloss Coating or Paint: Has a gloss of greater than or equal to 70 (using a 60-degree meter). 4. Anti-Corrosive / Rust Preventative Paint: Coating formulated and recommended for use in preventing the corrosion of ferrous metal substrates.
PRIMER	Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the substrate; or to provide a smooth surface for application of a subsequent coating.
REPRODUCTIVE TOXIN	A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq.).
SANDING SEALER	Clear/semi-transparent coating formulated to seal bare wood. Can be abraded to create a smooth surface for subsequent coatings. Does not include sanding sealers that are lacquers (see Clear Wood Finish above).
SEALANT	Any material with adhesive properties, formulated primarily to fill, seal, or waterproof gaps or joints between surfaces. Includes sealant primers and caulks.

SHELLAC	Clear or pigmented coating formulated solely with the resinous secretions of the lac beetle, thinned with alcohol and formulated to dry by evaporation without chemical reaction. Excludes floor applications.
STAIN	Clear semi-transparent/opaque coating formulated to change the color but not conceal the grain pattern or texture of the substrate.
VOLATILE AROMATIC COMPOUND	Any hydrocarbon compound containing one or more 6-carbone benzene rings, and having an initial boiling point less than or equal to 280 degrees Celsius measured at standard conditions of temperature and pressure.
VOLATILE ORGANIC COMPOUND	Any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which vaporizes (becomes a gas) and participates in atmospheric photochemical reactions, as specified in Part 51.00 of Chapter 40 of the U.S. Code of Federal Regulations, at normal room temperatures. For the purposes of this specification, formaldehyde and acetaldehyde are considered to be VOCs.
WATERPROOFING SEALER	A coating that prevents the penetration of water into porous substrates.

1.5 GENERAL REQUIREMENTS:

A. The City of New York is committed to implementing good environmental practices and procedures which include achieving a LEED Green building rating. Specific project requirements related to this goal which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor must ensure that the requirements as defined in the sections below and in related sections of the Contract Documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, must not be allowed if such changes compromise the stated environmental goals.

1.6 REFERENCES:

A. Rule 1168 – “Adhesive and Sealant Applications”, amended 7 January 2005): South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

B. Rule 1113 - “Architectural Coatings”, amended 9 July 2004: South Coast Air Quality Management District (SCAQMD), State of California, www.aqmd.gov

C. Green Seal Standard GS-11- “Paints”, of Green Seal, Inc., Washington, DC, www.greenseal.org

D. Green Seal Standard GC-03- “Anti-Corrosive Paints”, of Green Seal, Inc., Washington, DC, www.greenseal.org

1.7 VOC REQUIREMENTS FOR INTERIOR ADHESIVES, SEALANTS, PAINTS AND COATINGS:

A. GENERAL: Unless otherwise specified herein, the VOC content of all interior adhesives, sealants, paints and coatings (herein referred to as “products”) must not be in excess of **250 grams per liter.**

B. No product shall contain any ingredients that are carcinogens, mutagens, reproductive toxins, persistent bioacculmulative compounds, hazardous air pollutants, or ozone-depleting compounds. An exception must be made for titanium dioxide and, for products that are pre-tinted by the manufacturer, carbon black, which shall be less than or equal to 1% by weight of the product.

C. No product will contain the following:
1. methylene chloride
2. 1,1,1-trichloroethane
3. benzene
4. toluene
5. ethylbenzene
6. vinyl chloride
7. naphthalene
8. 1,2-dichlorobenzene
9. di (2-ethylhexyl) phthalate
10. butyl benzyl phthalate
11. di-n-butyl phthalate
12. di-n-octyl phthalate
13. diethyl phthalate
14. dimethyl phthalate
15. isophorone
16. antimony
17. cadmium
18. hexavalent chromium
19. lead
20. mercury
21. formaldehyde
22. methyl ethyl ketone
23. methyl isobutyl ketone
24. acrolein
25. acrylonitrile

D. No product will contain more than 1.0% by weight of sum total of volatile aromatic compounds.

1.8 VOC REQUIREMENTS FOR INTERIOR ADHESIVES:

A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers, or adhesive primers used in this project shall not exceed the limits defined in Rule 1168 – "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.

B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

C. For specified building construction related applications, the allowable VOC content is as follows:

1. Architectural Applications**:**

a.	Indoor carpet adhesive	50
b.	Carpet pad adhesive	50
c.	Wood flooring adhesive	100
d.	Rubber floor adhesive	60
e.	Subfloor adhesive	50
f.	Ceramic tile adhesive	65
g.	VCT and asphalt tile adhesive	50
h.	Drywall and panel adhesive	50
i.	Cove base adhesive	50
j.	Multipurpose construction adhesive	70
k.	Structural glazing adhesive	100

2. Specialty Applications:

a.	PVC welding	510

b.	CPVC welding	490
c.	ABS welding	325
d.	Plastic cement welding	250
e.	Adhesive primer for plastic	550
f.	Contact Adhesive	80
g.	Special Purpose Contact Adhesive	250
h.	Structural Wood Member Adhesive	140
i.	Sheet Applied Rubber Lining Operations	850
j.	Top and Trim Adhesive	250

3. Substrate Specific Applications:

a.	Metal to metal	30
b.	Plastic foams	50
c.	Porous material (except wood)	50
d.	Wood	30
e.	Fiberglass	80

4. Aerosol Adhesives:

a.	General purpose mist spray	65% VOC's by weight
b.	General purpose web spray	55% VOC's by weight
c.	Special purpose aerosol adhesives (all types)	70% VOC's by weight

1.9 VOC REQUIREMENTS FOR INTERIOR SEALANTS:

A. The volatile organic compound (VOC) content of sealants, or sealant primers used in this project must not exceed the limits defined in Rule 1168 – "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.

B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Sealants:

a.	Architectural	250
b.	Non-membrane roof	300
c.	Roadway	250
d.	Single-ply roof membrane	450
e.	Other	420

2. Sealant Primer:

a.	Architectural – Nonporous	250
b.	Architectural – Porous	775
c.	Other	750

1.10 VOC REQUIREMENTS FOR INTERIOR PAINTS:

A. Paints and Primers: Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

1. Volatile Organic Compounds:
   a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

      Interior Paints and Primers:
      Non-flat: 150 g/l

Flat: 50 g/l
The calculation of VOC shall exclude water and tinting color added at the point of sale.

B. Anti-Corrosive and Anti-Rust Paints: Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must meet the VOC limitations of the Green Seal Paint Standard GC-03, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:
1. Volatile Organic Compounds:

a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.
Anti-Corrosive and Anti-Rust Paints: 250 g/l

The calculation of VOC must exclude water and tinting color added at the point of sale.

1.11 VOC REQUIREMENTS FOR INTERIOR COATINGS:

A. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior must meet the VOC limitations defined in Rule 1113, “Architectural Coatings” of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

1.	Clear Wood Finishes:	
	a. Varnish	350
	b. Sanding Sealers	350
	c. Lacquer	550
2.	Shellac:	
	a. Clear	730
	b. Pigmented	550
3.	Stains	250
4.	Floor Coatings	100
5.	Waterproofing Sealers	250
6.	Sanding Sealers	275
7.	Other Sealers	200

The calculation of VOC must exclude water and tinting color added at the point of sale.

1.12 SUBMITTALS:

A. Submit Material Safety Data Sheets, for all applicable products in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets must indicate the Volatile Organic Compound (VOC) limits of products submitted. (If an MSDS does not include a product’s VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

B. Submit Environmental Building Materials Certification Form (EBMCF) as referenced in Section 01 81 13.03 SUSTAINABLE REQUIREMENTS FOR LEED v3 BUILDINGS: For each field-applied adhesive, sealant, paint, and coating product, provide the VOC requirement, as provided in this Specification, for the relevant material category indicated on the documentation noted above.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 13.13

(No Text on This Page)

SECTION 01 81 19
INDOOR AIR QUALITY REQUIREMENTS FOR LEED BUILDINGS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 81 19

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

1.2 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT:

A. The City of New York has determined that this Project must minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on-site, and poor housekeeping, must be minimized.

1.3 RELATED SECTIONS:

A. All sections of the Specifications related to interior construction, MEP systems and items affecting indoor air quality.

B. Division 9 (of the Specifications): Finishes.

C. Refer to the Addendum to identify whether this project is designed to comply with a Certification Level according to the U.S. Green Building Council's LEED Rating System, as specified in Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.

D. Refer to the Addendum to identify whether this project is designed to comply with Section 01 81 13.13 VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS FOR LEED v3 BUILDINGS.

E. Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS.

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and specifications) and providing services in connection with such documents during construction. The entity serving as the "Design Consultant" may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.

Volatile Organic Compounds (VOCs)	Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives, composite wood binder, and foam insulations. Not all VOCs are harmful, but many of those contained within building products contribute to the formation of smog and may irritate building occupants by their smell or health impact.
Materials that act as "sinks" for VOC contamination	Absorptive materials, typically dry and soft materials (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOCs emitted by "source" materials and release them over a prolonged period of time.
Materials that act as "sources" for VOC contamination	Products with high VOC contents that emit VOCs either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such as flooring coverings with plasticizers and engineered wood with formaldehyde).

1.5 REFERENCES, RESOURCES:

A. "IAQ Guidelines for Occupied Buildings Under Construction", Second Edition, 2007, The Sheet Metal and Air Conditioner Contractors National Association (SMACNA). (703) 803-2980, www.smacna.org.

B. ANSI/ASHRAE 52.2-2007, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org.

1.6 LEED BUILDING GENERAL REQUIREMENTS:

A. Implement practices and procedures as necessary to meet the Project's environmental performance goals as set forth in the specific requirements of this section. Specific Project goals that may impact this area of work include: use of recycled-content materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this section, are implemented to the fullest extent. Substitutions or other changes to the work will not be allowed if such changes compromise the stated LEED building performance criteria.

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN:

A. The Contractor must prepare a Construction IAQ Management Plan in coordination with each Subcontractor and submit the Construction IAQ Management Plan to the Commissioner for approval in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. The Construction IAQ Management Plan must meet the following criteria:

1. Construction activities must be planned to meet or exceed the minimum requirements of SMACNA's "IAQ Guidelines for Occupied Buildings under Construction", Second Edition, 2007.

2. Absorptive materials must be protected from moisture damage when stored on-site and after installation.

3. The planned operation of air handlers during construction must be described. If air handlers are to be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grille and return or transfer duct inlet opening, such that there is no bypass around the filtration media, as determined by ASHRAE 52.2-2007.

4. Filtration media must be replaced immediately prior to occupancy. Filtration media must have a MERV of 13 as determined by ASHRAE 52.2-2007.

5. A sequence of finish installation plan "Plan" must be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".

6. The use of tobacco products is prohibited inside the building and within 25 feet of the building entrance during construction.

7. A flush-out or air testing must be performed.

8. Upon approval of the finish installation plan by the Commissioner, it must be implemented by the Contractor through the duration of the construction process, and documented in accordance with the Submittal Requirements of Sub-Section 1.8 herein.

B. Detailed requirements of the Construction IAQ Management Plan are as follows:

1. SMACNA Guidelines: Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings Under Construction", outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan must be organized in accordance with the SMACNA format, and must address measures to be implemented in each of the five categories (including subsections). All subsections must be listed in the Plan; items that are not applicable for this Project should be listed as such.

a. HVAC Protection

1) Protect air handling, distribution equipment and air supply, and return ducting during construction.

2) All ductwork arriving on site will be sealed with plastic sheeting and stored on pallets or dunnage until installed.

3) Cover and protect all exposed air inlets and outlets, openings, grilles, ducts, plenums, etc. to prevent water, moisture, dust and other contaminant intrusion.

4) Apply protection immediately after ducting.

5) Protect ducting runs at the end of day's work.

6) Inspect temporary filtration weekly and replace as required to maintain the proper ventilation rates in the building.

7) To reduce debris and contamination to mechanical systems, do not store materials in mechanical rooms.

b. Source Control

1) Protect stored on-site or installed absorptive or porous materials. Store materials in dry conditions indoors, under cover, and off the ground or floor.

2) Do not use wet or damaged porous materials in the building. Materials which become contaminated through direct exposure to moisture from precipitation, plumbing leaks, or condensation must be replaced by the Contractor, at no additional cost to the City of New York.

3) Use low-toxicity and low-VOC materials to the greatest extent possible.

4) Recover, isolate, and ventilate containers housing toxic materials and materials with VOC levels above the limits for interior adhesives, sealants, paints, and coatings described in these Specifications.

5) Prevent exhaust fumes from idling vehicles, equipment and fossil-fueled tools from entering the building.

6) Containers housing toxic materials and materials with VOC levels above the limits for interior adhesives, sealants, paints, and coatings described in these Specifications, must be closed when not in use.

7) Enforce the no-smoking job site policy.

c. Pathway Interruption

1) Depressurize work areas which contain dust and odors.

2) Pressurize occupied spaces to prevent intrusion of dust and odors.

3) Erect barriers to contain construction areas.

4) Relocate pollutant sources.

5) Temporarily seal the building and provide 100% outside air for ventilation.

6) Provide walk-off mats at entryways to reduce introduced dirt and pollutants.

7) Use dust guards and collectors on saws and other tools.

d. Housekeeping

1) Store materials on elevated platforms under cover, in a designated dry, clean location, prior to unpacking for installation.

2) If materials are not stored in an enclosed location, cover tops and sides of material with waterproof sheeting, securely tied.

3) Institute cleaning activities to remove contaminants from the building prior to occupancy. Clean all coils, air filters and ductwork prior to performing testing, adjusting and balancing of HVAC systems.

4) Sweep the work area on a daily basis. Use an efficient and effective dust collecting method such as damp cloth, wet mop, or vacuum with high-efficiency particulate filters. Activities which produce high levels of dust must be cleaned up immediately upon completion.

5) Spills or excess applications of products containing solvents, or with VOC levels above the limits for interior adhesives, sealants, paints and coatings described in these Specifications, must be removed immediately.

6) Dust all walls prior to application of finishes.

7) Vacuum all stud tracks prior to application of insulation.

8) Keep materials organized to improve job safety as well as indoor air quality.

e. Scheduling

1) Phase construction such that absorptive materials are installed only in areas that are weathertight.

2) Schedule activities that utilize “sources” of VOC contamination to take place prior to installing high absorbent materials that will act as “sinks” for contaminants.

3) Review of the appropriate components of the Construction IAQ Management Plan must be a regular action topic at weekly site coordination meetings. Implementation of the Plan must be documented in the meeting minutes.

2. Protection of Materials from Moisture Damage: As part of the “Source Control” section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage must be described. This section must also describe corrective measures to be taken if moisture damage does occur to absorptive materials during the course of construction (see Section 1.7 B.1.b).

3. Replacement of Filtration Media: Under the “HVAC Protection” section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment must be provided.

The description must include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.

4. Sequence of Finish Installation for Materials: Where feasible, absorptive materials must be installed after the installation of materials or finishes which have high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds. Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

5. Pre-Occupancy Phase: Perform either a flush-out or air sample testing (Options 1 or 2, respectively), as follows:

   a. OPTION 1 — Flush-Out

      1) Perform flush-out using either Path 1 or Path 2.

         i. Path 1: After construction ends, prior to occupancy and with all interior finishes installed, install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60 degrees F and no higher than 80 degrees F and relative humidity no higher than 60%.

         ii. Path 2: If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cu.ft. of outdoor air per sq.ft. of floor area to the space. Once a space is occupied, it must be ventilated at a minimum rate of 0.30 cfm/sq.ft. of outside air or the design minimum outside air rate determined in IEQ Prerequisite: Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cu.ft./sq.ft. of outside air has been delivered to the space.

      2) Commissioning can occur during flush-out, at the discretion of the Commissioner, provided none of the commissioning procedures introduce contaminants into the space and none of the flush-out procedures circumvent the commissioning process. Complete testing and balancing of the HVAC system after the flush-out is complete. Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS.

      3) If even partial construction work occurs during the flush-out, the flush-out must be started again from the beginning for that space. If multiple, discrete HVAC systems operate independently, flush-out may be completed in portions of the building as work is completed in each area served by a given system.

   OR

   b. OPTION 2 — Air Testing

      1) Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with current versions of the United States Environmental Protection Agency “Compendium of Methods for the Determination of Air Pollutants in Indoor Air” or ISO methods, as additionally detailed in the USGBC “LEED BD+C Reference Guide.”

2) Demonstrate that the contaminant maximum concentrations listed below are not exceeded.

CONTAMINANT	MAXIMUM CONCENTRATION
Formaldehyde	27 parts per billion
Particulates (PM10 for all buildings; PM25 for buildings in EPA nonattainment areas, or local equivalent)	PM10: 50 micrograms per cubic meter PM25: 15 micrograms per cubic meter
Ozone (for buildings in EPA nonattainment areas)	0.075 parts per million
Total Volatile Organic Compounds (TVOC)	500 micrograms per cubic meter
Target chemicals listed in the California Department of Public Health (CDPH) Standard Method c1.1, Table 4-1, except formaldehyde	CDPH Standard Method v1.1-2010, Allowable Concentrations, Table 4-1
Carbon Monoxide (CO)	9 part per million and no greater than 2 parts per million above outdoor levels

3) The air sample testing must be conducted as follows:

i. All measurements must be conducted prior to occupancy, but during normal occupied hours and with the building ventilation system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.

ii. The building must have all interior finishes installed, including but not limited to millwork, doors, paint, carpet and acoustic tiles. Non-fixed furnishings such as workstations and partitions are required to be in place for the testing.

iii. Prior to air sample testing, all punch-list items that would generate VOCs or other contaminants, the testing and balancing of the HVAC system and finalization of all cleaning must be completed. Use low-emitting cleaning products and vacuum cleaners with HEPA filtration.

iv. The number of sampling locations will vary depending upon the size of the building and number of ventilation systems. For each portion of the building served by a separate ventilation system, the number of sampling points must not be less than one per 25,000 sq.ft., or for each contiguous floor area, whichever is larger, and include areas with the least ventilation and greatest presumed source strength.

v. Air samples must be collected between 3 feet and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum 4-hour period.

vi. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.

6. Implementation and Coordination: Before Demolition and/or Construction begins, the Contractor must implement the Construction IAQ Management Plan, coordinate the Construction IAQ Management Plan with all affected trades, and designate one individual as the Construction IAQ Representative at no additional cost to the City of New York, who will be responsible for communicating the progress of the Construction IAQ Management Plan with the Commissioner monthly and for assembling the required LEED documentation. Include provisions in the Construction

IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order or to rectify non-compliant conditions.

a. Distribution: The Contractor must distribute copies of the Construction IAQ Management Plan in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

b. Instruction: The Contractor must provide on-site instruction of appropriate site management to all Contractor's Subcontractors.

c. Monitoring: The Construction IAQ Representative must monitor the implementation of the Construction IAQ Management Plan.

1.8 SUBMITTALS:

A. Submit the following LEED-required records and documents in accordance with Section 01 33 00 SUBMITTAL PROCEDURES and, as applicable, Section 01 81 13.03 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v3 BUILDINGS or Section 01 81 13.04 SUSTAINABLE DESIGN REQUIREMENTS FOR LEED v4 BUILDINGS.

A. A copy of the Construction IAQ Management Plan as defined in Sub-Section 1.7 herein.

B. IAQ Tracking Log
   1. Note date of observed major Construction IAQ issues, describe any damage, describe any repairs or maintenance of specific control measures performed and note responsible party.
   2. Note date and findings of weekly site review, describe any repairs or maintenance performed, and note responsible party. Provide date-stamped photographs, inspection reports or other recording processes.
   3. Submit log monthly.

B. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets must be submitted with the Contactor's or Subcontractor's "approved" stamp as confirmation that the products are the products installed on the Project.

C. PHOTOGRAPHS: Submit to the Commissioner a minimum of 18 photographs as required under the provision for special photographs, in accordance with Section 01 32 33 PHOTOGRAPHIC DOCUMENTATION, comprised of at least six photographs taken on three different occasions during construction of each IAQ measure. The photographs must document the implementation of the Construction IAQ Management Plan throughout the course of the Project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs must include integral date stamping, and must be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to Project meeting minutes or similar Project documents which reference to the Construction IAQ Management Plan measure documented.

D. A copy of the Project's "Testing, Adjusting and Balancing" (TAB) report, if applicable.

1.9 QUALITY ASSURANCE:

A. The Contractor will be responsible for preparing and implementing the Construction IAQ Management Plan and must coordinate and incorporate the work of its Subcontractors in the IAQ Management Plan. Include the Construction IAQ Management Plan requirements in contract agreements with Subcontractors. Familiarize Subcontractors with the Construction IAQ Management Plan and how the Construction IAQ Management Plan will affect their daily activities. Hold a Subcontractors' orientation meeting to review the Construction IAQ Management Plan requirements.

B. Responsibility of Subcontractors: Subcontractors for this Project will be responsible for cooperating with the Contractor in the preparation and implementation of the Construction IAQ Management Plan.

C. Include construction IAQ progress check-ins as a regular item in weekly Subcontractor meetings and safety meetings. Provide a copy of the plan on site, posted in an easily accessible area.

PART II – PRODUCTS (Not Used)

PART III – EXECUTION (Not Used)

END OF SECTION 01 81 19

SECTION 01 91 13
GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 91 13

PART I – GENERAL

1.1 RELATED DOCUMENTS:

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

B. The OPR and BOD documents are included by reference for information only.

C. The Commissioning Plan, prepared by the Commissioning Agent (CxA) under separate contract with the City of New York, contains requirements that apply to this section.

1.2 SUMMARY:

This section includes general requirements that apply to implementation of Commissioning without regard to systems, subsystems and equipment being commissioned. General Requirements for building enclosure commissioning are addressed in a separate specification.

A. This Section includes:
1. Definitions
2. Commissioning Team
3. City's Responsibilities
4. Contractor's Responsibilities
5. CxA Responsibilities
6. Commissioning Documentation
7. Submittals
8. Coordination
9. Execution

1.3 RELATED SECTIONS:

A. System-Specific Commissioning requirements indicated in other sections of the Project Specifications for specific requirements for commissioning systems.

B. This Project will be commissioned by an independent third party under separate contract with the City of New York. Commissioning must be in accordance with ASHRAE and USGBC LEED procedures, and specific commissioning requirements of the Project Specifications, whichever is more stringent. The Contractor must cooperate with the CxA and provide whatever assistance is required.

C. Related sections include, without limitation, the following:

1.	Section 01 10 00	SUMMARY
2.	Section 01 31 00	PROJECT MANAGEMENT AND COORDINATION
3.	Section 01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
4.	Section 01 78 39	CONTRACT RECORD DOCUMENTS
5.	Section 01 79 00	DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION
6.	Section 01 81 13	SUSTAINABLE DESIGN REQUIREMENTS FOR LEED BUILDINGS
7.	Section 01 91 15	GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE

1.4 DEFINITIONS:

A. Refer to Article 2 of the Contract for definition of terms, words and expressions used in the General Conditions not otherwise defined herein.

Basis of Design (BOD)	A document, prepared by the Design Consultant, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
Checklists	Forms that outline the step-by-step process that must be executed to fulfill the test requirements and to verify that materials, equipment, assemblies and systems are installed in accordance with the Contract Documents. The CxA must develop the checklists; the Contractor must complete them.
Commissioning	Commissioning is a systematic process of ensuring and documenting that the building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The process does not eliminate or reduce the responsibility of the installing contractors to provide a finished product.
Commissioning Agent (Aka Commissioning Authority) (CxA)	Consultant under separate contract with the City of New York to provide Commissioning services for this Project. The CxA must not be an employee of the Contractor, nor will the CxA have any interest in the Contract.
Commissioning Plan	A document developed by the CxA that outlines the organization, schedule, roles and responsibilities, allocation of resources, and documentation requirements of the commissioning process.
Deferred Performance Tests	Performance tests that are performed, at the discretion of the CxA, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.
Design Consultant	The entity responsible for providing design services for the Project, including without limitation, preparing the construction documents (drawings and Specifications) and providing services in connection with such documents during construction. The entity serving as the “Design Consultant” may be a corporation, firm, partnership, joint venture, individual or combination thereof. Such entity may be either an employee(s) of the City or an entity engaged by the City to provide such services.
Factory Testing	Testing of equipment on-site or at the factory, by factory personnel, with or without the City’s representative.
Functional Performance Test (FPT)	Functional performance testing includes the dynamic functions and operations of equipment and systems using manual or monitoring methods under various levels of operation. Systems are tested under various modes, such as during low cooling loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarms, power failure, etc. The systems are run through all the control system’s sequences of operation and components are verified to respond as the sequences state. Such tests must be performed as per the protocol written by the CxA which definines the methods, personnel and expectations.
Issue (or Deficiency)	A condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents.

Issues Log	A formal and ongoing record of problems, deficiencies or concerns that have been raised by members of the Commissioning Team during the course of commissioning. The Issues Log is the primary tracking tool to address all Commissioning Issues by concerned parties. All Issues must be addressed and resolved by the concerned parties before the closeout of the Project. This log tracks the resolution performed and date of closure of each Issue.
Master Equipment List (MEL)	A complete listing of all commissioned building equipment, including details such as make, model, location, ID Tag number, etc. that is taken from submittals and is the basis from which checklists will be generated. The MEL is a spreadsheet which is also used as a tracking tool for all milestones of the commissioning process, such as the creation and performance of checklists, startup of equipment, TAB work, etc.
Monitoring	The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.
Owner (City of New York) Contracted Tests	Tests paid for by the City of New York outside of the Contractor's Contract and for which the CxA does not provide oversight. These tests will not be repeated during functional testing if properly documented.
Owner's (City of New York) Project Requirements (OPR)	A document, prepared by the Design Consultant that details the functional requirements of a Project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.
Pre-functional (Installation) Checklists	A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the Contractor. Installation checklists are primarily static inspections and procedures to prepare equipment or systems for initial operation. Pre-functional (Installation) checklists augment, and are combined with, the manufacturer's startup checklist. The Checklists are filled out by the Contractor and reviewed by the CxA.
Sampling	Functional testing for a percentage of the total number of identical or near-identical pieces of equipment.
Seasonal Performance Tests	Functional tests that are deferred until, or performed again when, the system(s) will experience climate conditions close to their design conditions.
Startup	The initial starting or activating of equipment, including executing construction checklists.
Systems, Subsystems, Equipment, and Components	Where these terms are used together or separately, they mean "as-built" systems, subsystems, equipment, and components.
Systems Manual	A system-focused composite document that includes the Operation and Maintenance Manual, and additional information of use to the owner during the occupancy and operations phase.
Testing, Adjusting and Balancing (TAB)	Testing, adjusting, and balancing of the Heating Hot Water (HHW), Chilled Water (CHW) and Heating, Cooling, and Ventilation Airflow distribution system flows and pressures as specified in Contract Documents by a subcontractor certified to perform such work.
Test Requirements	Requirements specifying what modes and functions, etc. must be tested on any given piece of equipment or any given system (integrated or standalone). The test requirements are not the detailed test procedures. The test requirements for each system are specified in the respective Contract Documents.

Trending	Monitoring using the building controls system, and analysis of the data gathered over a period of time.

1.5 COMMISSIONING TEAM:

A. Members Appointed by the Contractor and its Subcontractors: Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the Commissioning process through coordinated actions. The Commissioning Team will consist of, but not be limited to, representatives of the Contractor, including Project superintendent and Subcontractors, installers, suppliers and specialists deemed appropriate by the CxA.

B. Members Appointed by the City:

1. Commissioning Authority/Agent (CxA): The designated person, company, or entity under separate Contract with the City that plans, schedules and coordinates the Commissioning Team to implement the commissioning process.

2. Representatives of the facility user and operation and maintenance personnel.

3. Design Consultant and other concerned entities.

1.6 CITY'S RESPONSIBILITIES:

A. Provide the OPR and BOD documentation to the CxA for use in developing the Commissioning Plan; systems manual; operation and maintenance orientation plan; and testing plans and checklists.

B. Assign operation and maintenance personnel to participate in Commissioning Team activities.

C. Provide full details and results of any Owner- contracted tests relevant to the current Project.

1.7 CONTRACTOR'S RESPONSIBILITIES:

A. The Contractor must provide utility services required for the commissioning process.

B. As a member of the Commissioning Team, the Contractor and Subcontractors must assign representatives with expertise and authority to act on behalf of the Contractor and its Subcontractor and schedule them to participate in and perform Commissioning Team activities including, but not limited to, the following:

1. Participate in scheduled construction-phase coordination and Commissioning Team meetings.

2. Integrate and coordinate commissioning process activities with the construction schedule.

3. Provide all factory acceptance test reports to the CxA through the Commissioner.

4. Respond to any additional specific information requests from the CxA. CxA may request additional documentation necessary for the commissioning process. Requests by CxA may precede, be concurrent with, or follow normal submittals.

5. Ensure the cooperation and participation of all Subcontractors and manufacturers of equipment to be commissioned.

6. Verify and confirm that components, equipment, and system are functioning as per design prior to CxA witnessing testing.

7. Perform testing required in the Commissioning schedule as per the Commissioning process test procedures provided by the CxA, providing no less than 48 hours' notice to the CxA through the Commissioner.

8. Complete installation checklists as Work is completed and return to CxA through the Commissioner.

9. Provide written responses to the CxA through the Commissioner for resolution of Issues recorded in the Issues Log within five (5) business days.

10. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

11. Submit As-Built documents, operation and maintenance manuals for systems and subsystems, and equipment in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS. Such documents must be submitted prior to functional testing.

12. Provide orientation sessions for operations and maintenance personnel (sessions will be witnessed by the CxA) in accordance with Section 01 79 00 DEMONSTRATION AND OWNER'S PRE-ACCEPTANCE ORIENTATION. Provide no less than 48 hours' notice to the CxA, through the Commissioner. Video record and edit orientation sessions and provide DVD to the CxA and Commissioner no later than two (2) weeks after the orientation session occurs. Edit as requested by the Commissioner.

1.8 COMMISSIONING AGENT'S (CxA) RESPONSIBILITIES:

A. Organize and lead the Commissioning Team.

B. Prepare a construction-phase Commissioning Plan. Collaborate through the Commissioner with each Contractor and with Subcontractors to develop test and inspection procedures. Include design changes and coordinate Commissioning activities with the overall Project schedule. Identify Commissioning Team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task. Update the Commissioning Plan during construction as required.

C. Review and comment in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, on submittals from the Contractor for compliance with the OPR, BOD, Contract Documents, and construction-phase Commissioning Plan. Review and comment on performance expectations of systems and equipment and interface between systems relating to the OPR and BOD.

D. Coordinate with the Commissioner, in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION, to convene Commissioning Team meetings for the purpose of coordination, communication and conflict resolution; discuss progress of the commissioning processes.

E. At the beginning of the construction phase, coordinate with the Commissioner's kick-off meeting schedule to conduct an initial construction-phase coordination meeting for the purpose of reviewing the Commissioning activities and establishing tentative schedules for operation and maintenance submittals, operation and maintenance orientation sessions, TAB Work, testing, and Project completion.

F. Perform site visits to observe and inspect construction as described in the Commissioning Plan. Report progress and deficiencies to the Commissioner. In addition to compliance with the OPR, BOD, and Contract Documents, inspect systems and equipment installation for adequate accessibility required for component maintenance replacement and repair.

G. Prepare and distribute project-specific test and inspection procedures and checklists and maintain MEL.

H. Verify air and water systems balancing by sampling, reviewing completed reports and selected site observation. Coordinate submittal reviews with the Commissioner so that the comments are combined into a single review and submitted to the Contractor.

I. Coordinate with the Commissioner to witness and document tests, inspections and systems startup, as per the Commissioning Plan.

J. Maintain an Issues Log and a record of functional testing. Report all Issues as they occur to the Commissioner.

K. Compile test data, inspection reports and certificates, and include them in the systems manual and Commissioning Report.

L. Certify date of acceptance and startup for each item of equipment for start of warranty periods.

M. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BOD, and Contract Documents. Operation and maintenance documentation requirements are specified in other sections of the Project Specifications and described in Section 01 78 39 CONTRACT RECORD DOCUMENTS.

N. Review agenda for orientation; witness and confirm orientation session conforms with agenda and Contract Documents; review recording of demonstration and orientation sessions provided by the Contractor on USB drive or other electronic media as requested by the Commissioner and provide appropriate comments for editing.

O. Return to the site ten (10) months into the twelve (12)-month guaranty period, to review with facility staff the current building operation and the condition of outstanding Issues related to the original and seasonal commissioning. Interview facility staff and identify problems or concerns they have with operating the building as originally intended.

P. Prepare Commissioning Reports.

Q. Assemble the final commissioning documentation, including the Commissioning Report and Systems Manual.

R. Perform all CxA tasks as defined by LEED; prepare LEED submittal documents.

1.9 COMMISSIONING DOCUMENTATION:

The Contractor must assist the CxA in the development and compiling of the following Commissioning Documentation:

A. Index of Commissioning Documents: The CxA will prepare an index including the storage location of each document.

B. Commissioning Plan: A document prepared by the CxA that outlines the schedule, allocation of resources, roles and responsibilities, and documentation requirements of the Commissioning process.

C. Test Checklists: The CxA will develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. The CxA will prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Space will be provided for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in other sections of the Project Specifications, but must include without limitation:

1. Identification of tested item
2. Date of test
3. Indication of whether the record is for a first test or retest following correction of a problem or Issue
4. Dated signatures of the person performing the test and of the witness if applicable
5. Deficiencies and Issues, if any, generated as a result of the test

D. Inspection Checklists will be signed by the Contractor, Subcontractor(s), Installer(s), and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing.

E. Test and Inspection Reports: The CxA will record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application will be included with data.

CxA must compile test and inspection reports and test and inspection certificates and include them in systems manual and Commissioning Report.

F. Corrective Action Documents: The CxA will document corrective action taken for systems and equipment that fail tests and include required modifications to systems and equipment and revisions to test procedures, if any. The Contractor must retest systems and equipment requiring corrective action. The CxA will document retest results.

G. Issues Log: The CxA will prepare and maintain an Issues Log that describes design, installation, and performance Issues that are at variance with the OPR, BOD, and Contract Documents. The log will identify and track Issues as they are encountered, documenting the status of unresolved and resolved Issues. The Issues Log will identify, at a minimum:

1. The party responsible for correcting the Issue,
2. The person documenting the Issue resolution,
3. The exact location of the Issue (floor and room),
4. The applicable system component,
5. A detailed description of the Issue,
6. The Issue status, and
7. The date the Issue was discovered and the date the Issue was resolved.

H. Commissioning Report: The CxA will document results of the commissioning process including unresolved Issues and performance of systems, subsystems, and equipment. The Commissioning Report will indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BOD, and Contract Documents. The Commissioning Report must include:

1. An executive summary, including participants and their roles, a brief building description, an overview of the commissioning and testing scope, and a general description of testing and verification methods,
2. Installation/Pre-Functional Checklists,
3. Start-up reports,
4. Functional Test documentation,
5. Trend Log Analysis,
6. The final Issues Log, with all Issues identified through the commissioning process, identifying which, if any, Issues remain unresolved,
7. The Commissioning Plan,
8. Commissioning progress and field reports,
9. Commissioning review documents, and
10. Record of owner’s orientation.

I. Systems Manual: The CxA will gather required information and compile systems manual as specified in other sections of the Project Specifications and described in Section 01 78 39 CONTRACT RECORD DOCUMENTS.

1.10 SUBMITTALS:

A. Submittal of shop drawings, product data, samples, etc., relevant to commissioning must be provided to the CxA as requested. Such submittals must be in compliance with Section 01 33 00 SUBMITTAL PROCEDURES.

B. As-Built Contract Record Drawings and Operating and Maintenance Manuals relevant to commissioning must be provided to the CxA as requested. Such submittals must be in compliance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.

C. All demonstration and orientation submittals relevant to commissioning must be provided to the CxA as requested. Such submittals must be in compliance with Section 01 79 00 DEMONSTRATION AND OWNER'S PREACCEPTANCE ORIENTATION.

D. Completed Prefunctional (Installation) Checklists must be provided to the CxA.

1.11 COORDINATION:

A. Coordination of Commissioning is the responsibility of all Commissioning Team members.

B. Coordinating Meetings: The CxA will coordinate with the Commissioner's regularly scheduled construction progress meetings to conduct coordination meetings of the Commissioning Team to review progress on the Commissioning Plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities. Commissioner and Contractor must ensure that all required Commissioning Team members attend.

C. Construction Documents: The Contractor, through the Commissioner, will furnish copies of all construction documents, addenda, change orders and appropriate submittals and shop drawings to the CxA.

D. Pre-testing Meetings: The CxA will coordinate with the Commissioner to conduct pretest meetings of the Commissioning Team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested. Commissioner and Contractor must ensure that all required Commissioning Team members attend.

E. Testing Coordination: Contractor must coordinate schedule times with the Commissioning Team, through the Commissioner, for tests, inspections, obtaining samples, and similar activities. The CxA will advise the Commissioning Team as to the sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

F. Manufacturers' Field Services: The Contractor must coordinate manufacturers' field services, as per the Commissioning Plan.

G. The CxA will regularly apprise the Commissioner of progress, pending problems and/or disputes, as well as provide regular status reports on progress with each system.

PART II – PRODUCTS

2.1 TEST EQUIPMENT

A. All industry standard test equipment required for performing the specific tests must be provided by the Contractor responsible for testing. Any proprietary Vendor-specific test equipment must be provided by that Vendor or Manufacturer.

B. Special equipment, tools, instruments, software, and equipment communication network access hardware and software (only available from Vendor, specific to the piece of equipment) required for testing equipment according to the Contract Documents must be included at no extra cost to the City and must be turned over

to the City at Project close-out, except for stand-alone data logging equipment that may be used by the CxA.

C. Any portable or handheld setup and/or calibration devices required to initialize the control system must be made available by the control vendor for use by the CxA at no additional cost to the City.

D. The instrumentation used in the commissioning process must comply with the following:

1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required
2. Be calibrated at the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument
3. Be maintained in good repair and operating condition throughout use duration on this Project
4. Be immediately recalibrated or repaired if dropped and/or damaged in any way during this Project.

PART III – EXECUTION

3.1 COMMISSIONING PROCESS

A. The following provides an overview of the Commissioning tasks during Project construction and the general order in which they occur.

1. Construction-phase Commissioning begins with a Commissioning Kickoff Meeting, conducted by the CxA through the Commissioner in accordance with section 01 31 00 PROJECT MANAGEMENT AND COORDINATION, where the Commissioning process is reviewed with all the Commissioning Team Members.
2. Additional meetings may be required throughout construction, scheduled by the CxA through the Commissioner in accordance with 01 31 00 PROJECT MANAGEMENT AND COORDINATION with necessary parties attending, to plan, scope, coordinate and schedule future activities and resolve open Issues.
3. The CxA will review the Contractor submittals concurrent with the Commissioner and provide comments to the Commissioner for inclusion in their review. The reviewed submittals will include all commissioned equipment information, including detailed startup procedures, and coordination drawings that include commissioned equipment and systems, control drawings and sequences, and interfaces and interlocks between systems.
4. The CxA works with the Commissioner and Contractor in developing Pre-functional and Functional Test documentation formats.
5. Periodically throughout the construction process, the CxA will perform site visits to observe component and system installations.
6. The checkout and performance verification generally proceeds from component level to equipment to systems and intersystem levels. Pre-functional (Installation) Checklists are to be completed before Functional Performance Checklists.
7. The Contractor must, with guidance from the CxA, execute and document the Pre-Functional (Installation) Checklists and perform startup and initial checkout of equipment and systems. The CxA documents that the checklists and startup are completed according to the approved plans. This will include the CxA witnessing selected assembly markups, portions of the startup of selected equipment, and spot checking the Pre-Functional (Installation) Checklists.
8. The CxA develops specific equipment and system Functional Checklists. The Contractor receives a copy of the procedure through the Commissioner. The CxA may request additional design

narrative from the Commissioner and Controls Contractor, depending on the completeness of the Basis of Design and sequences provided within the design documents.

9. The Functional Checklists are executed by the Contractor and witnessed and documented by the CxA.

10. Items of non-compliance in material, installation startup, and operation are corrected and the equipment or system is rechecked. The CxA will maintain an Issues Log to track Issues and Issue resolution.

11. The CxA will review the Operation & Maintenance documentation for completeness.

12. Commissioning, excluding the Warranty Walkthrough, must be completed prior to Substantial Completion.

13. The CxA reviews the orientation documentation. The orientation schedules and agenda are provided by the subcontractors. The CxA verifies that orientation is completed, attended by the appropriate City of New York personnel, is thorough and provides all necessary information required to operate and service the equipment or system.

14. Deferred testing/checkouts are conducted, as specified or required in the Contract Documents.

3.2 COMMISSIONING PLAN AND SCHEDULE

A. Commissioning Plan: The Commissioning Plan provides guidance in the execution of the commissioning process. After the initial construction phase Commissioning kickoff meeting, the CxA will update the plan. This plan is a living document that must evolve and expand as the Project progresses. The Commissioning Plan must include:

1. Description of the facility and Project.

2. Description of the commissioning process and associated deliverable documents.

3. Description of equipment and systems to be commissioned.

4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.

5. Sample rates for equipment to be tested.

6. Identification of task items that must be completed before the next operation can proceed.

7. Description of responsibilities of Commissioning Team members.

8. Description of observations to be made and reported on during testing and witnessing of testing by all parties involved in the Project.

B. Commissioning Schedule: Contractor must provide construction schedules to the CxA, in accordance with Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION. The CxA will develop and submit a schedule identifying the commissioning process and provide commissioning scheduling information to the Commissioner and Contractor for review and planning activities. The Contractor must incorporate the CxA's activities into the Project schedule.

3.3 TESTING PROCEDURES

A. The CxA will determine and document the acceptance procedures for each system within disciplines. The acceptance procedures must incorporate the commissioning standards and successful testing results as referred to throughout the Specifications.

B. The CxA will provide performance checklists and performance checkout data sheets for each system based on actual system configuration. Special emphasis must be placed on checkout procedures that must conclusively determine actual system performance and compliance with the OPR and BoD.

C. The Contractor and appropriate Vendor(s) must be informed of what tests are to be performed and the expected results. The Commissioning Plan must address the test requirements and be distributed to all parties involved with that system.

D. Prior to Functional Testing, the Contractor must provide the following:

1. Contractor must certify in writing that commissioned systems, subsystems, and equipment have been installed, calibrated and started, and are operating according to the Contract Documents.

2. Contractor must certify in writing that all relevant instrumentation and control systems have been completed and calibrated; are operating according to the Contract Documents; and that pretest set points have been recorded.

3. Contractor must certify in writing that TAB procedures have been completed, and that the TAB report has been submitted, discrepancies corrected, and corrective work approved.

4. Contractor must perform tests for system and intersystem performance only after CxA and Commissioner have approved the completed testing checklists for systems, subsystems, and equipment.

E. The Functional Performance tests must be performed by the Contractor and Vendor(s) with oversight by the CxA. The CxA must witness, verify, and document these tests.

1. Functional Performance Tests must include operating the systems and components through each of the written sequences of operation, other significant modes of miscellaneous alarms, power failure, and security alarm when impacted by and interlocked with commissioned equipment, as detailed in the Commissioning Plan.

2. Checklists must be completed comprehensively and to the extent necessary to enable the CxA to assure the Commissioner that the systems perform as per the OPR, BOD, and Contract Documents.

3. If a test is failed for any reason and retesting is required, the Contractor must provide retesting at no additional cost to the City.

4. After testing, Contractor must return settings to normal operating conditions.

3.4 OPERATION & MAINTENANCE MANUALS

A. General

1. The CxA must review the Operation & Maintenance manuals provided by the Contractor for completeness of the document. The review process will verify that Operation & Maintenance instructions meet Specifications and are included for all commissioned equipment furnished by the Contractor.

2. Published literature will be specifically oriented to the provided equipment, indicating required operation and maintenance procedures, parts lists, assembly / disassembly diagrams and related information.

3. The Contractor must incorporate the standard technical literature into system-specific formats for this facility as designed and as actually installed. The resulting Operation & Maintenance information must be system-specific, concise, to the point and tailored specifically to this facility. The CxA must review these documents as necessary for final corrections by the Contractor.

4. Contractor must submit Operations & Maintenance Manuals for each piece of equipment for review no later than 45 days after submittal approval.

B. The Operation & Maintenance Manual review and coordination efforts must be completed prior to Owner orientation sessions, as these documents are to be utilized in the orientation sessions.

C. System Operations Manual

1. The CxA must prepare and deliver these documents with inputs from the Contractor. The Contractor must provide all required documents to the CxA, through the Commissioner. The required documents must be described in the Commissioning Plan and Contract Documents. Typically, the manual includes the following:

   a. System, subsystem, and equipment descriptions
   b. Commissioned systems single line diagrams (to be provided by Mechanical, Electrical, Plumbing, and Building Management System (BMS) subcontractors).
   c. As built sequences of operations, control drawings and original set points (to be provided by Design Consultant and BMS subcontractor).
   d. Operating instructions for integrated building systems (to be provided by Mechanical and BMS subcontractors).
   e. Recommended schedule of maintenance requirements and frequency (to be provided by subcontractors).
   f. Recommended schedule for calibrating sensors and actuators (to be provided by BMS subcontractor).

3.5 DEMONSTRATION AND INSTRUCTION

A. The Contractor must schedule and coordinate instruction sessions for the facility's staff for each commissioned system. Demonstrations must be held per Contract Documents, along with the appropriate schematics, handouts and visual / audio orientation aids onsite with equipment.

B. The equipment vendors must provide instruction on the specifics of each major equipment item including philosophy, troubleshooting and repair techniques.

C. The Contractor must record and edit demonstration and orientation sessions, and provide these records to the CxA, through the Commissioner.

D. For additional direction pertinent to instruction, refer to other specific divisions for demonstration and instruction requirements.

3.6 WARRANTY REVIEW / SEASONAL TESTING

A. The CxA will return upon the start of the new season (cooling or heating) after Project completion to conduct performance tests that could not be performed due to ambient conditions. The seasonal testing will only be performed if suitable loads / conditions were unavailable during the performance testing stages (in other words; the requirement for testing is warranted).

B. The CxA will return to the site approximately ten (10) months into the twelve (12)-month guaranty period and interview the occupants and maintenance staff, review the operation of the building, provide recommendations for installation and operational problems and document warranty and operational Issues in the Issues database.

3.7 RECORD DRAWINGS

A. The CxA must review the as built Contract Documents to verify incorporation of both design changes and as-built construction details. Discrepancies noted must be corrected by the appropriate party.

END OF SECTION 01 91 13

SECTION 01 91 15
GENERAL COMMISSIONING REQUIREMENTS FOR BUILDING ENCLOSURE

REFER TO THE ADDENDUM FOR APPLICABILITY OF THIS SECTION 01 91 15

PART I – GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum, and (5) the Contract [City of New York Standard Construction Contract].

B. The Owner's Project Requirements (OPR) and Basis of Design (BOD) documents are included by reference for information only.

C. The Commissioning Plan, prepared by the Commissioning Agent (CxA) under separate contract with the City of New York, contains requirements that apply to this section.

1.2 SECTION INCLUDES

A. This section includes the commissioning requirements for the Building Enclosure systems. Refer to "Building Enclosure Functional Performance Test Protocol" in other sections of the Project Specifications for specific requirements regarding Building Enclosure Commissioning.

1. The commissioning requirements for the Building Enclosure systems given in this section are entirely separate from, and in addition to, the Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for this Project. The Contractor, and his/her Suppliers, Subcontractors, Vendors, etc., are required to participate in both commissioning processes as required.

1.3 DESCRIPTION

A. Building Enclosure Commissioning (BECx) is a systematic process of ensuring all building enclosure systems responsible for environmental separation perform as per the OPR and BOD. The BECx process is intended to verify and document proper installation and performance of building enclosure materials and systems in accordance with the Contract Documents.

B. Commissioning does not take away from, or reduce, the Contractor's responsibility to provide a finished and fully functioning product and installation.

C. This section will in no way diminish the responsibility of the Contractor in performing all aspects of work and testing as outlined in the Contract Documents. Any requirements outlined in this section are in addition to requirements outlined in the Contract Drawings and Specifications.

1.4 RELATED WORK

A. Specific BECx requirements are given in this Section. The following Project Specification sections are related to the commissioning work specified in this section:

1. Basic Concrete Requirements: Refer to Division 03
2. Basic Metal Requirements: Refer to Division 05
3. Basic Waterproofing, Roofing, Air Barrier and Insulation Requirements: Refer to Division 07
4. Basic Fenestrations Requirements: Refer to Division 08
5. Basic Finishing Requirements: Refer to Division 09

1.5 DEFINITIONS AND ABBREVIATIONS

A. Refer to Article 2 of the Contract and Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for terms, words, and expressions not otherwise defined herein.

Approval	Acceptance that a material or system has been properly installed and is functioning in tested modes according to the Contract Documents.
Building Enclosure Commissioning Agent (BECA)	BECA directs and coordinates day-to-day BECx commissioning activities.
Building Enclosure Testing Agency (BETA)	Building Enclosure Testing Agency whom is an independent agency retained by the Contractor and approved by the Commissioner, fully accredited by the appropriate governing body for each of the materials, components or systems to be tested or evaluated for compliance with requirements of the Contract Documents and as directed by the BECA. Documentation of such certification must be submitted to and approved by the Commissioner prior to the start of any work by the BETA.
Commissioning	Commissioning is a systematic process of ensuring and documenting that the building systems, including the Building Enclosure, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent, and have documentation to support proper installation and operation. The process does not eliminate or reduce the responsibility of the installing Contractors to provide a finished product.
Commissioning Agent (CxA)	Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for Definition.
Commissioning Plan	Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for Definition.
Deficiency	Condition of a building enclosure material or system that is not in compliance with Contract Documents (that is, does not perform properly or does not comply with design intent).
Design Consultant	Refer to Section 01 91 13 GENERAL COMMISSIONING REQUIREMENTS FOR MEP SYSTEMS for Definition.
Simulated Condition	Condition created for testing component or system (e.g., applying pressure differential across the building enclosure concurrent with water spray to simulate a wind driven rain).
Mock-up	The activities where systems or materials are initially constructed and tested.

1.6 COORDINATION

A. Building Enclosure Commissioning Team: Members of the Building Enclosure Commissioning Team will consist of:

1. CxA
2. BECA
3. BETA
4. Commissioner
5. Contractor, and all Building Enclosure Subcontractors
6. Design Consultant

B. Management: City of New York will contract services of the BECA through a separate contract. The BECA will direct and coordinate commissioning activities and report to the Commissioner. All members of the

Building Enclosure Commissioning Team must cooperate to fulfill contracted responsibilities and objectives of the Contract Documents.

C. Scheduling: BECA must work with the Building Enclosure Commissioning Team to establish required commissioning activities to incorporate into the preliminary commissioning schedule. The Contractor must integrate commissioning activities into master construction schedule, in accordance with Section 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION. Necessary notifications are to be made in a timely manner in order to expedite commissioning.

1.7 SUBMITTALS

A. Contractor must provide documentation required for commissioning work in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. At minimum, documentation must include, but not be limited to:

1. Submittal of shop drawings, product data, samples, etc., relevant to BECx and as requested by the BECA. Such submittals must be in compliance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
2. As-Built Record Drawings and Operation and Maintenance Information relevant to BECx and as required by the BECA. Such submittals must be in compliance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
3. All demonstration and orientation submittals relevant to BECx and as requested by the BECA. Such submittals must be in compliance with Section 01 79 00 DEMONSTRATION AND OWNER'S PREACCEPTANCE ORIENTATION.
4. Performance data, any performance test procedures, and installation and checkout materials.

B. The Contractor must provide all submittals to the Design Consultant, as per Section 01 33 00 SUBMITTAL PROCEDURES. The Design Consultant will transmit all building enclosure related submittals to the BECA for concurrent review.

PART II – PRODUCTS – Part not used.

PART III – EXECUTION

3.1 SYSTEMS TO BE COMMISSIONED

A. Building Enclosure systems to be commissioned may include, but are not limited to, Below Grade Waterproofing Systems, Opaque Wall/Cladding Systems, and Fenestration systems. Refer to the Contract Documents for clarity.

3.2 RESPONSIBILITIES OF COMMISSIONING TEAM MEMBERS DURING CONSTRUCTION PHASE

A. Responsibilities of the Design Consultant include without limitation the following:

1. Review BECA comments on construction documents and shop drawings.
2. Assist in dispute resolution regarding building enclosure items.
3. Review BECA reports.
4. Incorporate BECA Submittal Review Comments into response on submittals.

B. Responsibilities of the BECA include the following without limitation:

1. Review and comment on Mock-up construction and testing plan as provided by Contractor.
2. Development of BECx Plan.
3. Review of building enclosure shop drawings and submittals, including "approved equal" requests, through the Commissioner in accordance with Section 01 33 00 Submittal Procedures.

4. Attend combined pre-construction and BECx kick-off meeting.
5. Develop construction checklists for the building enclosure for the Contractor's use.
6. Observe the construction of a building enclosure Mock-up.
7. Witness the testing of a building enclosure Mock-up.
8. Project meetings / conference calls / coordination.
9. Field monitor installation of exterior enclosure components.
10. Update field report log.
11. Update BECx Plan.
12. Advise on Requests for Information.
13. Assist with the preparation of LEED paperwork.
14. Prepare systems manual, with required inputs and documentation from the Contractor in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
15. Complete Maintenance Plan, with required inputs and documentation from the Contractor in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
16. Prepare training manual, with required inputs and documentation from the Contractor in accordance with Section 01 78 39 CONTRACT RECORD DOCUMENTS.
17. Prepare final BECx record and enclosure commissioning close-out documents.
18. Develop on-going BECx Plan.

C. Responsibilities of the Contractor and Building Enclosure Subcontractors include without limitation the following:

1. Review BECx Plan and FPT specification.
2. Attend commissioning kick-off meeting and other Building Enclosure Commissioning Team meetings.
3. Incorporate commissioning activities into the construction schedule.
4. Periodically update Commissioning activities in the construction schedule.
5. Notify Commissioner and BECA of work completion.
6. Verify building enclosure materials and assemblies are ready for functional testing.
7. Retain the services of an approved independent BETA; submit qualifications of independent BETA to Commissioner for approval; coordinate all activities and deliverables of this BETA; ensure all BETA deliverables are provided to the Building Enclosure Commissioning Team.
8. Attend all required material and systems testing.
9. Execute all periodic maintenance or repairs required on started systems from initial Mock-up of equipment to Final Acceptance by Commissioner to prevent material warranties from being voided.
10. Submit maintenance logs of all interim maintenance or repair tasks performed by Contractor.
11. Ensure installation work is complete, is in compliance with Contract Documents, and is ready for Functional Performance Testing. FPT test results will be documented by BECA.
12. Ensure resolution of non-compliance and deficiencies in construction or test results. Obtain written documentation of completion from the appropriate Contractors.
13. Provide letters of compatibility for adjacent building enclosure materials and assemblies.

14. Facilitate all repairs and retesting of failed condition at no additional cost to the City of New York.
15. Provide all warranty information to BECA.

D. Responsibilities of the BETA include without limitation the following:
   1. Attend Commissioning kick-off meeting and other Building Enclosure Commissioning Team meetings.
   2. Provide on-site technician and equipment to complete Mock-up and field Functional Performance Testing.
   3. Prepare and submit reports to the Commissioner at the conclusion of all testing.
   4. Perform retesting and prepare corresponding reports.

3.3 BUILDING ENCLOSURE COMMISSIONING TEAM (BECx) MEETINGS

A. BECx meetings will be held periodically, as determined by the Commissioner and recommended by BECA.

B. Discussions held in BECx meetings must include, but not be limited to: system/materials, mock-up/field, progress, scheduling, testing, documentation, deficiencies, and problem resolution.

C. The Contractor must attend BECx meetings, and must ensure the attendance of required subcontractors, as requested.

3.4 REPORTING

A. BECA will provide status reports to the Commissioner. The Commissioner will provide such status reports to the Contactor, CxA, Design Consultant, and other entities as needed.

B. BECA will submit non-compliance and deficiency reports to Commissioner. The Commissioner will provide such reports to the Contractor, CxA, Design Consultant, and other entities as needed.

C. BECA will provide a final summary report to Commissioner and CxA.

3.5 MOCK-UP AND FINAL CONSTRUCTION

A. Prior to Functional Performance Testing or concealment of functional performance layers within the building enclosure, the Contractor must verify that all assemblies are complete, including deficiency long items, and all Contract requirements are met.

3.6 FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope
   1. The objective of Functional Performance Testing is to demonstrate that the building enclosure is performing according to documented design intent and Contract Documents. Functional Performance Testing facilitates bringing the building enclosure systems from a state of Substantial Completion to fully operational. Additionally, during Functional Performance Testing, areas of deficient performance are identified and corrected, improving building enclosure system performance.

B. Development of Test Procedures
   1. The purpose of a specific test is to verify and document compliance of the installed enclosure systems with the OPR. Building Enclosure Functional Performance Test Protocols are provided in other sections of the Project Specifications for specific requirements regarding BECx.

C. Coordination and Scheduling
   1. Contractor must provide sufficient notice to BECA, through the Commissioner, regarding completion schedule for materials and systems. Testing to be performed in conjunction with site visits. Contractor must schedule Functional Performance Tests with Commissioning Team. BECA must witness and

document functional testing of equipment and systems. BETA, as retained by the Contractor, must execute tests under direction of BECA.

2. Successful completion of Mock-up functional performance testing must occur prior to full production installation of building enclosure materials and systems.

3.7 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation

1. BECA must witness and document results of FPT.

B. Non-Conformance

1. BECA must record results of functional testing. Deficiency or non-conformance issues must be noted and reported to the Commissioner. The Commissioner must provide such non-conformance reports to the CxA, Design Consultant, Contractor, and other entities, as needed.
2. Corrections of minor deficiencies identified may be made during tests at the discretion of the Commissioner and as recommended by the BECA. In such cases, deficiency and resolution must be documented.
3. Every effort must be made to expedite testing and minimize unnecessary delays, while not compromising integrity of tests.
4. Deficiencies are handled in the following manner:
   a) BECA documents deficiencies and notes Contractor's response and intentions. A finding of deficiency will not end the testing process.
   b) BECA submits deficiency report to the Commissioner. The Commissioner will provide such deficiency report to the CxA, Contractor, Design Consultant, and other entities as required.
   c) Contractor corrects deficiency and certifies that material or assembly is ready to be retested.
   d) Contractor informs Commissioner of retesting schedule for coordination with the BECA.
   e) Contractor reschedules test with the Commissioner and BETA at no additional cost to the City of New York.

C. Testing

1. Costs for all testing and retesting required for the Project will be the responsibility of the Contractor. The Contractor is to provide access to the test specimens to the Commissioning Team, through the Commissioner.

3.8 COMMISSIONING DOCUMENTATION

A. Final Report Details

1. Final BECx Report must include an executive summary, list of participants and roles, brief building description, overview of Commissioning and testing scope, and general description of testing and verification methods. Report must contain evaluation regarding:
   a) Conformance to Specifications and design intent.
   b) Material/system installation.
   c) Functional performance.
2. All outstanding non-compliance items must be specifically listed.
3. Recommendations for improvement to system or operations, future actions, etc. must also be listed.

END OF SECTION 01 91 15

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

30-30 THOMSON AVENUE LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc

Department of Design and Construction

Contract for Furnishing all Labor and Material Necessary

Contractor

Dated _____ , 20

Approved as to Form
Certified as to Legal Authority

Acting Corporation Counsel

Dated _____ , 20

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____ , 20

FMS ID: **S136-383N**

THE CITY OF NEW YORK
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DIVISION OF PUBLIC BUILDINGS
30-30 THOMSON AVENUE LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc

Department of Design and Construction

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

DSNY Brooklyn 17/18 Garage Roof and HVAC Upgrade

LOCATION: **10502 Avenue D**
BOROUGH: **Brooklyn, NY 11236**
CITY OF NEW YORK

Contractor

Dated _____ , 20 _____

Approved as to Form
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Acting Corporation Counsel

CL 8/13/20

Dated August 13 , 20 20

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____ , 20 _____

Department of Design and Construction

PROJECT ID: **S136-383N**

THE CITY OF NEW YORK
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VOLUME 3 OF 3

ADDENDUM TO THE GENERAL CONDITIONS

SPECIFICATIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

DSNY 17/18 Brooklyn Garage Roof and HVAC Upgrade

LOCATION: **10502 Avenue D**
BOROUGH: **Brooklyn, NY 11236**
CITY OF NEW YORK

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

NYC Dept. of Sanitation

Syska Hennessy Group

Date: **June 25, 2020**

Department of Design and Construction

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDUM TO THE GENERAL CONDITIONS FOR SINGLE CONTRACT PROJECTS

The General Conditions are hereby amended in accordance with the terms and conditions set forth in this Addendum.

I. PROJECT DESCRIPTION

FMS #: ***S136-383N***

PROJECT NAME: ***DSNY 17/18 Brooklyn Garage Roof & HVAC Upgrade***

PROJECT DESCRIPTION: This Project consists of replacement of mechanical equipment serving the office spaces, locker rooms, and garage spaces. The project scope will also include replacement of existing roof. Finally, a new solar panel system will be installed on the roof to generate electricity for the facility.

PROJECT LOCATION: ***10502 Avenue D***
BOROUGH: ***Brooklyn***
CITY OF NEW YORK
ZIP CODE: ***11236***
COMMUNITY BOARD #: ***18***

LANDMARK STATUS:

DESIGNATED LANDMARK STRUCTURE OR SITE: *NO*
If this is a Designated Landmark Structure or Site, Section 01 3591, Historic Treatment Procedures applies to this project.
LANDMARK QUALITY STRUCTURE: *NO*
If this is a Landmark Quality Structure, Section 01 3591, Historic Treatment Procedures applies to this project.

II. LEED GREEN BUILDING REQUIREMENTS

Not Used

III. COMMISSIONING REQUIREMENTS

This project includes MEP Commissioning Requirements.

The General Commissioning Requirements for MEP Systems are found in Section 01 9113 of the DDC Standard General Conditions.

Other specific Commissioning Requirements can be found in the Project Specification Sections.

IV. PROJECT MANAGEMENT

☐ DDC shall publicly bid and enter into all contracts for the Project. DDC shall manage the Project using its own personnel.

☒ DDC shall publicly bid and enter into all contracts for the Project. A Construction Management firm (the "CM") hired by DDC shall manage the Project. The Contractor is advised that the CM shall serve as the representative of the Commissioner at the site and shall, subject to review by the Commissioner, be responsible for the inspection, management, coordination and administration of the required construction work, as delineated in the article of the Standard Construction Contract entitled "The Resident Engineer".

V. CONTRACTS FOR THE PROJECT

The Project consists of a single contract, the Contract for General Construction Work. The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents (General Conditions, Drawings and Specifications), including all responsibilities and obligations assigned to separate Contractors for the following subdivisions of the work: Plumbing Work, HVAC Work, and Electrical Work. All responsibilities and obligations in the Contract Documents assigned to separate Contractors for such subdivisions of the work are the responsibility of the Contractor for General Construction Work.

VI. SCHEDULES

The Contractor is advised that Schedules A through F are attached to, and incorporated as part of, this Addendum to the General Conditions. These schedules contain important information that is specific to this Project. The Contractor is advised to carefully review these schedules.

VII. APPLICABILITY OF SECTIONS/SUB-SECTIONS AND AMENDED SUB-SECTIONS

The Contractor is advised that various Sections/Sub-Sections in the General Conditions may not apply to this Project or may apply as amended. Such Sections/Sub-Sections advise the Contractor to "Refer to the Addendum for the applicability of this Section/Sub-Section." Such Sections/Sub-Sections are set forth below. A check mark indicates whether the Section/Sub-Section (1) applies to the Project, (2) does not apply to the Project, or (3) applies to the Project as amended. If no box is checked, the Section/Sub-Section, as set forth in the General Conditions, applies to the Project. Amended Sections/Sub-Sections, if any, are set forth following this list of Sections.

Section	Sub-Section	Sub-Section	Applies	Does not Apply	Applies as Amended
01 1000	1.4 (B)	Scope and Intent / LEED		X	
	1.4(C)	Scope and Intent / Commissioning	X		
01 3216.10		PROJECT SCHEDULES (METHOD A)		X	
01 3216.20		PROJECT SCHEDULES (METHOD B)		X	
01 3216.30		PROJECT SCHEDULES (METHOD C)	X		
	1.7 Q	Cost Loaded Schedule	X		
01 3233		Photographic Documentation	X		
01 3300	1.7 (A-D)	LEED Submittals		X	
01 3503		General Mechanical Requirements	X		
01 3506	3.2 (A-B)	Electrical Conduit System Including Boxes (Pull, Junction and Outlet)	X		
	3.3 (A-E)	Electrical Wiring Devices	X		
	3.4 (A-I)	Electrical Conductors and Terminations	X		
	3.5 (A-B)	Circuit Protective Devices	X		
	3.6 (A-J)	Distribution Centers	X		
	3.7 (A-I)	Motors	X		
	3.8 (A-I)	Motor Control Equipment	X		
01 3591		Historic Treatment Procedures		X	
01 5000	3.2 (A)	Temporary Water Facilities / Temporary Water	X		
	3.2 (B)	Temporary Water Facilities / Temporary Water – Work in Existing Facilities	X		
	3.3 (B)	Temporary Sanitary Facilities / Self-Contained Toilet Units	X		
	3.3 (C)	Temporary Sanitary Facilities / Existing Toilets	X		
	3.4 (B) 1	Temporary Power, Lighting, and Site Lighting / Connection to Utility Lines	X		
	3.4 (B) 2	Temporary Power, Lighting, and Site Lighting / Connection to Existing Electrical Power Service	X		
	3.4 (B) 3	Temporary Power, Lighting, and Site Lighting / Electrical Generator Power Service		X	
	3.4 (D)	Temporary Power, Lighting, and Site Lighting / Temporary Lighting	X		
	3.4 (E)	Temporary Power, Lighting, and Site Lighting / Site Security Lighting (for New Construction Only)		X	
	3.5 (A-J)	Temporary Heat	X		
	3.8 (A)	DDC Field Office / Office Space in Existing Building		X	

Section	Sub-Section	Sub-Section	Applies		Does not Apply		Applies as Amended
01 5000	3.8 (B)	DDC Field Office / DDC Field Office Trailer	X				
	3.8 (B-3a)	DDC Field Office / DDC Managed Field Office Trailer			X		
	3.8 (B-3b)	DDC Field Office / CM Managed Field Office Trailer	X				
	3.8 (D)	DDC Field Office / Additional Equipment for the DDC Field Office	X				
	3.13(A-D)	Work Fence Enclosure	X				
	3.17(B)	Project Rendering			X		
	3.18 (A-C)	Security Guards / Fire Guards on Site	X				
01 5411	3.1 (A-J)	Temporary Use, Operation and Maintenance of Elevators During Construction for New Buildings Up To and Including 15 Stories			X		
	3.2 (A-M)	Temporary Use, Operation and Maintenance of Elevators During Construction for New Buildings Over 15 Stories			X		
	3.3 (A-E)	Temporary Use, Operation and Maintenance of Elevators During Construction for Existing Buildings			X		
01 7300	3.3 (A-I)	Surveys	X				
	3.4 (A-B)	Borings			X		
	3.12 (A-D)	Sleeves and Hangers	X				
	3.13 (A)	Sleeve and Penetration Drawings	X				
	3.15 (A)	Location of Partitions			X		
01 7419	1.5 (C)	Waste Management Performance Requirements / LEED Certification			X		
01 7900		Demonstration and Owner's Pre-Acceptance Orientation			X		
01 8113.03		Sustainable Design Requirements for LEED v3 Buildings			X		
01 8113.04		Sustainable Design Requirements for LEED v4 Buildings			X		
01 8113.13		VOC Limits for Adhesives, Sealants, Paints and Coatings for LEED v3 Buildings			X		
01 8119		Indoor Air Quality Requirements for LEED Buildings			X		
01 9113		General Commissioning Requirements for MEP Systems	X				
01 9115		General Commissioning Requirements for Building Enclosure			X		

AMENDED SECTIONS/SUB-SECTIONS

The Contractor is advised that the amended Sub-Sections set forth below are included in the General Conditions and apply to the Project.

Reference **SECTION 01 50 00 – TEMPORARY FACILITIES, SERVICES AND CONTROLS**

The following articles are amended to Sub-Section **3.8 DDC FIELD OFFICE**

B. DDC Field Office Trailer

Replace part 3.b. with the following:
3.b. CM Managed Project Trailers: DDC and CM Field Office Trailer Size, Layout and Computer Workstation. Provide one of the following trailers, one for use by DDC and the Construction Manager.

1. Overall length: 40 feet. Overall width: 8 feet
2. Interior Layout: Provide one (1) general office/conference room area and one (1) private office at one end of the trailer. Provide one desk at the other side of the trailer. Provide equipment and amenities as specified in Sub-Section 3.8.B herein.
3. Computer Workstation: Provide four (4) complete computer workstations as specified in Sub-Section 3.8 D herein. Provide two (2) complete workstation in the private office and two (2) complete workstation at the 30” deep desk.

ADDITIONAL SECTIONS/SUB-SECTIONS

The Contractor is advised that the additional Sub-Sections set forth below are included in the General Conditions and apply to the Project.

Reference **SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION**

The following articles are added to Sub-Section **1.4 COORDINATION**

F. Construction Phasing Guidelines:

1. The facility will be occupied during construction. The facility is occupied 24/7 and areas of Work and Phasing as indicated in the construction documents must be strictly adhered to for the Operations of DSNY at the facility to continue during construction.
2. All General Construction, Plumbing, and HVAC Work in the facility and at or below the apron of the facility shall be phased in two (2) Phases, as indicated on sheets PH-100.00 through PH-105.00. The sequence of this Phased construction work to achieve at least Partial Beneficial Occupancy shall be as follows:

    a. District 17 Office Area 495 ccds
    b. District 17 Garage Area 520 ccds
    c. District 18 Office Area 860 ccds
    d. District 18 Garage Area 885 ccds

3. Upon NTP, Contractor to immediately submit Site Safety Plan, submittals for review and approval, order long lead items, complete trailer submission/approval/permit and fabrication for start of work, and be prepared to store away long lead items off-site until ready to install.
4. Contractor shall provide all necessary safety barriers, enclosures, fire watch, etc. and as further stipulated in the Contract between the City and the Contractor and the General Conditions to the Contract to assure safe public access to all areas outside of the “EXTENT OF WORK” and “AREA OF NO TRUCKS” during each Phase of construction.
5. Work on site shall only be conducted between April 15 and October 31, annually, except where otherwise noted in this Section. Work may be conducted between the hours of 7 AM and 4 PM, Monday through Friday with the exception of work inside offices/locker/shower rooms which are to be done on swing-shift hours

between 3 PM and 12 AM. No phase can be left incomplete between November 1 and April 30. No building materials or equipment may remain on site between November 1 and April 15.

6. Work that does not affect Department of Sanitation operation may be conducted between the hours of 7 AM and 4 PM, Monday through Friday.
7. Partial Beneficial Occupancy must be achieved and approved by the Commissioner for each phase before commencing the following phase unless otherwise agreed by the Commissioner. All concrete must be fully cured at the time of Partial Beneficial Occupancy.

Reference **SECTION 01 35 26 – SAFETY REQUIREMENTS PROCEDURES**

The following articles are added to Sub-Section **3.2 PROTECTION OF PERSONNEL**

B.5. In the event of hazardous odors being emitted from soil exposed by slab openings during construction, the Contractor shall provide sufficient ventilation to meet applicable safety requirements. A minimum of two high volume fans shall be provided. The Contractor shall provide dustproof partitions as indicated in section 01 50 00 Temporary Facilities, Services and Controls to prevent odor from spreading to other interior spaces of the facility.

Reference **SECTION 01 50 00 – TEMPORARY FACILITIES, SERVICES AND CONTROLS**

The following articles are added to Sub-Section **3.11 TEMPORARY PARTITIONS**

A.8. Construct dustproof partitions with a minimum 10-mil 3-ply polyethylene sheet. Dustproof partitions shall extend from the bottom ceiling to the floor. Dustproof partitions shall be secured on all sides. Overlap and tape full length of joints. Dust proof partitions shall be provided at all locations in which the Work Area is adjacent to interior spaces of the facility.

a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.

The following articles are added to PART III **– Execution**

3.20 LOCKERS/SHOWER/LAVATORY/SHOWERS DISPLACED FACILITY PERSONNEL

B. DSNY Operations Locker and Shower Trailer:

1. GENERAL: The Contractor shall, for no less than the duration of Phase as indicated on drawing PH-100.00 to PH-105.00, provide and maintain at its own cost and expense a DSNY operations locker and shower trailer and all related items as specified for the exclusive use of DSNY BME personnel. The DSNY operation locker and shower trailer shall be located at the site as indicated on PH-100.00.

2. TRAILER: The Contractor shall provide at its own cost and expense a mobile office trailer for use as the DSNY operations locker and shower trailer. The Contractor shall install and connect all utility services to the trailer prior to the any work proceeding in the BME personnel locker rooms, shower facility and lavatories. The trailer shall have equipment in compliance with the minimum requirements hereinafter specified. Any permits and fees required for the installation and use of said trailer shall be borne by the Contractor. The trailer including furnishing and equipment provided by the Contractor, shall remain the property of the Contractor.

3. Trailer shall be a locker/shower type trailer of the size specified herein, with exterior stairs at entrance. Trailer construction shall be minimum 2 x 4 wall construction fully insulated with paneled interior walls, pre-finished gypsum board ceilings and vinyl tile floors.

    a. Shower/locker trailer side:

        1) Overall length: minimum 64 feet. Overall width: minimum 12 feet.
        2) Interior Layout: Refer to phasing drawings for layout

4. The interior shall be divided by partitions as shown on the interior layout plan on the phasing drawings.

5. Provide trailer and utilities per SECTION 01 50 00 – TEMPORARY FACILITIES, SERVICES AND CONTROLS, part 3.8 sub-sections B.5, B.8, B.9, B.10, B.11, B.13.

VIII. SPECIAL EXPERIENCE REQUIREMENTS FOR THE PROJECT

Refer to the PASSPort Questionnaire for Special Experience Requirements.

IX. REVISIONS: SPECIFICATIONS AND CONTRACT DRAWINGS

The Specifications and the Contract Drawings for the Project are revised in accordance with the provisions set forth below.

(1) Owner: Wherever the term “Owner” is used in the Specifications and/or the Contract Drawings, such term shall mean the City of New York.

(2) Other Entities: In the event any entity other than the City of New York is referred to or named as the “Owner” in the Specifications and/or the Contract Drawings, the name of such other entity is deemed deleted and replaced with the “City of New York”.

(3) Architect / Engineer: Wherever the words “Architect”, “Engineer”, “Architect / Engineer” or “Architect and/or Engineer” are used in the Specifications and/or the Contract Drawings, such words are deemed deleted and replaced with the word “Commissioner”.

(4) Products / Manufacturers: Wherever the Specifications and/or the Contract Drawings require the Contractor to provide a particular product (i.e., material and/or equipment) from a designated manufacturer and/or vendor, the term “or approved equal” is deemed inserted, even if only one product and/or manufacturer is specified, except as otherwise provided below.

(a) Proprietary Items: If the Documents section in PASSPort contains a Notice which identifies a particular product from a designated manufacturer as a "Sole Source Product, the Contractor shall be required to provide such specified product. In such case, no substitution or “approved equal” will be permitted.

(5) Special Experience Requirements: Special Experience Requirements for the Project, if any, are set forth in the PASSPort Questionnaire. Special Experience Requirements may apply to Contractors, subcontractors, installers, manufacturers and/or suppliers. If the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth in the PASSPort Questionnaire, such Special Experience Requirement is deemed deleted, except as otherwise provided below.

(a) Any Special Experience Requirement that provides that the entity performing the work or supplying the material must have more than three (3) years of experience, is revised to provide that the entity performing the work or supplying the material must have three (3) years of experience, except as described in paragraph (b) below.
(b) Any Special Experience Requirement that pertains to the abatement of hazardous materials shall not be subject to the deletion and/or revision set forth above. Such Special Experience Requirement shall remain in full force and effect.
(c) Any Special Experience Requirement that provides that the entity performing the work must be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such entity must be properly trained for the specified work.
(d) Any Special Experience Requirement that provides that the individual workers performing the work must be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such individual workers must be properly trained for the specified work.

(6) Alternate Bids: If the agency is requesting the submission of Alternate Bids, a Notice regarding such Alternate Bids is set forth in the Documents section in PASSPort. In the event of any conflict or inconsistency between (1) the Notice regarding Alternate Bids set forth in the Documents section in PASSPort and (2) a provision in the Specifications and/or the Contract Drawings regarding Alternate Bids, the Notice set forth in the Documents section in shall prevail. If the agency is not requesting the submission of Alternate Bids, as indicated by the absence of a Notice in the Documents section in PASSPort , and the Specifications and/or the Contract Drawings contain any provision regarding Alternate Bids, such provision is deemed deleted.

(7) Contractor Retained Engineer: If the Specifications and/or the Contract Drawings require the Contractor to retain an Engineer to provide engineering services for the Project, the following sentence is deemed inserted: “Such Engineer must be a Professional Engineer, licensed in the State of New York.”

(8) LEED Related Provisions: If the Specifications and/or the Contract Drawings require the Contractor to purchase FSC certified wood, rapidly renewable materials, or materials within 500 miles (LEED v3) or 100 miles (LEED

v4), such provisions are deemed deleted and replaced with the requirement that if the Contractor has purchased FSC certified wood, rapidly renewable materials, or materials within 500 miles (LEED v3) or 100 miles (LEED v4), the Contractor shall submit such forms or documentation as may be required by the City in order for the USGBC to certify that the Project qualifies for the related LEED credit(s).

(9) Guarantees: Requirements for Guarantees and Maintenance are set forth in Schedule B, which is included in the Addendum to the General Conditions. In the event of any conflict or inconsistency between (1) a guarantee and/or maintenance requirement set forth in the Specifications and/or the Contract Drawings and (2) a guarantee and/or maintenance requirement set forth in Schedule B, the guarantee and/or maintenance requirement set forth in Schedule B shall prevail.

(10) Warranties: Requirements for Warranties are set forth in Schedule B, which is included in the Addendum to the General Conditions.

(a) The term "manufacturer's warranty" as described in this article encompasses the following terms as indicated in the Specifications: "Manufacturer's Warranty", "Manufacturer's Special Warranty", "Special Warranty", "Special Finish Warranty", "Manufacturer's Special Warranty for a (product, assembly)."
(b) In the event of any conflict or inconsistency between (1) a warranty requirement set forth in the Specifications and/or the Contract Drawings and (2) a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall prevail.
(c) In the event a warranty requirement set forth in the Specifications and/or the Contract Drawings is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications and/or the Contract Drawings, shall remain in full force and effect.
(d) In the event a warranty requirement for a particular item of material or equipment is omitted from Schedule B, as well as from the Specifications or the Contract Drawings, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.

(11) Exculpatory Provisions: In the event the Specifications and/or the Contract Drawings contain any provision whereby the consultant and/or any of its officers, employees or agents, including subconsultants, is absolved of responsibility for any act or omission, such provision is deemed deleted.

(12) Insurance: Provisions regarding insurance coverage the Contractor is required to provide are set forth in Article 22 of the City of New York Standard Construction Contract and Schedule A, which is included in the Addendum to the General Conditions. In the event the Specifications and/or the Contract Drawings contain any provision regarding insurance requirements, such provision is deemed deleted.

(13) Indemnification: Provisions regarding indemnification are set forth in Articles 7, 12, 22 and 57 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding indemnification, such provision is deemed deleted.

(14) Dispute Resolution: Provisions regarding dispute resolution are set forth in Article 27 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding dispute resolution, such provision is deemed deleted.

(15) Payment to Other Entities: In the event the Specifications and/or the Contract Drawings contain any provision which requires the Contractor to make payments to an entity other than a subcontractor and/or supplier providing services and/or material for the project, such provision is deemed deleted.

(16) General Conditions: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the General Conditions, the General Conditions shall prevail.

(17) Standard Construction Contract: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the City of New York Standard Construction Contract, the City of New York Standard Construction Contract shall prevail.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)
PART I - Contract Requirements

Various Articles of the Contract refer to requirements which are set forth in Schedule A of the General Conditions. The Schedule set forth below specifies the following: (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the contract.

REFERENCE	ITEM	REQUIREMENTS	CONTRACT #1	
Information For Bidders	Bid Security		See the PASSPort Procurement Information	
Information For Bidders	Performance and Payment Bonds		For Contracts in the amount of $1,000,000.00 or more, Performance and Payment Bonds must each be in amount equal to 100% of the Contract Price.	
Information For Bidders	Department of Design and Construction Safety Requirements	The Contractor must provide the safety personnel as indicated to the right	■ Project Safety Representative □ Dedicated, full-time Project Safety Manager	
Article 14 Contract	Time of Substantial Completion	Consecutive Calendar Days	**885**	
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time for each phase	**$2,500**	
Article 17 Contract	Sub-Contracts	Not to exceed Percent of Contract Price	**60%**	
Article 21 Contract	Retainage	Percent of Voucher	If 100% bonds are required	**5%**
			If 100% bonds are not required, and Contract Price is $1,000,000 or less	**5%**
			If 100% bonds are not required, and Contract Price is more than $1,000,000	**10%**
Article 24 Contract	Deposit Guarantee	Percent of Contract Price	**1%**	
Article 24 Contract	Period of Guarantee		See Schedule B of the Addendum to the General Conditions	
Article 74 Contract	Statement of Work		Addenda, numbered: _____	
Article 75 Contract	Compensation to be Paid to Contractor		Amount for which the Contract was Awarded: _____ _____ Dollars ($_____)	
Article 79 Contract	MWBE Program		See M/WBE Utilization Plan in the PASSPort Procurement M/WBE Considerations Section.	

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Note: All certificate(s) of insurance submitted pursuant to Contract Article 22.3. 3 must be accompanied by a Certification by Broker consistent with Part III below and include the following information:

- **For each insurance policy, the name and NAIC number of issuing company, number of policy, and effective dates;**
- **Policy limits consistent with the requirements listed below;**
- **Additional insureds or loss payees consistent with the requirements listed below; and**
- **The number assigned to the Contract by the City (in the "Description of Operations" field).**

Insurance indicated by a blackened box (■) or by (X) in the ☐ to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
■ Commercial General Liability Art. 22.1.1	This Contract requires Commercial General Liability Insurance (CGL) that is at least as broad as ISO Form CG 00 01 (see Section 22.1.1 of the New York City Standard Construction Contract). CGL policies that include endorsements that add exclusions to ISO Form CG 00 01 do not comply with the Contract. The Department may, in its sole discretion, accept endorsements that add exclusions, but the Department will generally reject endorsements that add exclusions that exempt all or part of the Work of the Project. For example, if the Project includes Work on a roof of a four-story building, the Department will reject a CGL policy that includes a "Three Story Height Limitation Endorsement." The minimum limits shall be $1,000,000.00 per occurrence and $2,000,000.00 per project aggregate applicable to this **Contract.** Additional Insureds: 1. City of New York, including its officials and employees, with coverage at least as broad as ISO Forms CG 20 10 and CG 20 37, and 2. All person(s) or organization(s), if any, that Article 22.1.1(b) of the **Contract** requires to be named as Additional Insured(s), with coverage at least as broad as ISO Form CG 20 26. The Additional Insured endorsement shall either specify the entity's name, if known, or the entity's title (e.g., Project Manager). 3. New York City Sanitation Department (DSNY)

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Insurance indicated by a blackened box (■) or by (X) in the ☐ to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2 ■ Employers' Liability Art. 22.1.2 □ Jones Act Art. 22.1.3 □ U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.3	Workers' Compensation, Employers' Liability, and Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction. **Note**: The following forms are acceptable: (1) New York State Workers' Compensation Board Form No. C-105.2, (2) State Insurance Fund Form No. U-26.3, (3) New York State Workers' Compensation Board Form No. DB-120.1 and (3) Request for WC/DB Exemption Form No. CE-200. The City will not accept an ACORD form as proof of Workers' Compensation or Disability Insurance. Jones Act and U.S. Longshoremen's and Harbor Workers' Compensation Act: Statutory per U.S. law.
■ Builders' Risk Art. 22.1.4	100 % of total value of **Work** **Contractor** the Named Insured; the **City** both an Additional Insured and one of the loss payees as its interests may appear. If the **Work** does not involve construction of a new building or gut renovation work, the **Contractor** may provide an installation floater in lieu of Builders Risk insurance. Note: Builders Risk Insurance may terminate upon **Substantial Completion** of the **Work** in its entirety.
■ Commercial Auto Liability Art. 22.1.5	$1,000,000.00 per accident combined single limit If vehicles are used for transporting hazardous materials, the **Contractor** shall provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions

Insurance indicated by a blackened box (■) or by (X) in the ☐ to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
□ Contractor's Pollution Liability Art. 22.1.6	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
□ Marine Protection and Indemnity Art. 22.1.7(a)	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
□ Hull and Machinery Insurance Art. 22.1.7(b)	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
□ Marine Pollution Liability Art. 22.1.7(c)	$_____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.8 □ Ship Repairers Legal Liability	$_____ each occurrence

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the ☐ to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
[OTHER] Art. 22.1.8 □ Collision Liability/Towers Liability	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.8 □ Railroad Protective Liability _____	$_____ per occurrence $_____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.8 ■ Asbestos Liability _____	Only required of the Contractor or Subcontractor performing any required asbestos removal. $1,000,000 each occurrence, $2,000,000 aggregate (Combined Single Limit); only required of the Contractor or Subcontractor performing any required asbestos removal. Additional Insureds: 1. City of New York, including its officials and employees, and 2.New York City Sanitation Department (DSNY)

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Types of Insurance, Minimum Limits and Special Conditions (Continued)

Insurance indicated by a blackened box (■) or by (X) in the ☐ to left will be required under this contract.

[OTHER] Art. 22.1.8 □ Boiler Insurance_____	 $200,000
[OTHER] Art. 22.1.8 ■ Professional Liability In the event any section of the Specifications requires the Contractor to engage a Professional Engineer to provide design and/or engineering services, the Engineer engaged by the Contractor, as well as any sub consultant(s) performing professional services, shall provide Professional Liability Insurance.	$1,000,000 per occurrence The Contractor's Professional Engineer shall maintain and submit evidence of Professional Liability Insurance in the minimum amount of $1,000,000 per claim. The policy or policies shall include an endorsement to cover the liability assumed by the Contractor under this Agreement arising out of the negligent performance of professional services or caused by an error, omission or negligent act of the Contractor's Professional Engineer or anyone employed by the Contractor's Professional Engineer. Claims-made policies will be accepted for Professional Liability Insurance. All such policies shall have an extended reporting period option or automatic coverage of not less than two (2) years. If available as an option, the Contractor's Professional Engineer shall purchase extended reporting period coverage effective on cancellation or termination of such insurance unless a new policy is secured with a retroactive date, including at least the last policy year.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certificates of Insurance

All certificates of insurance (except certificates of insurance solely evidencing Workers' Compensation Insurance, Employer's Liability Insurance, and/or Disability Benefits Insurance) must be accompanied by one of the following:

(1) the Certification by Insurance Broker or Agent on the following page setting forth the required information and signatures;

-- OR --

(2) copies of all policies as certified by an authorized representative of the issuing insurance carrier that are referenced in such certificate of insurance. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. Certification by Insurance Broker or Agent

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

_____

[Name of broker or agent (typewritten)]

_____

[Address of broker or agent (typewritten)]

_____

[Email address of broker or agent (typewritten)]

_____

[Phone number/Fax number of broker or agent (typewritten)]

_____

[Signature of authorized official or broker or agent]

_____

[Name and title of authorized official, broker or agent (typewritten)]

State of ……...)
) ss:
County of ……)

Sworn to before me this

_____ day of _____, 20__

_____

NOTARY PUBLIC FOR THE STATE OF_____

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART IV. Address of Commissioner

Wherever reference is made in Article 7 or Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth below or, in the absence of such address, to the **Commissioner's** address as provided elsewhere in this **Contract**.

ACCO's Office, Insurance Unit

30-30 Thomson Avenue, 4th Floor

Long Island City, New York 11101

SCHEDULE B

Guarantees and Warranties

(Reference: Section 01 7839, Article 2.7 of the DDC Standard General Conditions)

GUARANTY FROM CONTRACTOR

(1) Contractor's Guaranty Obligation: The Contractor shall promptly repair, replace, restore or rebuild, as the Commissioner may determine, any finished Work in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of Substantial Completion (or use and occupancy in accordance with the Contract), except for the areas of Work set forth below:

- Roofing, Waterproofing, and Joint Sealant Work. For these types of work, the guarantee period shall be (2) two years.

- Trees and/or Plant Material. For trees and/or plant material furnished and installed, the guarantee period shall be (2) two years. During the guarantee period, the Contractor shall provide all maintenance services set forth in the Specifications.

(2) Guaranty Period: The obligation of the Contractor, and its Surety under the Performance Bond, is limited to the period(s) of time specified above.

(3) Other Provisions Deemed Deleted: In the event the Specifications and/or the Contract Drawings contain any provisions regarding guaranty requirements, such provisions are deemed deleted and replaced with the guaranty requirements set forth in this Schedule B.

****

WARRANTY FROM MANUFACTURER

(1) Contractor's Obligation to Provide Warranties: The items of material and/or equipment for which manufacturer warranties are required are listed below. For each item of material and/or equipment listed below, the Contractor shall obtain a written warranty from the manufacturer. Such warranty shall provide that the material or equipment is free from defects for the period set forth below and will be replaced or repaired within such specified period. The Contractor shall deliver all required warranties to the Commissioner.

(2) Required Warranties:

Specification Number	Material or Equipment	Warranty Period
07 52 16	SBS Modified Bituminous Membrane Roofing - Material	20 Years
07 72 00	Roof Accessories: roof hatches	5 Years
07 92 00	Joint Sealants	2 Years
08 11 00	Steel Doors and Frames	12 Months
08 71 00	Locksets	12 Months
-	Hinges	5 years
23 09 00	Instrumentation and Control for HVAC	12 Months
23 41 03	Carbon Monoxide Detection System with Fan and Alarm Control - Material	2 Years
23 74 13	Compressor	5 Years
-	Gas Furnace Heat Exchanger	5 Years
-	Solid State Ignition Module	3 Years
-	Control Board	3 Years
23 81 36	Compressor	6 Years
-	Components	18 Months

26 24 13	Switchboards	3 Years
-	SPD	5 Years
26 24 16	Panelboard	18 Months
-	SPD	5 years
26 28 16	Enclosed Switches and Circuit Breakers	12 Months
23 31 00	Photovoltaic Collectors – Modules	2 years
-	Photovoltaic Collectors – Performance	25 years
26 51 00	Interior Lighting – Enclosure	5 Years
-	Interior Lighting – Lamps	12 Months
31 23 33	Trenching Backfill and Compaction	1 Year

(3) Application: The obligations under the warranty for the periods specified above shall apply only to the manufacturer of the material or equipment, and not to the Contractor or its Surety; provided, however, the Contractor retains responsibility for obtaining all required warranties from the manufacturers and delivering the same to the Commissioner.

(4) Other Provisions: The warranty requirements set forth in this Schedule B are also included in the Specifications.

(a) In the event of any conflict between a warranty requirement set forth in the Specifications and a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall take precedence.

(b) In the event a warranty requirement set forth in the Specifications is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications, shall remain in full force and effect.

(c) In the event a warranty requirement for a particular item of material or equipment is omitted from both Schedule B and the Specifications, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.

(d) In the event a warranty requirement is provided for a particular item of material or equipment, and such requirement specifies a warranty period that is longer than that which is actually provided by any of the specified manufacturers, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by any of the specified manufacturers, unless otherwise directed in writing by the Commissioner.

(e) Unless indicated otherwise Warranties are to take effect on the date of Substantial Completion.

SCHEDULE C

Contract Drawings

(Reference: Section 01 1000, Article 1.5 (A) of the DDC Standard General Conditions)

The Schedule set forth below lists all Contract Drawings for the Project.
0The Schedule set forth below lists all Contract Drawings for the Project.
1

Sheet no.	Sheet title
G-000	GENERAL COVER SHEET
G-100	GENERAL NOTES, ABBREVIATIONS AND SYMBOL LIST/LEGEND
G-101	FLOOD MAP
PH-100	TRAILER LOCATION AND PLAN
PH-101	DISTRICT 17 PHASING PLANS
PH-102	DISTRICT 17 PHASING PLANS
PH-103	DISTRICT 18 PHASING PLANS
PH-104	DISTRICT 18 PHASING PLANS
PH-105	DISTRICT 17 PHASING PLANS
EN-001	2016 NYC ECC TABULAR ANALYSIS
EN-002	MECHANICAL COMPLIANCE
EN-003	MECHANICAL COMPLIANCE
DM-101	ROOF PLAN REMOVALS 1 OF 4
DM-102	ROOF PLAN REMOVALS 2 OF 4
DM-103	ROOF PLAN REMOVALS 3 OF 4
DM-104	ROOF PLAN REMOVALS 4 OF 4
DM-201	WEST AND NORTH ELEVATIONS REMOVALS
DM-202	EAST AND SOUTH ELEVATIONS REMOVALS
A-101	ROOF PLAN CONSTRUCTION 1 OF 4
A-102	ROOF PLAN CONSTRUCTION 2 OF 4
A-103	ROOF PLAN CONSTRUCTION 3 OF 4
A-104	ROOF PLAN CONSTRUCTION 4 OF 4
A-105	PARTIAL ROOF PLAN SOLAR PANEL AND ROOF PAVER LAYOUT 1 OF 2
A-106	PARTIAL ROOF PLAN SOLAR PANEL AND ROOF PAVER LAYOUT 2 OF 2
A-107	ROOF SLOPE LAYOUT
A-108	ROOF PARTIAL ENLARGED PLAN AND SECTION
A-109	REFLECTED CEILING PLANS DISTRICT 17
A-110	REFLECTED CEILING PLANS DISTRICT 18
A-111	NEW ELECTRICAL SERVICE ROOM - ENLARGED PLANS AND SECTIONS
A-112	NEW ELECTRICAL SERVICE ROOM - DETAILS
A-201	WEST AND NORTH ELEVATIONS CONSTRUCTION
A-202	EAST AND SOUTH ELEVATIONS CONSTRUCTION
A-203	ENLARGED PARTIAL ELEVATIONS
A-301	WALL SECTIONS AND DETAILS 1 OF 2
A-302	WALL SECTIONS AND DETAILS 1 OF 2
A-401	ROOF DETAILS
A-402	DETAILS
A-501	DOOR AND WINDOW SCHEDULE AND DETAILS
S-001	STRUCTURAL NOTES
S-101	ROOF FRAMING PLAN 1 OF 4
S-102	ROOF FRAMING PLAN 2 OF 4
S-103	ROOF FRAMING PLAN 3 OF 4
S-104	ROOF FRAMING PLAN 4 OF 4
S-105	STRUCTURAL DETAILS
C-001	EXISTING CONDITIONS AND REMOVAL PLAN
C-002	PROPOSED SITE PLAN, SECTION AND DETAILS

C-003	PAVEMENT SECTION AND DETAILS
BPP-001	BUILDERS PAVEMENT PLAN TITLE SHEET
BPP-002	BUILDERS PAVEMENT PLAN - PROFILE AND DETAILS
BPP-003	BUILDERS PAVEMENT PLAN - PHOTOS
BPP-004	BUILDERS PAVEMENT PLAN - MPT
M-001	MECHANICAL SYMBOL LIST, ABBREVIATIONS AND NOTES
DMM-101	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17
DMM-102	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17
DMM-103	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18
DMM-104	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18
DMM-105	MECHANICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 17
DMM-106	MECHANICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 18
DMM-107	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
DMM-108	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
DMM-109	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
DMM-110	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
M-101	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 17
M-102	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 17
M-103	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 18
M-104	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 18
M-105	MECHANICAL 2ND FLOOR PART PLAN-DISTRICT 17
M-106	MECHANICAL 2ND FLOOR PART PLAN-DISTRICT 18
M-107	MECHANICAL ROOF PART PLAN-DISTRICT 17
M-108	MECHANICAL ROOF PART PLAN-DISTRICT 17
M-109	MECHANICAL ROOF PART PLAN-DISTRICT 18
M-110	MECHANICAL ROOF PART PLAN-DISTRICT 18
M-501	MECHANICAL DETAILS
M-502	MECHANICAL DETAILS
M-701	MECHANICAL SCHEDULES
M-702	MECHANICAL SCHEDULES
M-801	BMS SYMBOLS, ABBREVIATIONS AND NOTES
M-802	BMS DETAILS
M-803	BMS DETAILS
M-804	BMS DETAILS
M-805	BMS ARCHITECTURE
E-001	ELECTRICAL SYMBOL LIST, ABBREVIATIONS AND NOTES
DE-101	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17
DE-102	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17
DE-103	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18
DE-104	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18
DE-105	ELECTRICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 17
DE-106	ELECTRICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 18
DE-107	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
DE-108	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
DE-109	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
DE-110	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
E-101	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 17
E-102	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 17
E-103	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 18
E-104	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 18
E-105	ELECTRICAL 2ND FLOOR PART PLAN-DISTRICT 17
E-106	ELECTRICAL 2ND FLOOR PART PLAN-DISTRICT 18
E-107	ELECTRICAL ROOF PART PLAN-DISTRICT 17
E-108	ELECTRICAL ROOF PART PLAN-DISTRICT 17
E-109	ELECTRICAL ROOF PART PLAN-DISTRICT 18
E-110	ELECTRICAL ROOF PART PLAN-DISTRICT 18
E-201	ELECTRICAL GROUND FLOOR LIGHTING PART PLAN-DISTRICT 17
E-202	ELECTRICAL GROUND FLOOR LIGHTING PART PLAN-DISTRICT 18

E-203	ELECTRICAL 2ND FLOOR LIGHTING PART PLAN-DISTRICT 17
E-204	ELECTRICAL 2ND FLOOR LIGHTING PART PLAN-DISTRICT 18
E-401	ELECTRICAL EQUIPMENT ELEVATIONS
E-402	ELECTRICAL EQUIPMENT ELEVATIONS
E-403	ELECTRICAL EQUIPMENT ELEVATIONS
E-404	ELECTRICAL EQUIPMENT ELEVATIONS
E-501	ELECTRICAL DETAILS
E-502	ELECTRICAL DETAILS
E-503	ELECTRICAL DETAILS
E-504	ELECTRICAL DETAILS
E-505	ELECTRICAL DETAILS
E-506	ELECTRICAL DETAILS
E-507	ELECTRICAL DETAILS
E-601	ELECTRICAL ONE LINE DIAGRAM - EXISTING
E-602	ELECTRICAL ONE LINE - NEW
E-603	ELECTRICAL ONE LINE - NEW SERVICE
E-604	ELECTRICAL THREE LINE DIAGRAM - PHOTOVOLTAIC SYSTEM
SP-001	SPRINKLER SYMBOLS LIST, ABBREVIATIONS AND NOTES (SHEET 1 OF 3)
SP-002	GENERAL NOTES (SHEET 2 OF 3)
SP-003	GENERAL NOTES (SHEET 3 OF 3)
SP-101	1ST FLOOR SPRINKLER PLAN - DISTRICT 17
SP-501	SPRINKLER DETAILS
SP-601	SPRINKLER RISER DIAGRAM
P-001	PLUMBING SYMBOLS LIST, ABBREVIATIONS AND NOTES
DP-101	PLUMBING GROUND FLOOR DEMOLITION PLAN-DISTRICT 17
P-101	PLUMBING GROUND FLOOR PLAN-DISTRICT 17
P-102	PLUMBING GROUND FLOOR PLAN-DISTRICT 17
P-103	PLUMBING GROUND FLOOR PLAN-DISTRICT 18
P-104	PLUMBING GROUND FLOOR PLAN-DISTRICT 18
P-105	PLUMBING GROUND 2ND FLOOR PLAN-DISTRICT 17
P-106	PLUMBING GROUND 2ND FLOOR PLAN-DISTRICT 18
P-107	PLUMBING ROOF PLAN
P-108	PLUMBING ROOF PLAN
P-109	PLUMBING ROOF PLAN
P-110	PLUMBING ROOF PLAN
P-501	PLUMBING DETAILS
FA-001	FIRE ALARM SYMBOLS LIST, ABBREVIATIONS AND NOTES
FA-002	FIRE ALARM SPECIFICATIONS
DFA-101	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17
DFA-102	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17
DFA-103	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 18
DFA-104	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 18
DFA-105	FIRE ALARM 2ND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17
DFA-106	FIRE ALARM 2ND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 18
DFA-107	FIRE ALARM ROOF DEMOLITION
DFA-108	FIRE ALARM ROOF DEMOLITION
DFA-109	FIRE ALARM ROOF DEMOLITION
DFA-110	FIRE ALARM ROOF DEMOLITION
FA-101	FIRE ALARM GROUND FLOOR PLAN- DISTRICT 17
FA-102	FIRE ALARM GROUND FLOOR PLAN- DISTRICT 17
FA-103	FIRE ALARM GROUND FLOOR PLAN- DISTRICT 18
FA-104	FIRE ALARM GROUND FLOOR PLAN- DISTRICT 18
FA-105	FIRE ALARM 2ND FLOOR PLAN- DISTRICT 17
FA-106	FIRE ALARM 2ND FLOOR PLAN- DISTRICT 18
FA-107	FIRE ALARM ROOF
FA-108	FIRE ALARM ROOF
FA-109	FIRE ALARM ROOF
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SCHEDULE D

Electrical Motor Control Equipment

(Reference: 01 3506, Article 3.8 of the DDC Standard General Conditions)

Requirements for electrical motor equipment may be included in one or more sections of the Specifications for the Contract for the Project. Schedule D set forth below delineates specific information for electrical motor control equipment. In the event of any conflict between the Specifications and this Schedule D, Schedule D shall take precedence; provided, however, in the event of an omission from Schedule D (i.e., Schedule D omits either a reference to or information concerning electrical motor equipment which is set forth in the Specifications), such omission from Schedule D shall have no effect and the Contractor's obligation with respect to the electrical motor control equipment, as set forth in the Specifications, shall remain in full force and effect.

DB Disconnect Circuit Breaker (Switch)
TS Thermal Switch
MS Magnetic Starter
CMS Comb. Mag. Starter
P Pilot Light
F Firestat
T Thermostat
AL Alternator
BG Break Glass Station
HOA Hand-Off Auto.
PB Push Button Station
RO Remote "off"

Equip. Ident.	Location	# of Units	HP or KW	Volts and Phase	Control Type: See legend above	Remarks:
RTU-1	Roof	1	90 KW	208/3	CMS; DB; T	
RTU-2	Roof	1	90 KW	208/3	CMS; DB; T	
HV	Roof	2	2	208/3	CMS; DB; T	
UEF	Roof	14	5	208/3	CMS; DB	
MU	Roof	18	15	208/3	CMS; DB; T	
GEF	Roof	18	5	208/3	CMS; DB	
TEF	Roof	12	1/2	208/3	CMS; DB	
RF	Roof	7	1	208/3	CMS; DB	

SCHEDULE E

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NOT USED FOR SINGLE CONTRACTS

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CONTRACT # 1

GENERAL CONSTRUCTION WORK

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SECTION 02 41 13 - SELECTIVE REMOVALS & DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes removals and demolition of selected items from selected areas of the building as indicated on the Drawings; items to be removed include, the following:

1. Existing roofing system to underlying metal deck
2. Existing metal deck at areas of damage
3. Selective existing brick and CMU masonry and coping at parapets
4. Existing equipment curbs and associated mechanical, electrical and plumbing items
5. Selective interior ceiling removals for mechanical installations.
6. Existing concrete curbs and equipment in the truck wash room.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

1.4 RESPONSIBILITY, PROTECTION, DAMAGES, RESTRICTIONS

A. Condition of Space

1. The Commissioner assumes no responsibility for actual condition of the space in which removals and demolition work is performed.

B. Protections

1. Provide temporary barricades and other forms of protection required to protect DSNY and neighboring personnel and the general public from injury due to selective removals and demolition work.
2. Erect barriers, fences, guard rails, enclosures, chutes, and shoring to protect structures and utilities remaining intact.
3. Protect designated trees and plants from damage.

C. Maintaining Traffic

1. Ensure minimum interference with roads, street, driveways, sidewalks, and adjacent facilities based on NYCDOT requirements.
2. Do not close or obstruct streets, sidewalks, alleys, or passageways without permission.
3. If required by The City of New York, provide alternate routes around closed or obstructed traffic ways.

D. Damages

1. Promptly restore any and all damages to all property and finishes caused by the removals and demolition work; to the Commissioner's satisfaction and at no extra cost.

PART 2 - PRODUCTS NOT APPLICABLE

PART 3 - EXECUTION

3.1 RELATED DOCUMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSPECTION

A. Prior to commencement of the selective removals and demolition work, inspect the areas in which the Work will be performed. Determine and list the existing conditions of rooms or area surfaces and equipment. After the work in each respective area is completed, determine if adjacent surfaces or equipment have been damaged as a result of the work; if so, the damage shall be corrected at the Contractor's expense.

3.3 PREPARATION

A. Prepare adjacent areas to prevent injury, movement or settlement of structures which are to remain.

B. Arrange for, and verify termination of utility services to include removing meters and capping lines.

C. Remove items scheduled to be salvaged for The City of New York, and place in designated storage area.

3.4 REMOVALS AND DEMOLITION WORK

A. Perform selective demolition work in a systematic manner and use such methods as are required to complete the work indicated, and in accordance with the Specifications and NYC Building Code.

B. When walls, partitions, floors, and ceilings (or portions thereof) are indicated to be removed;

1. Refer to the drawings for items to be removed and/or temporarily re-located

C. Remove concrete pavement, base, curbs, gutters, sidewalks, driveways, etc. and dispose of them as follows:
1. Dispose of items which are not more than two feet below sub-grade elevation.
2. Break items more than two feet below subgrade elevation into sizes not-to-exceed twelve inches in maximum dimension and leave in place, unless it interferes with succeeding items of construction.
3. Stockpile ballast, gravel and other pavement materials when required.

D. Coordinate removal and relocation of power poles, street lighting, telephone lines and site lighting, with the local electric utility.

E. Remove existing water services, sanitary sewer and storm drainage pipe and structures as indicated and as necessary to facilitate new construction.

F. Remove old foundations, cisterns, etc., which maybe encountered within the building area.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish and other materials resulting from the removals and demolitions from the building immediately; transport and legally dispose of materials off-site. Disposal method shall be in accordance with NYC Building Code.

B. Burning of removed materials is not permitted on the job site.

3.6 CLEAN UP AND RESTORATION

A. Upon completion of removals and demolition work, remove tools, equipment and all remaining demolished materials from the site.

B. Restore all damaged areas caused by the removals and demolition Work. Restore adjacent construction or surfaces soiled or damaged by selective demolition work. Restore materials shall match the existing construction. New and adjacent surfaces shall be painted to match the existing. Paint shall extend to include the entire surface in which the restoration has been made.

C. All areas in which work was performed under this Section shall be left "broom-clean."

3.7 OWNERSHIP OF MATERIALS

A. All equipment, materials and items removed shall remain the property of the Contractor and shall be removed from the site by the Contractor.

END OF SECTION 02 41 13

SECTION 028013 – GENERAL CONTRACTOR WORK
NOVEMBER 2017 VERSION

ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT

1.01 SCOPE FOR ASBESTOS ABATEMENT WORK

A. The "General Conditions" apply to the work of this Section.

B. The asbestos abatement contractor shall remove asbestos containing materials as needed to perform the other work of this Contract when discovered during the course of work. When required, the asbestos abatement contractor shall replace the ACM with non-asbestos containing materials. An allowance of **$15,000.00** for the **General Contractor** is herein established for this incidental work when so ordered and authorized by the Commissioner.

C. All work shall be done in accordance with the applicable provisions of the rules and regulations of the asbestos control program as promulgated by Title 15 Chapter I of RCNY and New York State Department of Labor Industrial Code Rule 56 cited as 12 NYCRR Part 56, whichever is more stringent as per latest amendments to these laws and as modified herein by these specifications.

D. All disposal of asbestos contaminated material shall be per Local Law 70/85.

E. The asbestos abatement contractor's attention is directed to the fact that certain methods of asbestos abatement are protected by patents. To date, patents have been issued with respect to "negative pressure enclosure" or “negative-air” or "reduced pressure” and "glove bag".

F. The asbestos abatement contractor shall be solely responsible for and shall hold the Department of Design and Construction and the City harmless from any and all damages, losses and expenses resulting from any infringement by the asbestos abatement contractor of any patent, including but not limited to the patents described above, used by the asbestos abatement contractor during performance of this agreement.

G. "Asbestos" shall mean any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite.

H. Prior to starting, the asbestos abatement contractor must notify the Commissioner of the Department of Design and Construction if he/she anticipates any difficulty in performing the Work as required by these Specifications. The asbestos

abatement contractor is responsible to prepare and submit all filings, notifications, etc. required by all City, State and Federal regulatory agencies having jurisdiction.

The asbestos abatement contractor is responsible for submitting the Asbestos Project Notification Form (ACP-7 Form) to the Department of Environmental Protection, Asbestos Control Program, as per Title 15, Chapter I of RCNY and to the NYSDOL as per Industrial Code Rule 56.

The asbestos abatement contractor is responsible for preparing, and submitting Asbestos Variance Application (ACP-9). If a Variance is required, the asbestos abatement contractor is responsible to retain a NYSDOL Asbestos Project Designer, as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required variance.

The general contractor is responsible for preparing and submitting an Asbestos Abatement Permit and/or Work Place Safety Plans (WPSP) that may be required for the completion of the Contract or incidental work. If such plans are required, the general contractor is responsible for retaining a registered design professional as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the required plans.

The asbestos abatement contractor is responsible for the submission of all required documents to the NYCDEP to acquire the appropriate Asbestos Project Conditional Closeout (ACP-20) and/or Asbestos Project Completion Forms (ACP-21) on a timely basis for the completion of the incidental work encountered under this contract.

The asbestos abatement contractor will be required to attend an on-site job meeting with the Construction Project Manager prior to the start of work to examine conditions and plan the sequence of operations, etc.

The asbestos abatement contractor shall have a NYSDOL/NYCDEP Asbestos Supervisor onsite to oversee the work and conduct a final visual inspection as required by both Title 15, Chapter 1 of the RCNY and NYSDOL Industrial Code Rule 56.

I. All work shall be done during regular working hours unless the asbestos abatement contractor requests authorization to work in other then regular working hours and such authorization is granted by the Commissioner. (Regular work hours are those hours during which any given facility, in which work is to be done, is customarily open and functioning, normally between the hours of 8:00 A.M. and 4:00 P.M. Monday - Friday.) If such work schedule is authorized by the Commissioner, the work shall be done at no additional cost to the City.

J. The Commissioner may order that work be done in other than regular working hours as herein by defined and this order may require the asbestos abatement

contractor to pay premium or overtime wages to complete the work. If the Commissioner orders work in other than regular working hours, the asbestos abatement contractor shall multiply the unit price for that portion of the work requiring premium wages by 1.50 when computing payment in accordance with Paragraph 1.09. All requests for premium payment must be supported by certified payroll sheets and field sheets approved by the Construction Project Manager.

1.02 QUALIFICATIONS OF ASBESTOS ABATEMENT CONTRACTOR

A. Requirements: The asbestos abatement contractor must be approved through the Department's Request for Subcontractor Approval, administered by the Agency Chief Contracting Office (ACCO), Vendor Integrity Unit. The asbestos abatement contractor must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (6) below. Such documentation shall include without limitation, all required licenses, certificates, and documentation.

1. The asbestos abatement contractor must, whether an individual, corporation, partnership, joint venture or other legal entity, demonstrate for the three year period prior to the work that it has been licensed by the New York State Department of Labor (NYSDOL), as an "Asbestos Abatement Contractor". The asbestos abatement contractor shall submit copies of the asbestos abatement contractors NYSDOL License for the past three years

2. The asbestos abatement contractor must, for the three-year period prior to the work, have been in the business of providing asbestos abatement services as a routine part of its daily operations.

3. The asbestos abatement contractor proposing to do asbestos abatement work must be thoroughly experienced in such work and must submit a list of five (5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least $1,000,000 in each of the three years.

4. For each project submitted to meet the experience requirements set forth above, the asbestos abatement contractor must submit the following information for the project; name and location of the project; name title and telephone number and email address of the owner or the owner's representative who is familiar with the asbestos abatement contractor's work; brief description of the scope of work completed as a prime or sub-asbestos abatement contractor; amount of contract or subcontract and the date of completion.

5. The asbestos abatement contractor must demonstrate that it has the financial resources, certified supervisory personnel and equipment

necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The asbestos abatement contractor must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract. The Department may also conduct an inspection of the asbestos abatement contractor's facility to verify if the contractor has equipment and staffing to perform the work.

6. The asbestos abatement contractor must submit a copy of their Corporate Health and Safety Plan for review and acceptance. A Job Hazard Analysis (JHA) for the specific work conducted must be included.

B. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof. Provide materials or workmanship that meet or exceed the specifically named codes or standards where required by these specifications.

C. Site Investigation: Asbestos abatement contractor shall inspect all the specifications and related drawings, and will investigate and confirm the site conditions affecting the work, including, but not limited to (1) through (5) below. The asbestos abatement contractor will attend a walkthrough site inspection with the department's Project Manager and the Third-Party Air Monitor prior to the work. Such walkthrough will be scheduled at the Department's convenience.

1. Physical considerations and conditions of both the material and structure. These considerations include any obstacles or obstructions encountered in accessing or removing the material.

2. Handling, storage, transportation and disposal of the material.

3. Availability of qualified and skilled labor.

4. Availability of utilities.

5. Exact quantities of all materials to be disturbed and/or removed

1.03 ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES

The asbestos abatement contractor will visit the subject location within one (1) working day of notification to ascertain actual work required. If the project is identified as being "urgent", then work shall commence no later than 48 hours from the time of notification. In this event, the asbestos abatement contractor shall immediately notify when applicable EPA NESHAPS Coordinator, NYSDOL Asbestos Control Bureau and NYCDEP

Asbestos Control Program of start of the work and file the necessary Asbestos Notifications and any applicable Variance Applications with the regulatory agencies cited above.

In the event that the project is not classified as "urgent" the asbestos abatement contractor shall notify the EPA NESHAPS Coordinator, NYSDOL and NYCDEP by submitting the requisite asbestos project notification forms, postmarked 10 days before activity begins if 260 linear feet or more and/or 160 square feet or more of asbestos containing material will be disturbed.

The following information must be included in the notification:

A. Name and address of building City or operator;

B. Project description:

1. Size - square feet, number of linear feet, etc;

2. Age - date of construction and renovations (if known);

3. Use - i.e., office, school, industrial, etc.

4. Scope - repair, demolition, cleaning, etc.

C. Amount of asbestos involved in work and an explanation of techniques used to determine the amount;

D. Building location/address, including Block and Lot numbers;

E. Work schedule including the starting and completion dates;

F. Abatement methods to be employed;

G. Procedures for removal of asbestos-containing material;

H. Name, title and authority of governmental representative sponsoring project.

1.04 WORK INCLUDED IN UNIT PRICE

The asbestos abatement contractor will be paid a basic unit price of **$25.00** per square feet for the removal and disposal of asbestos containing material and replacement of the same with non-asbestos containing materials.

Unit price shall include all costs necessary to do the work of this Contract, including but not limited to: labor, materials, equipment, utilities, disposal, insurance, overhead and profit.

1.05 AIR MONITORING – ASBESTOS ABATEMENT CONTRACTOR

A. "Air Sampling" shall mean the process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the N1OSH Standard Analytical Method 7400 or the provisional transmission electron microscopy methods developed by the USEPA and/or National Institute of Standard and Technology which are utilized for lower detectability and specific fiber identification.

B. Air monitoring of asbestos abatement contractor's personnel will be performed in conformance with OSHA requirements, (All costs associated with this work are deemed included in the unit price.).

C. Qualifications of Testing Laboratory:

The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

Note: Work area air testing and analysis before, during and upon completion of work (clearance testing) will be performed by a Third Party Air Monitor under separate Contract with the City.

1.06 THIRD PARTY MONITORING AND LABORATORY

A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.

B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM).

C. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the asbestos abatement contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.

D. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the asbestos abatement contractor.

1.07 PAYMENT REQUEST DOCUMENTATION

A. The following information shall be included for each payment request:

1. Description of work performed.

2. Linear footage and pipe sizes involved.

3. Square footage for boiler & breaching insulation removed.

4. Square footage of non pipe and boiler areas removed, patched, enclosed, sealed, or painted.

5. Square footage of encapsulation, sealing, patching, and painting involved.

6. Total cost associated with compliance with the assigned task.

7. Architectural, Electrical, HVAC, Plumbing, etc. work incidental to the Asbestos Abatement Work.

8. A certified copy (in form 4312-39) to the Comptroller or Financial Officer of the New York City to the effect that the financial statement is true.

9. A signed copy (in form 6506q-6) of certificate of compliance with non-discriminatory provisions of the Contract.

10. Attach a copy of valid workmen compensation insurance.

11. Valid asbestos insurance per occurrence.

12. General liability insurance when required.

B. Each payment request shall include a grand total for all work completed that billing period, the landfill waste manifests and a copy of waste transporter permit. The Department of Design and Construction will inspect the work performed, review the cost and approve or disapprove requests for payment.

C. EXPOSURE LOG: With this final payment, the asbestos abatement contractor shall submit a listing of the names and social security numbers of all employees actively engaged in the abatement work of this Contract. This list shall include a summary showing each part of the abatement work in which the employee was engaged and the dates thereof.

1.08 QUANTITY CALCULATIONS

In order to determine the square footage involved for the various pipe sizes of pipe insulation that might be encountered, the following table is to be used.

PIPE INSULATION SIZE O.D.	PIPE SIZE O.D.	SQUARE FOOTAGE PER LINEAR FOOT
2-1/2"	1/2"	0.65
2-3/4"	3/4"	0.72
3"	1"	0.79
3-1/4"	1-1/4"	0.85
3-1/2"	1-1/2"	0.92
4"	2"	1.05
4-1/2"	2-1/2"	1.18
5”	3”	1.31
6"	3-1/4"	1.57
7"	3-1/2"	1.83
8"	4"	2.09
9”	5"	2.36
10"	6"	2.62
12"	8"	3.14
14"	10"	3.67
16"	12"	4.19
18"	l4”	4.71

1.09 METHOD OF PAYMENT

Payment shall be made in accordance with Items A through R below. Payment shall be calculated based on the actual quantity of the item performed by the asbestos abatement contractor, times the unit price specified below. Credits may apply to certain times, as specified below.

A. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING PIPE INSULATION:** Actual linear footage, multiplied by the square footage factor listed for the respective pipe size in Section 1.08, multiplied by the unit price in Section 1.04.

EXAMPLE: 100 lin.ft. of 1/2" pipe and 100 lin.ft. of 6" pipe, including elbows, tees. Flanges, etc.

100 X 0.65 = 65 sq.ft. 65 x unit price = Payment

100 X 2.62 = 262 sq.ft. 262 x unit price = Payment

B. **REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER INSULATION:** (all types including Silicate Block and including the removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.

EXAMPLE: Item B. removal and replacement of 1000 S.F. of boiler insulation (incl. Silicate block)

1000 S.F. X (1.5) X the Unit Price = Payment

C. **REMOVAL, DISPOSAL AND REPLACEMENT OF TANK INSULATION:** (all types including removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.

a. **REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER UPTAKE, & BREACHING INSULATION:** (all types including stiffening angles and wire lath) Payment shall be made at 2.0 times the unit price per square foot.

b. **REMOVAL, DISPOSAL AND REPLACEMENT OF DUCT INSULATION:** Payment shall be made at 1.0 times the unit price per square foot.

c. **REMOVAL, DISPOSAL AND REPLACEMENT OF SOFT ASBESTOS CONTAINING MATERIAL:** (Including sprayed-on fire proofing and sound proofing) Payment shall be made at 1.0 times the unit price per square foot of surface area. Area of irregular surfaces must be calculated and confirmed with DDC representative.

d. **ACOUSTIC PLASTER REPAIR AND/OR ENCAPSULATION:** Payment shall be made at 0.5 times the unit price per square foot.

e. **PATCHING OR REPAIR** of items listed in A through F will be paid at 0.33 times the unit price per square foot.

f. **REMOVAL, DISPOSAL AND REPLACEMENT OF WATERPROOFING ASBESTOS CONTAINING MATERIAL: (**including friable and non-friable waterproofing material from interior and exterior walls, floors, foundations, penetrations, louvers, vents and openings other than windows, doors and skylights) Payment shall be made at 0.5 times the unit price per square foot.

g. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING ELECTRICAL WIRING INSULATION:** (including friable and non-friable wiring insulation) Payment shall be made at 0.33 times the unit price per square foot.

h. **PAINTING:** Payment shall be made at 0.05 times the unit price per square foot.

i. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING PLASTER:** from ceilings and walls, including any wire lath and disposal as asbestos containing waste. Payment shall be made at 0.80 times the unit price per square foot.

j. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING FLOOR TILES, CEILING TILES, TRANSITE PANELS:** (including any adhesive, glue, mastic and/or underlayment) and disposal as asbestos containing waste. Payment shall be made at 0.40 times the unit price per square foot. If multiple layers are discovered, each additional layer shall be paid at 0.20 times the unit price per square foot.

k. **ADDITIONAL CLEAN UP/HOUSEKEEPING OF WORK AREA:** (excluding pre-cleaning of work area required by regulations) HEPA vacuuming and wet cleaning of asbestos contaminated surface. Payment shall be made at 0.20 times the unit price per square foot. When GLOVE BAG is employed to remove ACM, cost of HEPA vacuuming and wet cleaning of floor area up to 3 feet on each side of glove-bag shall be included in unit price and no extra payment will be made.

l. **REMOVAL, DISPOSAL OF ASBESTOS-CONTAINING ROOFING MATERIAL:** including mastic, flashing and sealant compound and provide temporary asbestos-free roof covering consisting of one layer of rolled roofing paper sealed with asphaltic roofing compound. Payment shall be made at 0.8 times the unit price per square foot. Credit at a rate of 0.33 times the unit price will be taken for each square foot of temporary roof covering which the asbestos abatement contractor is directed not to install.

m. **PICK-UP AND DISPOSAL OF GROSS DEBRIS:** (excluding any waste generated from abatement under Item A-R) at a rate of $150 per cubic yard for asbestos contaminated waste and $75 per cubic yard for non-asbestos contaminated waste. This cost includes all labor and material cost associated with work.

n. **REMOVAL OF ASBESTOS-CONTAINING BRICK, BLOCK, MORTAR, CEMENT OR CONCRETE:** along with all surfacing materials including wire lath and/or other supporting structures and disposal as ACM waste. Payment shall be made at a rate of $25.00 per cubic foot of material removed.

o. **REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING WINDOW/DOOR CAULKING:** including friable and non-friable caulking, weather-stripping, glazing, sealants or other waterproofing materials applied to windows, doors, skylights, etc. Payment shall be made at the rate of $400.00 per opening regardless of size or configuration. This cost includes labor, consumable materials, set-up/breakdown, removal and disposal, as required.

Note 1: CREDIT: For items listed in A through F, a credit at a rate of 0.33 times the unit price, times the respective multiplier (for each item) will be taken for each square foot of insulation which the asbestos abatement contractor is not directed to reapply.

Note 2: MINIMUM PAYMENT: The minimum payment per call at any individual job sites or various job sites during the same day will be eight hundred dollars ($800.00).

Note 3: All payments shall be made as described in paragraph 1.09 herein**.**

Note 4: WORKING HIGHER THAN 12 FEET ABOVE FLOOR LEVEL OR WORK REQUIRING COMPLEX SCAFFOLDING OR CONSTRUCTION WORK PLATFORMS: Provisions are made in this Contract to compensate the asbestos abatement contractor for work performed in locations that are difficult to access due to

work at elevations that are significantly higher than the normal work level. The unit price for these items will be paid at 1.20 times the unit price described in Paragraphs 1.09, A through R for those portions of the work that are more than twelve (12) feet above the grade for that would be judged as the normal working level.

1.10 GUARANTEE

A. Work performed in compliance with each task shall be guaranteed for a period of one year from the date the completed work is accepted by the Department of Design and Construction.

B. The Commissioner of The Department of Design and Construction will notify the asbestos abatement contractor in writing regarding defects in work under the guarantee.

1.11 OCCUPANCY OF SITE NOT EXCLUSIVE

Attention is specifically drawn to the fact that contractors, performing the work of other Contracts, may be brought upon any of the work sites of this Contract. Therefore, the asbestos abatement contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other contractors who may be brought upon any site of the work of this Contract. This paragraph applies to those areas outside the regulated Work Area as defined by Title 15, Chapter I of RCNY.

1.12 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At this meeting, the asbestos abatement contractor shall present three copies of the following items:

   a. asbestos abatement contractor’s scope of work, work plan and schedule.

   b. Asbestos project notifications, approved variances and plans to Government Agencies.

   c. Copies of Permits, clearance and licenses if required.

   d. Schedules: the asbestos abatement contractor shall provide to the Construction Project Manager a copy of the following schedules for approval. Once approved, schedules shall be maintained and updated

as received. asbestos abatement contractor shall post a copy of all schedules at the site:

(1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.

(2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.

(3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.

e. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number to nearest hospital) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.

f. Safety Data Sheets (SDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until SDS are reviewed.

g. Worker Training and Medical Surveillance: The asbestos abatement contractor shall submit a list of the persons who will be employed by him /her to perform the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.

h. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.

(1) The asbestos abatement contractor shall provide a permanently bound log book of minimum 8-1/2” x 11” size at the entrance to the Worker and Waste Decontamination enclosure system as hereinafter specified. Log book shall contain on title page the project name, name, address and

phone number of the asbestos abatement contractor; name, address and phone number of asbestos abatement contractor and City's third party air monitoring firm; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved for entry into the Work Area.

(2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the asbestos abatement contractor shall submit the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.

i. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.

B. During Construction Submittals:

1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.

2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.

3. Floor plans indicating asbestos abatement contractor's current work progress shall be submitted for review by the Construction Project Manager.

4. All asbestos abatement contractors' air monitoring and inspection results.

C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the asbestos abatement contractor shall present two copies of the following items, bound and indexed:

1. Lien Waivers from asbestos abatement contractor, sub-asbestos abatement contractors and Suppliers,

2. Daily OSHA air monitoring results,

3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,

4. Field Sign-In/Sign-Out Logs for every shift,

5. Copies of all Building Department Forms and Permits,

6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,

7. All Warranties as stated in the Specifications,

    a. Fully executed disposal certificates and transportation manifest.

8. Project Record: The asbestos abatement contractor shall maintain a project record for all small and large asbestos projects. During the project, the project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:

    a. Copies of licenses of all asbestos abatement contractors involved in the project;

    b. Copies of NYCDEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;

    c. Copies of all project notifications and reports filed with NYCDEP, NYSDOL and USEPA for the project, with any amendments or variances;

    d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;

    e. A copy of the air sampling log and all air sampling results;

    f. A copy of the abatement asbestos abatement contractor’s daily log book;

g. Copies of all asbestos waste manifests;

h. A copy of all Project Monitor's Reports (ACP-15).

i. A copy of each ATR-1 Form completed for the asbestos project (if required).

j. A copy of each Asbestos Project Conditional Closeout Report (ACP-20) if required.

k. A copy of the Asbestos Project Completion Form (ACP-21).

1.13 PROTECTION OF FURNITURE AND EQUIPMENT

Cover all furniture and equipment that cannot be removed from Work Areas. Movable furniture and equipment will be removed from Work Areas by the asbestos abatement contractor prior to start of work. At the conclusion of the work (after final air testing), the asbestos abatement contractor will remove all plastic covering on walls, floors, furniture, equipment and reinstall furniture and equipment. He shall remove and store all sheaths, curtains and drapes, and reinstall same following final clean up.

1.14 UTILITIES

A. General:

All temporary facilities shall be subject to the approval of the Commissioner. Prior to starting work at any site, locations and/or sketches (if required) of temporary facilities must be submitted to the Construction Project Manager for the required approval.

B. Water:

The Department of Design and Construction will furnish all water needed for construction, at no cost to the asbestos abatement contractor in buildings under their jurisdiction. However, it is the responsibility of the asbestos abatement contractor to ensure that hot water is provided for showering in the decontamination unit. The asbestos abatement contractor shall furnish, install and maintain any needed equipment to meet these requirements at his own expense.

C. Electricity:

The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the asbestos abatement contractor in a building, under their jurisdiction. The asbestos abatement contractor is responsible for routing the electric power to the abatement Work Area.

All temporary lighting and temporary electrical service for Work Area shall be in weatherproof enclosures and be ground fault protected.

D. In leased spaces, arrangements for water supplies and electricity must be made with the landlord. However, all such arrangements must be made through and are subject to approval of the Department of Design and Construction. Utilities will be provided at no cost to the asbestos abatement contractor. However, it is the asbestos abatement contractor's (or the general contractor's) responsibility to furnish and install a suitable distribution system to the Work Area. This system will be provided at no cost to the City.

1.15 FEES

The asbestos abatement contractor shall be responsible for any and all fees or charges imposed by Local, State or Federal Law, Rule and Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the date of the Bid opening.

END OF SECTION

SECTION 028213
NOVEMBER 2017 VERSION

ASBESTOS ABATEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contract Documents are as defined in the "Agreement". The General Conditions shall apply to all Work of this Section.

B. Work specified herein shall be the removal and disposal of Asbestos Containing Materials (ACM) and asbestos-contaminated materials from designated areas of DSNY 17/18 Garage, 10502 Avenue D, Brooklyn, New York 11236.

C. The following documents were reviewed and utilized to generate this abatement design specification which serves to locate and quantify the amount of ACM, and asbestos contaminated material, to be abated in support of this project.

1. Set of drawings titled "DSNY 17/18 Garage replacement of Roof and HVAC Systems" Issued for Bid, dated 09/30/19, prepared by Syska Hennessy Group, Inc.

2. Asbestos survey performed by LiRo Engineers, Inc. titled, "Limited Asbestos Survey Services, Replacement of Roof and HVAC Systems DSNY District 17/18 Garage," dated 05/06/19.

3. Asbestos survey performed by LiRo Engineers, Inc. titled, "Final Report of Asbestos Survey Services, DSNY District 17/18 Garage Roof and HVAC Replacement," dated 11/27/17.

D. The phasing and scheduling of work for this project shall be coordinated with and approved by the Construction Project Manager and Facility Manager. The Construction Project Manager and Facility Manager will make the final determination on all issues under this Contract covered by this Specification.

1.02 SCOPE OF WORK

A. The asbestos abatement contractor is to provide all labor, materials, equipment, services, testing, appurtenances, permits and agreements necessary to perform the work required for the abatement of ACM as required by these contract documents. All work shall be performed in accordance with this Specification, EPA regulations, OSHA regulations, New York City Local Law 70, Title 15, Chapter 1 RCNY, New York State Industrial Code 56, NIOSH recommendations, and any other applicable

federal, state or local government regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.

B. The intent of this Specification section is to ensure that the asbestos abatement contractor is responsible for the following:

1. Abatement of all ACM.

2. Cleaning and decontamination of the entire affected area.

3. Demolition that may be required to access ACM in each area, Asbestos abatement contractor shall dispose of all debris associated with demolition activities as ACM waste.

4. Removal and disposal of all ACM found within these areas such as roof flashing/tar, drain flashing/tar, vent flashing/tar, flue/stack (pitch pockets) flashing/tar, skylight flashing/tar, access hatch flashing/tar, roof joint flashing/tar, GEF exhaust flashing/tar, UEF exhaust flashing/tar, A/C unit flashing/tar, TEF/EF exhaust flashing/tar, TPE/roof vent exhaust flashing/tar, etc.

5. Provide all scaffolding, platform installation, equipment, tools, transportation and any other equipment required and/or necessary to complete all work described in the Contract Documents.

6. The Asbestos abatement contractor shall be responsible for and shall include any and all fees or changes imposed by Local, State or Federal Law, Rule or Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the work.

7. Prior to destructive demolition activities, the DDC may elect to collect bulk samples of assumed asbestos-containing materials and analyze the bulk samples for asbestos content.

C. The Asbestos abatement contractor shall perform the following work as described below and indicated on the drawings. The drawings are only a diagrammatic representation of the Work Areas and do not constitute the actual quantities of material. Asbestos abatement contractor is responsible for the confirmation of the actual total quantities of the Work.

1. Drawing H002.00: District No. 17 Roof Plan

a. Remove and dispose of asbestos-containing roof flashing/tar (black), drain flashing/tar (black), vent flashing/tar (black), flue/stack (pitch pockets) flashing/tar (black), skylight flashing/tar (black), A/C unit flashing/tar (black), TEF/EF exhaust flashing/tar (black), TPE/roof vent exhaust flashing/tar (black) within **Work Area 1.** Asbestos-containing roof

flashing/tar (black), drain flashing/tar (black), vent flashing/tar (black), flue/stack (pitch pockets) flashing/tar (black), skylight flashing/tar (black), A/C unit flashing/tar (black), TEF/EF exhaust flashing/tar (black), TPE/roof vent exhaust flashing/tar (black) shall be removed utilizing NYCDEP 15, Chapter 1 §1-107 Foam Procedure for Roof Removal.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
1	NYCDEP Title 15, Chapter 1 §1-107 Foam Procedure for Roof Removal	1,200 Sq. Ft. of Roof Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Drain Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Vent Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Flue/Stack Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof Skylight Flashing/Tar (Black)	–
		275 Sq. Ft. of Roof A/C Unit Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof TEF/EF Exhaust Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof TPE/Roof Vent Exhaust Flashing/Tar (Black)	–

2. Drawing H003.00: District No. 18 Roof Plan

a. Remove and dispose of asbestos-containing drain flashing/tar (black), vent flashing/tar (black), flue/stack (pitch pockets) flashing/tar (black), skylight flashing/tar (black) within **Work Area 2.** Asbestos-containing drain flashing/tar (black), vent flashing/tar (black), flue/stack (pitch pockets) flashing/tar (black), skylight flashing/tar (black) shall be removed utilizing NYCDEP 15, Chapter 1 §1-107 Foam Procedure for Roof Removal.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
2	NYCDEP Title 15, Chapter 1 §1-107 Foam Procedure for Roof Removal	25 Sq. Ft. of Roof Drain Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Vent Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Flue/Stack Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof Skylight Flashing/Tar (Black)	–

3. Drawing H004.00: District No. 17 and No. 18 Garage Roof Plan

a. Remove and dispose of asbestos-containing roof flashing/tar (black), drain flashing/tar (black), vent flashing/tar (black), flue/stack (pitch pockets) flashing/tar (black), skylight flashing/tar (black), access hatch flashing/tar (black), roof joint flashing/tar (black), GEF exhaust flashing/tar (black), UEF exhaust flashing/tar (black) within **Work Area 3.** Asbestos-containing roof flashing/tar (black), drain flashing/tar (black), vent flashing/tar (black), flue/stack (pitch pockets) flashing/tar (black), skylight flashing/tar (black), access hatch flashing/tar (black), roof joint flashing/tar (black), GEF exhaust flashing/tar (black), UEF exhaust flashing/tar (black) shall be removed utilizing NYCDEP 15, Chapter 1 §1-107 Foam Procedure for Roof Removal.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
3	NYCDEP Title 15, Chapter 1 §1-107 Foam Procedure for Roof Removal	3,340 Sq. ft. of Garage Roof Flashing/Tar (Black) and Garage Roof Joint Flashing/Tar (Black)	–
		69 Sq. Ft. of Garage Roof Drain Flashing/Tar (Black)	–
		125 Sq. Ft. of Garage Roof Vent Flashing/Tar (Black)	–
		100 Sq. Ft. of Garage Roof Flue/Stack Flashing/Tar (Black)	–
		320 Sq. Ft. of Garage Roof Skylight Flashing/Tar (Black)	–
		80 Sq. Ft. of Garage Roof Access Hatch Flashing/Tar (Black)	–
		420 Sq. Ft. of Garage Roof GEF Exhaust Flashing/Tar (Black)	–
		1,500 Sq. Ft. of Garage Roof UEF Exhaust Flashing/Tar (Black)	–

D. The facility is under the jurisdiction of the New York City Department of Sanitation. The asbestos abatement contractor shall perform the work of this contract in a manner that will be least disruptive to the normal use of the building.

E. Asbestos abatement contractor's attention is directed to the fact that patents cover certain methods of asbestos abatement indicated in the specifications. To date, patents have been issued with regard to negative pressure enclosures or negative or reduced pressure and glove-bag.

F. Asbestos abatement contractor shall be solely responsible for and shall hold the City of New York Department of Design and Construction and the City harmless from, any and all damages, losses and expenses resulting from any infringement by Asbestos abatement contractor of any patent, including but not limited to the patents described above, used by Asbestos abatement contractor during performance of this agreement.

G. Prior to starting, the asbestos abatement contractor must notify the Commissioner of the City of New York Department of Design and Construction if he anticipates

any difficulty in performing the work as directed and required by these Specifications. Asbestos abatement contractor shall be required to attend an on-site job meeting with the Construction Project Manager prior to start of work to examine conditions of the site for removal and plan the sequence for removal operations.

H. The asbestos abatement contractor shall retain a certified Project Designer for the preparation of an Asbestos Variance Application (ACP-9), if required.

I. The asbestos abatement contractor shall be responsible for preparing and submitting all filings, notifications, amendments and variances, etc. required by all City, State and Federal regulatory agencies having jurisdiction, at no additional cost to the NYC DDC.

J. The general contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to prepare a Work Place Safety Plan (WPSP), if required.

K. The general contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to perform final inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required under Chapter 17 of the Building Code. Such special inspections and A-TR1 forms shall be completed by the Registered Design professional.

L. For coordination with other Asbestos abatement contractors, see the General Conditions governing all Contracts.

M. Related Asbestos Removal Work Under Other Contracts:

1. Each asbestos abatement contractor shall be responsible for the removal of incidental asbestos not identified in this section and found prior to or during the Work.

2. Incidental asbestos is defined as ACM that is discovered during the course of their work that must be abated to enable them to perform the work of their Contract.

N. Work Hours:

1. The asbestos abatement contractor shall establish his work schedule in a way that avoids interference or conflict with the normal functioning of the facility. Work in the evenings shall be done at no additional cost to the City.

2. All work shall be done during regular working hours unless the Asbestos abatement contractor requests authorization to work other than regular working hours and such authorization is granted by the Commissioner (Regular working hours are those during which any given facility in which work is to be done is customarily open and functioning). If such work schedule is authorized by the Commissioner the work shall be done at no additional cost to the City.

3. The order of phases and start dates associated with each will be determined by the Construction Project Manager.

4. Asbestos abatement contractor shall be required to schedule waste transfer during evening hours, when activity within the facility is at a minimum. Evening hours are defined as 6:00 p.m. to 6:00 a.m. Waste transfer must be approved by the Construction Project Manager and Facility Manager.

O. The following conditions shall apply to all temporary shutdowns of existing services:

1. All temporary lighting and temporary electrical services for use in the Work Area shall be in weather proof enclosures and be ground fault protected and:

2. Shall be performed at no additional charge to the City.

3. Shall be performed at times not interfering with the other activities in the building.

4. Shall be performed only with written consent from the Commissioner and the Facility Manager.

5. Shall be made through written request to the Commissioner at least 10 days in advance with complete written description of the work to be performed.

P. Stages of Asbestos Removal Work:

1. The asbestos abatement contractor will be required to perform the work and it is the intent of this Specification to remove all asbestos containing and asbestos contaminated materials from the Work Area. The asbestos abatement contractor is responsible for verifying all quantities of materials listed.

Q. Certain equipment in the Work Area may need to remain operational during removal. Therefore, the removal of ACM from this equipment shall be performed as the last removal activities within the Work Area. The Asbestos abatement contractor shall coordinate the scheduling for the removal of ACM on functioning equipment with the Construction Project Manager.

1.03 QUALIFICATIONS OF ASBESTOS ABATEMENT CONTRACTOR

A. Requirements: The asbestos abatement contractor must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (5) below. The asbestos abatement contractor must submit documentation demonstrating compliance with all listed requirements. Such documentation shall include without limitation, all required licenses, certificates, and documentation.

1. The asbestos abatement contractor must, whether an individual, corporation, partnership, joint venture or other legal entity, demonstrate for the three year period prior to the work, that it has been licensed by the New York State Department of Labor, as an "Asbestos Abatement Contractor".

2. The asbestos abatement contractor must, for the three year period prior to the work, have been in the business of providing asbestos abatement services as a routine part of its daily operations.

3. The asbestos abatement contractor proposing to do asbestos abatement work must be thoroughly experienced in such work and must provide evidence of having successfully performed and completed in a timely fashion at least five (5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least $1,000,000 in each of the three years.

4. For each project submitted to meet the experience requirements set forth above, the asbestos abatement contractor must submit the following information for the project; name and location of the project; name title and telephone number of the owner or the owner's representative who is familiar with the asbestos abatement contractor's work; brief description of the work completed as a prime or sub-asbestos abatement contractor; amount of contract or subcontract and the date of completion.

5. The asbestos abatement contractor must demonstrate that it has the financial resources, supervisory personnel and equipment necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The asbestos abatement contractor must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract.

B. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof. Provide materials or workmanship that meet or exceed the specifically named codes or standards where required by these specifications.

C. Site Investigation: Asbestos abatement contractor shall inspect all the specifications and related drawings, and will investigate and confirm the site conditions affecting the work, including, but not limited to:

1. Physical considerations and conditions of both the material and structure. These considerations include any obstacles or obstructions encountered in accessing or removing the material.

2. Handling, storage, transportation and disposal of the material.

3. Availability of qualified and skilled labor.

4. Availability of utilities.

5. Exact quantities of all materials to be disturbed and/or removed.

1.04 WORK BY OTHERS

The City reserves the right during the term of this Contract to have work performed on asbestos abatement projects by other asbestos abatement contractors as the situation warrants.

1.05 DEFINITIONS

A. General Explanation: Certain terms used in this Specification Section are defined below. Definitions and explanations of this Specification Section are not necessarily complete or exclusive, but are general for the Work to the extent they are not stated more explicitly in another element of the Contract Documents.

B. Definitions in General Use:

1. Approve: Where used in conjunction with Engineer's response to submittals, requests, applications, inquiries, reports and claims by Asbestos abatement contractor, the meaning of term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in Contract Documents. In no case will "approval" by Engineer be interpreted as a release of Asbestos abatement contractor from responsibilities to fulfill requirements of Contract Documents.

2. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Engineer," "requested by Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Asbestos abatement contractor's responsibility for construction supervision.

3. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

4. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

5. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

6. Installer: The term "installer" is defined as the entity (person or firm) engaged by the asbestos abatement contractor, or its sub-asbestos abatement contractor for performance of a particular unit of work at Project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.

7. Provide: Except as otherwise defined in greater detail, term “provide” means furnish and install, complete and ready for intended use, as applicable in each instance.

8. Third-Party Air Monitor: The term “Third-Party Air Monitor ” is defined as an entity engaged by City and Construction Project Manager to perform specific inspections or tests of the work, either at Project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

C. Definitions Relative to Asbestos Abatement:

1. Abatement: Any and all procedures physically taken to control fiber release from asbestos-containing materials. This includes removal, encapsulation, enclosure, cleanup and repair.

2. Adequately Wet: The complete penetration of a material with amended water to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not evidence of being adequately wet. ACM must be fully penetrated with the wetting agent in order to be considered adequately wet. If the ACM being abated is

resistant to amended water penetration, wetting agent shall be applied to the material prior to and during removal as necessary to minimize fiber release.

3. Aggressive Sampling: Method of sampling in which the individual collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

4. AHERA: Asbestos Hazard Emergency Response Act of 1986

5. AIHA: American Industrial Hygiene Association.

6. Airlock: System for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

7. Air Sampling: Process of measuring the fiber content of a known volume of air collected during a specific period. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400, or the provisional transmission electron microscopy methods developed by the US EPA which is utilized for lower detection levels and specific fiber identification.

8. Ambient Air Monitoring: "Ambient air monitoring" shall mean measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the worksite.

9. Amended Water: Water to which a surfactant has been added.

10. ANSI: American National Standards Institute

11. Area Air Sampling: Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

12. Asbestos: Any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crastmocidolite (riebeckite), tremolite, anthophyllite and actinolite.

13. Asbestos-Containing Material (ACM): Asbestos or any material containing more than one-percent asbestos.

14. Asbestos-Containing Waste Material: ACM, asbestos-contaminated objects or debris associated with asbestos abatement requiring disposal.

15. Asbestos-Contaminated Objects: Any objects which have been contaminated by asbestos or asbestos-containing material.

16. Asbestos Assessment Report: "Asbestos Assessment Report" shall mean the "Form ACP-5" form, as approved by NYCDEP, by which a NYCDEP-certified asbestos investigator certifies that a building or structure (or portion thereof) is free of ACM or the amount of ACM to be abated constitutes a minor project.

17. Asbestos Handler: Individual who disturbs, removes, repairs, or encloses asbestos material. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

18. Asbestos Handler Supervisor: Individual who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures as well as individual safety procedures are being adhered to. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

19. Asbestos Investigator: An individual certified by NYCDEP as having successfully demonstrated his or her ability to identify the presence of and evaluate the condition of asbestos in a building or structure.

20. Asbestos Project: Any form of work performed in a building or structure which will disturb (e.g., remove, enclose, encapsulate) asbestos-containing material.

21. ASTM: American Society for Testing and Materials.

22. Asbestos Project Notification: The "Form ACP-7" asbestos project notification form as approved by DEP.

23. Authorized Visitor: Authorized visitor shall mean the building owner and his/her representative, and any representative of a regulatory or other agency having jurisdiction over the project.

24. Building Owner: Person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

25. Building Materials: Any and all manmade materials, including but not limited to interior and exterior finishes, equipment, bricks, mortar, concrete,

plaster, roofing, flooring, caulking, sealants, tiles, insulation, and outdoor paving such as sidewalks, paving tiles and asphalt.

26. Certified Industrial Hygienist (CIH): Individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that board.

27. Certified Safety Professional (CSP): Individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that board.

28. Chain of Custody: “Chain of Custody” shall mean the form or set of forms that document the collection and transfer of a sample.

29. City: City of New York

30. Clean Room: An uncontaminated area or room that is part of worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.

31. Clearance Air Monitoring: Employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers and shall be performed as the final abatement activity.

32. Commissioner: shall mean the head of the Agency that has entered into this contract or his/her duly authorized representative.

33. Competent Person: Shall mean the designated person as defined by OSHA in 29 CFR1926.1101.

34. Curtained Doorway: Device that consists of at least three overlapping sheets of fire retardant plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.

35. Decontamination Enclosure System: Series of connected rooms, separated from the Work Area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.

36. Demolition: The dismantling or razing of a building, including all operations incidental thereto (except for asbestos abatement activities), for which a

demolition permit from the New York City Department of Buildings is required.

37. NYCDEP or DEP: The New York City Department of Environmental Protection.

38. Disturb: Any action taken which may alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.

39. DOB: The New York City Department of Buildings.

40. Egress: A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.

41. ELAP: Environmental Laboratory Approval Program administered by the New York State Department of Health.

42. Encapsulant (sealant) or Encapsulating Agent: Liquid material which can be applied to ACM and which temporarily controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

43. Encapsulation: The coating or spraying of asbestos-containing material encapsulant. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

44. Enclosure: Construction of airtight walls and/or ceilings between ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by the NYCDEP which prevents the release of asbestos fibers.

45. EPA or USEPA: United States Environmental Protection Agency.

46. Equipment Room: Contaminated area or room that is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

47. Exit: That portion of a means of egress system which is separated from other interior spaces of a building or structure by fire-resistance-rated construction to provide a protected path of egress travel between the exit access and the exit discharge.

48. FDNY: The Fire Department of the City of New York.

49. Fiber: An acicular single crystal or a similarity elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.

50. Fixed Object: A unit of equipment, furniture, or other item in the work area which cannot be removed from the work area. Fixed objects shall include equipment, furniture, or other items that are attached, in whole or in part, to a floor, ceiling, wall, or other building structure or system or to another fixed object and cannot be reasonably removed from the work area. Fixed objects shall also include pipes and other equipment inside the work area which are not the subject of the asbestos project. Active fire suppression system components shall not be considered fixed objects.

51. Glovebag technique: shall mean a method for removing asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.

52. HEPA-Filter: High efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers mass median aerodynamic equivalent diameter.

53. HEPA vacuum equipment: “HEPA vacuum equipment” shall mean vacuuming equipment with a HEPA filter.

54. Holding Area: Chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

55. Homogeneous Work Area: Portion of the Work Area that contains one type of ACM and/or where one type of abatement is used.

56. Industrial Hygiene: Science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among worker or among the citizens of the community.

57. Industrial Hygienist: Individual having a college or university degree or degrees in Engineering, Chemistry, Physics or Medicine, or related Biological Sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:

    a. To recognize the environmental factors and to understand their effect on people and their well being; and

    b. To evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in terms of ability to impair people's health and well being; and

    c. To prescribe methods to eliminate, control, or reduce such stresses when necessary to alleviate their efforts.

58. Isolation Barrier: The construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.

59. Large Asbestos Project: Asbestos project involving the disturbances (e.g., removal, enclosure, encapsulation) of 260 linear feet or more of ACM or 160 square feet or more of ACM.

60. Log: An official record of all activities that occurred during the project. At a minimum, the log shall identify the building owner, agent, asbestos abatement contractor, and workers, and other pertinent information including daily activities, cleanings and waste transfers, names and certificate numbers of asbestos handler supervisors and asbestos handlers; results of inspections of decontamination systems, barriers, and negative pressure ventilation equipment; summary of corrective actions and repairs; work stoppages with reason for stoppage; manometer readings at least twice per work shift; daily checks of emergency and fire exits and any unusual events.

61. Minor Project: A project involving the disturbance (e.g., removal, enclosure, encapsulation, repair) of 25 linear feet or less of asbestos containing material or 10 square feet or less of asbestos containing material.

62. Movable Object: Unit of equipment or furniture in the Work Area that can be removed from the Work Area.

63. Negative Air Pressure Equipment: Portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the Work Area.

64. NESHAPS: National Emission Standards for Hazardous Air Pollutants.

65. NFPA: The National Fire Protection Association.

66. NIOSH: National Institute for Occupational Safety and Health.

67. DEP or NYCDEP: New York City Department of Environmental Protection

68. NYSDOL: New York State Department of Labor.

69. NYSDOL ICR 56: "NYSDOL ICR 56" shall mean Part 56 of the Official Compilation of Codes, Rules and Regulations of the State of New York or 12 NYCRR Part 56.

70. NYSDOH: The New York State Department of Health.

71. Obstruction: The blocking of a means of egress with any temporary structure or barrier. A double layer of fire-retardant 6-mil polyethylene sheeting shall not be considered an obstruction when it is prominently marked as an exit with photo luminescent signage or paint and cutting tools (knife, razor) are attached to the work area side of the sheeting for use in the event that the sheeting must be cut to permit egress. A corridor shall not be considered obstructed when there is a clear path measuring at least three (3) feet wide.

72. Occupied Area: Area of the work site where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.

73. OSHA: Occupational Safety and Health Administration.

74. Outside air: "Outside air" shall mean the air outside the work place.

75. Person: Individual, partnership, company, corporation, association, firm, organization, governmental agency, administration, or department, or any other group of individuals, or any officer or employee thereof.

76. Personal Air Monitoring: Method used to determine employees' exposure to airborne asbestos fibers. The sample is collected outside the respirator in the worker's breathing zone.

77. Personal Protective Equipment (PPE): Appropriate protective clothing, gloves, eye protection, footwear, and head gear.

78. Phase Contrast Microscopy (PCM): The measurement protocol for the assessment of the fiber content of air. (NIOSH Method 7400).

79. Physician: Person licensed or otherwise authorized under Article 131 Section 65.22 of the New York State Education Law.

80. Plasticize: To cover floors and walls with fire retardant plastic sheeting as herein specified or by using spray plastics as acceptable to the Department.

81. Polarized Light Microscopy (PLM): The measurement protocol for the assessment of the asbestos content of bulk materials. (Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples- 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982)

82. Project Designer: A person who holds a valid Project Designer Certificate issued by the New York State Department of Labor.

83. Project Monitor: A person who holds a valid Project Monitor Certificate issued by the New York State Department of Labor.

84. Qualitative Fit Test: Individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator face-piece. Acceptable methods include irritant smoke test, odorous vapor test, and taste test.

85. Quantitative Fit Test: Exposing the respiratory wearer to a test atmosphere containing an easily detectable, nontoxic aerosol, vapor or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the face-piece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the test.

86. Registered Design Professional: A person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York.

87. Removal: Stripping of any asbestos- containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.

88. Renovation: An addition or alteration or change or modification of a building or the service equipment thereof, that is not classified as an ordinary repair as defined in §27-125 of the Administrative Code of the City of New York.

89. Repair: Corrective action using specified work practices (e.g., glovebag, plastic tent procedures, etc.) to minimize the likelihood of fiber release from minimally damaged areas of ACM.

90. Replacement material: Any material used to replace ACM that contains less than .01 percent asbestos.

91. Shift: A worker's, or simultaneous group of workers', complete daily term of work.

92. Shower Room: Room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.

93. Small Asbestos Project: Asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of ACM or more than ten and less than 160 square feet of ACM.

94. Staging Area: Work Area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the Work Area.

95. Strip: To remove asbestos materials from any part of the facility.

96. Structural Member: Load-supporting member of a facility, such as beams and load-supporting walls, or any non-load-supporting member, such as ceiling and non-load-supporting walls.

97. Surface barriers: The plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.

98. Surfactant: Chemical wetting agent added to water to improve penetration.

99. Transmission Electron Microscopy (TEM): The measurement protocol for the assessment of the asbestos fiber content of air. Interim Transmission Electron Microscopy Analytical Methods-40 CFR Part 763, Subpart E, Appendix A.

100. Visible Emissions: Emissions containing particulate material that are visually detectable without the aid of instruments.

101. Washroom: Room between the Work Area and the holding area in the equipment decontamination enclosure system where equipment and waste containers are wet cleaned and/or HEPA-vacuumed prior to disposal.

102. Waste decontamination enclosure system: "Waste decontamination enclosure system" shall mean the decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of a washroom and a holding area.

103. Wet Cleaning: "Wet cleaning" shall mean the removal of asbestos fibers from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

104. Wet methods: "Wet methods" shall mean the use of amended water or removal encapsulants to minimize the generation of fibers during ACM disturbance.

105. Work Area: Designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take(s) place.

106. Worker Decontamination Enclosure System: Portion of a decontamination enclosure system designed for controlled passage of workers and authorized visitors, consisting of a clean room, a shower room, and an equipment room separated from each other and from the Work Area by airlocks and curtained doorways.

107. Work Place: The work area and the decontamination enclosure system(s).

108. Work Place Safety Plan: Construction documents prepared by a registered design professional and submitted for review by DEP in order to obtain an asbestos abatement permit. Such plan shall include, but not be limited to, plans, sections, and details of the work area clearly showing the extent, sequence, and means and methods by which the work is to be performed.

109. Work Site: Premises where abatement activity is being performed. May be composed of one or more Work Areas.

1.06 STANDARD OPERATING PROCEDURES

A. Develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure of the workers, visitors, employees, public, and environment.

B. TELEPHONE DEVICE

The asbestos abatement contractor or his authorized representative shall, at all times during the normal workday or during periods of overtime work under this Contract, carry a mobile telephone. He/she shall supply the Department of Design and Construction with the phone number for the device and he/she is liable to respond back to the calls from DDC within the next one (1) hour period after he/she receives calls from DDC. The cost to the asbestos abatement contractor for this device and all charges accruing thereto is deemed included in the work.

C. The standard operating procedure shall ensure:

1. Tight security from unauthorized entry into the workspace.

2. Restriction of asbestos abatement contractor's personnel to the immediate Work Area and access/egress routes.

3. Donning of proper protective clothing and respiratory protection prior to entering the Work Area.

4. Safe work practices in the work place, including provisions for inter-room communications, exclusion of eating, drinking, smoking, or in any way breaking the respiratory protection.

5. Proper exit practices from the work space to the outside through the showering and decontamination facilities.

6. Removing asbestos in a way that minimizes release of fibers.

7. Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes exposure and contamination.

8. Emergency evacuation procedures, for medical or safety situations, to minimize the potential exposure to airborne asbestos fibers for emergency personnel, building occupants, and building environment.

9. Safety from accidents in the workspace, especially from electrical shocks, fall hazards associated with scaffolding, slippery surfaces, and entanglements in loose hoses and equipment.

10. Provisions for effective supervision, air monitoring and personnel monitoring for exposure during the work.

11. Engineering controls that minimize exposure to fibers within the workspace.

12. The asbestos abatement contractor shall provide a 24-hour fire watch throughout the entire term of the project, to protect against fire and unauthorized entry into the workspace. Fire watch shall be performed by an individual who is a certified asbestos worker capable of entering the Work Area for regular inspections.

D. Provide an Asbestos Handler Supervisor to provide continuous supervision of all work, and to be responsible for the following:

1. Ensure that individuals are using proper personal protective equipment, are trained in its use and hold valid NYCDEP and NYSDOL Asbestos Handler certificates

2. Maintain entry log records and ensure that they are recorded in accordance with the provisions of Title 15, Chapter 1 of RCNY and NYSDOL ICR 56.

3. Surveillance of the Work Areas at a minimum of once per work shift or as required by Title 15, Chapter 1 of RCNY and NYSDOL ICR 56 -7.3, to ensure the integrity of work place isolation, negative pressure equipment and workers personal protective equipment is not torn or ripped and that respiratory protection is worn at all times.

4. Ensure that sufficient personal protective equipment is stored in the clean room.

5. Take precautions to prevent heat stress. Precautions include, but are not limited to, selecting lightweight protective clothing, reducing the work rate, and providing adequate fluid breaks.

6. Perform work area inspection with project monitor prior to the commencement of final clearance air monitoring.

7. The asbestos abatement contractor shall retain the asbestos handler supervisor to perform a visual inspection prior to the post-abatement clearance air monitoring to confirm that all containerized waste has been removed from work and holding areas and there is no visible ACM debris or residue on or about all abated surfaces.

E. ENGINEERING CONTROLS

1. The 8-hour time weighted average airborne concentration of fibers to which any passerby may be exposed shall not exceed 0.01 fibers per cubic centimeter of air when fibers have a physical dimension longer than 5 micrometers as determined by the method prescribed in these Specifications.

2. All asbestos projects shall utilize negative pressure ventilation equipment.

a. The asbestos abatement contractor shall use a manometer to document the pressure differential. The asbestos abatement contractor shall install and make the manometer operational once the negative pressure has been established in the work area. Magnahelic manometers shall be calibrated at least every six months and a copy of the current calibration certification shall be available at the work site.

3. Negative pressure ventilation equipment shall be installed and operated to provide at least one air change in the work area every 15 minutes. Where there are no floor or wall barriers because floor or wall material is being abated, there shall be at least one air change in the work area every ten minutes.

4. The negative pressure ventilation equipment shall operate continuously, 24 hours a day, from the establishment of isolation barriers through successful clearance air monitoring. If such equipment shuts off, adjacent areas shall be monitored for asbestos fibers.

5. A static negative air pressure of 0.02 inches (minimum) water column shall be maintained at all times in the work place during abatement to ensure that contaminated air in the Work Area does not filter back to uncontaminated areas.

6. If the contaminated area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors, the cut off switch shall be able to turn off the equipment on all floors.

7. On loss of negative pressure or electric power to the negative pressure ventilating units, abatement shall stop immediately and shall not resume until power is restored and negative pressure ventilation equipment is operating again.

8. Negative pressure ventilation equipment shall be exhausted to the outside of the building away from occupied areas.

a. All openings (including but not limited to operable windows, doors, vents, air intakes or exhausts of any mechanical devices) less than 15 feet from the exterior exhaust duct termination location shall be

plasticized with two layers of fire retardant 6-mil polyethylene sheeting, or a second negative pressure ventilation unit with the primary unit's capacity shall be connected in series prior to exhausting to the outside.

b. Negative pressure ventilation equipment shall exhaust away from areas accessible to the public.

c. All ducting shall be sealed and braced or supported to maintain airtight joints. Ducts shall be reinforced and shall be installed so as to prevent breakage. Damage to ducts must be repaired immediately.

9. Where ducting to the outside is not possible, a second negative pressure ventilation unit compatible with the primary unit's capacity shall be connected in series. The area receiving the exhaust shall have sufficient, non-recycling exhaust capacity to the outside of the structure.

10. In the event that there is a failure of the containment system or a breach in the Isolation Barriers, all abatement work will cease and the asbestos abatement contractor will immediately correct the condition. Abatement work will not resume until the Work Area has been smoke tested by the third party laboratory and approved by the Construction Project Manager.

F. LOCKDOWN ENCAPSULATION PROCEDURES

1. The following procedures shall be followed to seal in non-visible residue while conducting lockdown encapsulation on all surfaces from which ACM has not been removed:

a. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA Contract shall be used for lockdown encapsulation.

b. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon unless reviewed and approved by DEP.

c. Latex paint with solids content greater than 15 percent shall be considered a lockdown sealant for coating all non-metallic surfaces.

d. Encapsulants shall be applied using airless spray equipment. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

e. The cleaned layer of the surface barriers shall be removed from walls and floors.

The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

1.07 NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS, AND POSTERS

A. The asbestos abatement contractor shall submit an Asbestos Project Notification (ACP-7) to the NYCDEP listing each work area within the building separately one week in advance of the start of work.

B. The registered design professional shall obtain an asbestos abatement permit authorizing the performance of construction work as required for asbestos projects involving one or more of the following activities:

1. Obstruction of an exit door leading to an exit stair or the exterior of the building;

2. Obstruction of an exterior fire escape or access to that fire escape;

3. Obstruction of a fire-rated corridor leading to an exit door;

4. Removal of handrails in an exit stair or ramp;

5. Removal or dismantling of any fire alarm system component including any fire alarm-initiating device (e.g., smoke detectors, manual pull station);

6. Removal or dismantling of any exit sign or any component of the exit lighting system, including photo luminescent exit path markings;

7. Removal or dismantling of any part of a sprinkler system including piping or sprinkler heads;

8. Removal or dismantling of any part of a standpipe system including fire pumps or valves;

9. Removal of any non-load bearing / non-fire-rated wall (greater than 45 square feet or 50 percent of a given wall);

10. Any plumbing work other than the repair or replacement of plumbing fixtures;

11. Removal of any fire-resistance rated portions of a wall, ceiling, floor, door, corridor, partition, or structural element enclosure including spray-on fire resistance rated materials;

12. Removal of any fire damper, smoke damper, fire stopping material, fire blocking, or draft stopping within fire-resistance rated assemblies or within concealed spaces;

13. Any work that otherwise requires a permit from the DOB (full demolitions, alterations, renovations, modifications or plumbing work).

C. The asbestos abatement contractor shall provide a floor plan showing the areas of the building under abatement and the location of all fire exits in said areas. It shall be prominently posted in the building lobby or comparable location, along with a notice stating the location within the building of the negative air cutoff switch, if applicable.

D. The general contractor shall submit, as required, an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (1-8) and (B) (13) of this specification. The asbestos abatement contractor is responsible for submitting, with an asbestos project notification, a work place safety plan (WPSP) and any other applicable construction documents. These documents must be prepared by a registered design professional.

E. A WPSP is not required for projects requiring an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (9-12) of this specification. The asbestos abatement contractor shall submit, together with the asbestos project notification, all applicable asbestos abatement permit construction documents.

F. The general contractor shall retain a Registered Design Professional to perform the inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required by Chapter 17 of the Building Code, as follows:

1. A final inspection shall be performed by a registered design professional retained by the asbestos abatement contractor after all work authorized by the asbestos abatement permit is completed. The person performing the inspection shall note all failures to comply with the provisions of the Building Code or approved asbestos abatement permit and shall promptly notify the owner in writing. All defects noted in such inspection shall be corrected. The final inspection report shall either:

   a. Confirm:

(1) That the construction work is complete, including the reinstallation or reactivation of any building fire safety or life safety component.

(2) That any defects previously noted have been corrected.

(3) That all required inspections were performed.

(4) That the work is in substantial compliance with the approved asbestos abatement permit construction documents, the Building Code, and other applicable laws and rules.

b. Confirm:

(1) That the construction work does not return the building (or portion thereof) affected by the abatement project to a condition compliant with the building code and other applicable laws and rules, but that the registered design professional has reviewed an application for asbestos abatement permit construction documents approval that has been approved by the department of buildings, and the subsequent scope of work as approved will, upon completion, render all areas affected by the asbestos project in full compliance with the building code and all applicable laws and rules.

(2) That any defects previously noted that are not addressed by the subsequent scope of work as approved by the department of buildings, have been corrected.

(3) That all required inspections that are not addressed by the subsequent scope of work as approved by the department of buildings were performed.

(4) That all completed work pursuant to an asbestos abatement permit is in substantial compliance with the approved asbestos abatement permit construction documents.

G. The general contractor shall provide the final inspection reports to be filed with DEP on A-TR1 form. Records of final inspections made by registered design professionals shall be submitted to DDC as part of the close out document package.

H. Erect bilingual (English-Spanish) warning signs around the work space and at every point of potential entry from the outside and at main entrance to building which can be viewed by the public without obstruction, in accordance with OSHA 29 CFR 1926.1101 (K) (Sign Specifications) and Title 15, Chapter 1 of RCNY. The warning

signs shall be a bright color so that they will be easily noticeable. The size of the sign and the size of the lettering shall be no less than OSHA requirements.

I. Provide the required labels for all polyethylene bags and all drums utilized to transport contaminated material to the landfill in accordance with OSHA 29 CFR 1926.1101 (K)(2) and by 49 CFR Parts 171 and 172 of the Department of Transportation regulations.

J. Provide any other signs, labels, warnings, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. Post in a prominent and convenient place for the workers a copy of the latest applicable regulations from OSHA, EPA, NIOSH, State of New York and New York City and any additional items mandated for posting by the aforementioned regulations.

K. Furnish all permits, variances and notices required to perform the Work.

1.08 EMERGENCY PRECAUTIONS

A. Establish emergency and fire exits from the Work Area. The clean side of all emergency exits shall be equipped with two full sets of protective clothing and respirators at all times.

B. Notify local medical emergency personnel, both ambulance crews and hospital emergency room staff prior to commencement of abatement operations as to the possibility of having to handle contaminated or injured workmen, and shall be advised on safe decontamination.

C. Prepare to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated immediately for decontamination. When an injury occurs, precautions shall be taken to reduce airborne fiber concentrations (i.e., misting of the air with water) until the injured person has been removed from the Work Area.

D. Notify, before actual removal of the asbestos material, the local police and fire departments to the danger of entering the Work Area. Asbestos abatement contractor shall make every effort to help these agencies form plans of action should their personnel need to enter the contaminated area.

1.09 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At

this meeting, the asbestos abatement contractor shall present three copies of the following items, bound and indexed. The detailed plan of action must be submitted at least five (5) days prior to the pre-construction meeting.

a. Asbestos abatement contractor's scope of work, work plan and schedule.

b. Asbestos project notifications, approved variances and plans to Government Agencies.

c. Copies of Permits, clearance and licenses if required.

d. Schedules: the asbestos abatement contractor shall provide to the Construction Project Manager a copy of the following schedules for approval. Once approved, schedules shall be maintained and updated as received. Asbestos abatement contractor shall post a copy of all schedules at the site:

(1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.

(2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.

(3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.

(4) A schedule of equipment to be used including numbers and types of all major equipment such as HEPA Air Filtration Units, HEPA-vacuums, airless sprayers, Water Atomizing Devices and Type "C" compressors.

e. A written plan and shop drawings for preparation of work site and decontamination chamber.

f. Description of protective clothing and approved respirator to be used, make, model, NIOSH approval numbers.

g. Delineation of responsibility of work site supervision, including competent person, with names, resumes, and home telephone numbers.

h. Explanation of decontamination sequence and isolation techniques.

i. Description of specific equipment to be utilized, including make and model number of air filtration devices, vacuums, sprayers, etc.

j. Description of any prepared methods, procedures, techniques, or equipment other than those specified in the Contract Documents.

k. Explanation of the handling of asbestos contaminated wastes including EPA and NYCDEP identification numbers of Waste Hauler.

l. Description of the final clean-up procedures to be used.

m. Name and qualifications of asbestos abatement contractor's Air Monitor including AIHA accreditation, and proof of NIOSH PAT and NIST/NVLAP Bulk Quality Assurance Proficiency of OSHA samples for approval by the City of New York Department of Design and Construction.

n. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.

o. Safety Data Sheets (SDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until SDS are reviewed.

p. Worker Training and Medical Surveillance: Asbestos abatement contractor shall submit a list of the persons who will be employed by him in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.

q. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.

(1) The asbestos abatement contractor shall provide a permanently bound log book of minimum 8-1/2” x 11” size at the entrance to the Worker and Waste Decontamination enclosure system as

hereinafter specified. Log book shall contain on title page the project name, name, address and phone number of Environmental Control Representative; name, address and phone number of asbestos abatement contractor; name, address and phone number of asbestos abatement contractor and City's air testing entity; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved by the laboratory for entry into the Work Area.

(2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the Asbestos abatement contractor shall submit a copy of the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.

r. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.

B. Submit copies of the following items to the Construction Project Manager during the work:

1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.

2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.

3. Floor plans indicating asbestos abatement contractor's current work progress shall be submitted for review by the Construction Project Manager at weekly progress meetings.

4. All asbestos abatement contractors' air monitoring and inspection results.

C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the asbestos abatement contractor shall present two copies of the following items, bound and indexed:

1. Lien Waivers from asbestos abatement contractor, Sub-asbestos abatement contractors and Suppliers,

2. Daily OSHA air monitoring results,

3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,

4. Field Sign-In/Sign-Out Logs for every shift,

5. Copies of all Building Department Forms and Permits,

6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,

7. All Warranties as stated in the Specifications,

    a. Fully executed disposal certificates and transportation manifest.

8. Project Record: The asbestos abatement contractor shall maintain a project record for all small and large asbestos projects. During the project, the project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:

    a. Copies of licenses of all asbestos abatement contractors involved in the project;

    b. Copies of DEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;

    c. Copies of all project notifications and reports filed with DEP and NYSDOL for the project, with any amendments or variances;

    d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;

    e. A copy of the air sampling log and all air sampling results;

f. A copy of the abatement asbestos abatement contractor's daily log book;

g. All data related to bulk sampling including the results of any asbestos surveys performed by an asbestos investigator;

h. Copies of all asbestos waste manifests;

i. A copy of all Project Monitor's Reports (ACP-15).

j. A copy of each ATR-1 Form completed for the asbestos project (if required).

k. A copy of each Asbestos Project Conditional Closeout Report (ACP-20).

l. A copy of the Asbestos Project Completion Form (ACP-21).

9. The asbestos abatement contractor shall submit one of the following certifications to the DOB, with a copy provided to DDC:

a. Asbestos Project Completion Form. If an asbestos project has been performed, a copy of the asbestos project completion form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

b. An Asbestos Project Conditional Close-out Form. If an asbestos project has been performed a copy of the asbestos project conditional close-out form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

1.10 QUALITY ASSURANCE

A. All work required for the completion of this project or called for in this Specification must be executed in a workmanlike manner by using the appropriate methods established by regulatory requirements and/or industrial standards. All workmanship or work methods are subject to review and acceptance by the Construction Project Manager. Throughout the Specification, reference is made to codes and standards which establish qualities, levels or types of workmanship which will be considered acceptable. It is the asbestos abatement contractor's

responsibility to comply with these codes and standards during the execution of this work.

B. All materials and equipment required or consumed during the work of this Contract must meet the minimum acceptable criteria established by codes and standards referenced elsewhere in this Specification. Materials and equipment must be submitted for prior approval as part of the asbestos abatement contractor's "Shop Drawings".

C. It is the asbestos abatement contractor's responsibility, when so required by the Specification or upon written request from the Commissioner or his representative to furnish all required proof that workmanship, materials and/or equipment meet or exceed the codes and standards referenced. Such proof shall be in the form requested, typically a certified report or test conducted by a testing entity approved for that purpose by DDC.

D. The asbestos abatement contractor shall furnish proof that employees working under his supervision have had instruction on the dangers of asbestos exposure, on respirator use, decontamination, and OSHA regulations. This proof shall be in the form of a notarized affidavit to the effect that the above requirements have been satisfied.

E. The asbestos abatement contractor will have at all times in his possession and in view at the job site the OSHA regulations 29 CFR 1910.1001, and 1926.1101 Asbestos, and Environmental Protection Agency 40 CFR, Part 61, subpart B: National Emission Standard for asbestos, asbestos stripping, work practices and disposal of asbestos waste. He shall also have one copy of NYC Title 15, Chapter 1 of RCNY and NYS DOL ICR 56 at the job site at all times.

F. Familiarity with Pertinent Codes and Standards: In procuring all items used in this work, it is the asbestos abatement contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements, and are suitable for their intended use.

G. Rejection of Non Complying Items: The Commissioner reserves the right to reject items incorporated into the work that fail to meet the specified minimum requirements. The Commissioner further reserves the right, and without prejudice to other recourse that maybe taken, to accept non-complying items subject to an adjustment in the Contract amount as approved by the City.

H. Applicable Regulations, Codes and Standards: Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. American National Standards Institute (ANSI)
   (Successor to USASI and ASA)
   25 West 43rd Street (between 5th and 6th Avenue) 4th Floor
   New York, NY 10036
   212-642-4900

2. American Society for Testing and Materials (ASTM)
   100 Bar Harbor Drive
   West Conshohocken, PA 19428-2959
   610-832-9500

3. National Institute for Occupational Safety and Health (NIOSH)
   Robert A. Taft Laboratory
   4676 Columbia Pkwy
   Mailstop R12 Cincinnati, Ohio 45226
   513-841-4428

4. National Electrical Code (NEC)
   See NFPA

5. National Fire Protection Association (NFPA)
   1 Batterymarch Park
   Quincy, Massachusetts 02169-7471
   617-770-3000

6. New York City Fire Department (FDNY)
   9 Metrotech Center
   Brooklyn, NY 11201-5431
   718-999-2117

7. New York City Department of Buildings (NYC DOB)
   Enforcement Division
   280 Broadway, New York, New York 10007
   212- 566-2850

8. New York City Department of Environmental Protection (NYCDEP)
   Bureau of Environmental Compliance
   Asbestos Control Program
   59-17 Junction Boulevard, 8th Floor
   Corona, New York 11368
   718-595-3682

9. New York City Department of Health and Mental Hygiene (NYC DOHMH)
   Environmental Investigation
   125 Worth Street
   New York, New York 10013
   212-442-3372

10. New York State Department of Labor (NYSDOL)
Division of Safety and Health
Engineering Services Unit
State Office Building Campus
Albany, New York 12240-0010

11. New York City Department of Sanitation
125 Worth Street, Room 714
New York, New York 10013
212-566-1066

12. Occupational Safety and Health Administration (OSHA)
Region II - Regional Office
201Varick Street, Room 908
New York, New York 10014
212-337-2378

13. United States Environmental Protection Agency (EPA or USEPA)
Region II
Asbestos NESHAPS Contact
Air and Waste Management Division
(Air Compliance Branch) – USEPA
290 Broadway, 21st Floor
New York, New York 10007-1866
212-637-3660

I. Post all applicable regulations in a conspicuous place at the job site. Assure that the regulations are not altered, defaced or covered by other materials. One copy of each regulation must also be kept at the Asbestos abatement contractor's office.

1.11 CITY/ASBESTOS ABATEMENT CONTRACTOR RESPONSIBILITIES

A. The normal occupants of the Work Areas will be relocated by the City prior to the performance of the abatement work and returned there to at the conclusion of the abatement work, at no cost to the asbestos abatement contractor. However, the asbestos abatement contractor shall protect all furniture and equipment in the Work Areas in a manner as hereinafter specified. In addition, the asbestos abatement contractor shall perform the work of this Contract in a manner that will be least disruptive to the normal use of the non-Work Areas in the building.

B. Asbestos abatement contractor shall be responsible for cleaning all portable items not specifically addressed by the Facility, in the Work Areas, or dispose of same as asbestos contaminated waste.

C. Facility to provide asbestos abatement contractor with a list of items that cannot be removed and need special attention.

D. Facility to stop all deliveries that may be scheduled to the Work Area while work is in progress.

E. Facilities to have authorized personnel on site at all times or supply the asbestos abatement contractor with means of contacting such personnel without unreasonable delay. Such personnel shall have access to all areas, have knowledge of electrical, and air handling equipment. Such personnel shall assist the asbestos abatement contractor in case of any power failure or breakdown to shut down air supply systems, to reset and control all protective systems such as alarms, sprinklers, locks, etc. The Facility shall ensure no active air handling systems are operating within the Work Area.

F. City will not occupy the portions of the building, in which work is being performed during the entire asbestos removal operation, including completion of clean up.

G. Asbestos abatement contractor shall provide a plan for 24 hour job security both for prevention of theft and for barring entry of curious but unprotected personnel into Work Areas.

H. Asbestos abatement contractor shall provide surveillance by a fire watch and set forth procedures to be taken for the safety of building occupants in the event of an emergency, in accordance with the WPSP.

I. Should the failure of any utility occur, the City will not be responsible to the asbestos abatement contractor for loss of time or any other expense incurred.

J. Facility will be responsible to notify the asbestos abatement contractor of any planned electrical power shutdowns in order to ensure that there are no power interruptions in the negative air pressure systems.

K. Asbestos abatement contractor shall remove all flammable materials from the work area and all sources of ignition (including but not limited to pilot lights) shall be extinguished.

L. Asbestos abatement contractor shall require a competent person (as defined in OSHA 1926.1101) to perform the following functions and to be on-site continuously for the duration of the project:

1. Monitor the set up of the Work Area enclosure and ensure its integrity.

2. Control entry and exit into the work enclosure.

3. Ensure that employees are adequately trained in the use of engineering controls, proper work practices, proper personal protective equipment and in decontamination procedures.

4. Insure that employees use proper engineering controls, proper work practices, proper personal protective equipment and proper decontamination procedures.

5. The competent person (as defined in OSHA1926.1101) shall check for rips and tears in work suits, and ensure that they are mended immediately or replaced.

1.12 USE OF BUILDING FACILITIES

A. City shall make available to the asbestos abatement contractor, from existing outlets and supplies, all reasonably required amounts of water and electric power at no charge.

B. Electric power to all Work Areas shall be shut down and locked out except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided by asbestos abatement contractor in accordance with applicable codes. All power to Work Areas shall be brought in from outside the area through ground-fault interrupter circuits installed at the source. Stationary electrical equipment within the Work Area, which must remain in service, shall be adequately protected, enclosed and ventilated. The Facility will identify all electric lines that must remain in service. Asbestos abatement contractor shall protect all lines.

C. Asbestos abatement contractor shall provide, at his own expense, all electrical, water, and waste connections, tie-ins, extensions, and construction materials, supplies, etc. All water tie-ins shall be hard piped with polyethylene or copper piping. At the end of each shift, asbestos abatement contractor shall disconnect all hoses within the work zone and place in equipment room of the worker decontamination unit. Asbestos abatement contractor shall ensure positive shutoff of all water to Work Area during non-working hours.

D. Utilities:

1. General:
   All temporary facilities required to be installed, shall be subject to the approval of the Commissioner. Prior to starting the work at any site; specify clearly the temporary locations of facilities preferably with sketches and submit the same to the Construction Project Manager for approval.

2. Water:
   The Department of Design and Construction will furnish all water needed for construction, at no cost to the asbestos abatement contractor in buildings

under their jurisdiction. All temporary plumbing or adaptations to supply the needs of the Work Area shall be installed and removed by the asbestos abatement contractor and the cost thereof included in the Lump Sum price for abatement work. Shower water for the decontamination unit shall be provided hot. Heating of water, if necessary, shall be provided by the asbestos abatement contractor.

3. Electricity:
The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the asbestos abatement contractor in buildings under their jurisdiction. All temporary electrical work or adaptations to supply the needs of the Work Area shall be installed and removed by the asbestos abatement contractor and the cost thereof included in the Lump Sum price for abatement work.

In leased spaces, arrangements for water supplies and electricity must be made with the landlord. However, all such arrangements must be made through and are subject to approval of the Department of Design and Construction. Utilities will be provided at no cost to the Asbestos abatement contractor. However, it is the asbestos abatement contractor's (or the General contractor's) responsibility to furnish and install a suitable distribution system to the Work Area. This system will be provided at no cost to the City.

A dedicated power supply for the negative pressure ventilating units shall be utilized. The negative air equipment shall be on a ground fault circuit interrupter (GFCI) protected circuit separate from the remainder of the work area temporary power circuits.

E. Asbestos abatement contractor shall shut down and lock out all electric power to all work areas except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided in accordance with all applicable codes. Existing light sources (e.g., house lights) shall not be utilized. All power to work areas shall be brought in from outside the area through ground-fault circuit interrupter at the source.

1. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:

a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed.

All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

b. Any energized circuits remaining in the work area shall be posted with a minimum two (2) inch high lettering warning sign which reads: DANGER LIVE ELECTRICAL - KEEP CLEAR. A sign shall be placed on all live covered barriers at a maximum of ten (10) foot intervals. These signs shall be posted in sufficient numbers to warn all persons authorized to enter the work area of the existence of the energized circuits.

2. Any source of emergency lighting which is temporarily blocked as a result of work place preparation shall be replaced for the duration of the project by battery operated or temporary exit signs, exit lights, or photo luminescent path markings.

F. Asbestos abatement contractor shall provide a separate temporary electric panel board to power asbestos abatement contractor’s equipment. The Facility will designate an existing electrical source in proximity to the Work Area. Asbestos abatement contractor's licensed electrician shall provide temporary tie-in via cable, outlet boxes, junction boxes, receptacles and lights, all with ground fault interruption. At no time shall extension cords greater than 50-feet in length be allowed. All temporary electrical installation shall be in accordance with OSHA regulations. The electric shut down for power panel tie-in will be on off-hours and must be coordinated with the Facility. Asbestos abatement contractor shall provide to the City a specification and drawing outlining his power requirements at the pre-construction meeting.

G. Additional electrical equipment (i.e., transformers, etc.), which is necessary due to the lack of existing power on the floor, shall be at the asbestos abatement contractor's expense.

H. Asbestos abatement contractor shall provide fire protection in accordance with all State and Local fire codes.

I. Sprinklers, standpipes, and other fire suppression systems shall remain in service and shall not be plasticized.

J. When temporary service lines are no longer required, they shall be removed by the asbestos abatement contractor. Any parts of the permanent service lines, grounds and buildings, disturbed or damaged by the installation and/or removal of the temporary service lines, shall be restored to their original condition by the asbestos abatement contractor. Senior Stationary Engineer will inspect and test all switches, controls, gauges, etc. and shall submit a list to the Construction Project Manager of any equipment damaged by the asbestos abatement contractor.

K. Asbestos abatement contractor shall supply hot shower water necessary for use in the decontamination unit.

1.13 USE OF THE PREMISES

A. Asbestos abatement contractor shall confine his apparatus, the storage of materials, and supplies, and the operation of his workmen to limits established by law, ordinances, and the directions of the Construction Project Manager and the Facility. All flammable or combustible materials shall be properly stored to obviate fire and in areas approved by the Facility.

B. Asbestos abatement contractor shall assure that no exits from the building are obstructed, that appropriate safety barriers are established to prevent access, and that Work Areas are kept neat, clean, and safe.

C. Asbestos abatement contractor shall maintain exits from the work area or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.

D. If the openings of temporary structural partitions related to abatement work areas block egress, the partition shall consist of two sheets of fire retardant 6-mil plastic, prominently marked as an exit with photo luminescent paint or signage. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress.

E. All surrounding work, fixtures, soil lines, drains, water lines, gas pipes, electrical conduit, wires, utilities, duct work railings, shrubbery, landscaping, etc. which are to remain in place shall be carefully protected and, if disturbed or damaged, shall be repaired or replaced as directed by the City, at no additional cost.

F. All routes through the building to be used by the asbestos abatement contractor shall first be approved by the Construction Project Manager and the Facility.

G. Attention is specifically drawn to the fact that other asbestos abatement contractors, performing the work of other Contracts, may be (or are) brought upon any of the work sites of this Contract. Therefore, the asbestos abatement contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other asbestos abatement contractors who may be on (or are on) any site of the work of this Contract. Regulated area exempted.

H. Temporary toilet facilities must be provided by the asbestos abatement contractor on the site. Coordinate location of facilities with Construction Project Manager. No toilet facilities will be allowed in the Work Area.

1.14 PROTECTION AND DAMAGE

A. The asbestos abatement contractor is responsible to cover all furniture and equipment that cannot be removed from Work Areas. Moveable furniture and equipment will be removed from Work Areas by asbestos abatement contractor prior to start of work and returned upon successful completion of the final air testing. At the conclusion of the work (after clearance level of air testing reaches the acceptable limit), the asbestos abatement contractor will remove all plastic covering from the walls, floors, furniture, equipment and reinstall furniture and equipment in the cleaned Work Area. The asbestos abatement contractor shall remove all shades, curtains and drapes from the Work Area, and reinstall the same following the final clean up.

B. Prior to plasticizing, the proposed work areas shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning methods. Methods that raise dust, such as sweeping or vacuuming with equipment not equipped with HEPA filters, are prohibited.

C. Use rubber tired vehicles that use non-volatile fuels for conveying material inside building and provide temporary covering, as necessary, to protect floors.

D. No materials or debris shall be thrown from windows or doors of the building. Building waste system shall NOT be used to remove refuse.

E. Debris shall be removed from the work site daily. Premises shall be left neat and clean after each work shift, so that work may proceed the next regular workday without interruption. Limited bag storage may take place within the Work Area when approved by the Construction Project Manager.

F. Protect floors and walls along removal routes from damage, wear and staining with contamination control flooring. All finished surfaces to be protected with Masonite or other rigid sheathing material.

G. A preliminary inspection for pre-existing damage shall be conducted by asbestos abatement contractor and representative of the City before commencement of the project.

1.15 RESPIRATORY PROTECTION REQUIREMENTS

A. Respiratory protection shall be worn by all individuals who may be exposed to asbestos fibers from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with Regulations and these Specifications.

B. Asbestos abatement contractor shall develop and implement a written respiratory protection program with required site-specific procedures and elements. The program shall be administered by a properly trained individual. The written respiratory protection program shall include the requirements set forth in OSHA Standard 29 CFR 1910.134, at a minimum.

C. The Asbestos abatement contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the Work Area(s), as specified in OSHA Standards 26 CFR 1910.134 and 29 CFR 1926.1101, NIOSH Standard 42 CFR 84, or as more stringently specified otherwise, herein.

D. Where respirators with disposable filter parts are employed, the asbestos abatement contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.

E. All respiratory protection shall be NIOSH approved. All respiratory protection shall be provided by asbestos abatement contractor, and used by workers in conjunction with the written respiratory protection program.

F. Asbestos abatement contractor shall provide respirators selected by an Industrial Hygienist that meet the following requirements:

Table 1. -- Assigned Protection Factors[5]

Type of Respirator[1,2]	Half mask	Full facepiece	Helmet/hood
1. Air-Purifying Respirator	[3]10	50	……
2. Powered Air-Purifying Respirator (PAPR)	50	1,000	[4]25/1,000
3. Supplied-Air Respirator (SAR) or Airline Respirator			
• Demand mode	10	50	……
• Continuous flow mode	50	1,000	[4]25/1,000
• Pressure-demand or other positive-pressure mode	50	1,000	……
4. Self-Contained Breathing Apparatus (SCBA)			
• Demand mode	10	50	50
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	……...	10,000	10,000

Notes:

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

G. Selection of high efficiency filters:

1. All high efficiency filters shall have a nominal efficiency rating of 100 (99.97-percent effective) when tested against 0.3-micrometer monodisperse diethyl-hexyl phthalate (DOP) particles.

2. Choose N-, R-, or P-series filters based upon the presence or absence of oil particles.

a. N-series filters shall only be used for non-oil solid and water based aerosols or fumes.

b. R- and P-series filters shall be used when oil aerosols or fumes (i.e., lubricants, cutting fluids, glycerin, etc.) are present. The R-series filters are oil resistant and the P-series filters are oil proof.

c. Follow filter manufacture recommendations.

3. If a vapor hazard exists, use an organic vapor cartridge in combination with the high efficiency filter.

H. Historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for an abatement task. Historical data provided

by the asbestos abatement contractor shall be based on personal air monitoring performed during work operations closely resembling the processes, type of material, control methods, work practices, and environmental conditions present at the site. Documentation of aforementioned results may be requested by the City and/or Third-Party Air Monitor for review. This will not relieve the asbestos abatement contractor from providing personal air monitoring to determine the time-weighted average (TWA) for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101.

I. At no time during actual removal operations shall half-mask air purifying respirators be allowed unless a full 8-hour TWA and excursion limit have been conducted, and reviewed by the Construction Project Manager. If the TWA and excursion limit have not been conducted, a Supplied-Air Respirator (SAR) or Airline Respirator or Self-Contained Breathing Apparatus (SCBA) must be used. Use of single use dust respirators is prohibited for the above respiratory protection.

J. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

K. Asbestos abatement contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every 12 months thereafter with the type of respirator he/she will be using.

L. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

M. No facial hairs (beards) shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

N. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the asbestos abatement contractor at the asbestos abatement contractor's expense.

O. Respiratory protection maintenance and decontamination procedures shall meet the following requirements:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134 (b); and

2. High efficiency filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures as stated in Section 3.03 and/or 3.04.

4. Airline respirators with high efficiency filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator face pieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the face-piece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

P. Authorized visitors shall be provided with suitable respirators and instruction on the proper use of respirators whenever entering the Work Area. Qualitative fit test shall be done to ensure proper fit of respirator.

1.16 PROTECTIVE CLOTHING

A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. Provide to all workers, foremen, superintendents, authorized visitors and inspectors, protective disposable clothing consisting of full body coveralls, head covers, gloves and 18-inch high boot type covers or reusable footwear.

B. In addition to personal protective equipment for workers, the asbestos abatement contractor shall make available at each worksite at least four (4) additional uniforms and required respiratory equipment each day for personnel who are authorized to inspect the work site. He/she shall also provide, for the duration of the work at any site involving a decontamination unit for worksite access, a lockable storage locker for use by the Construction Project Manager. In addition to respiratory masks for workers, the asbestos abatement contractor must have on hand at the beginning of each work day, at least four (4) masks each with two sets of fresh filters, for use by personnel who are authorized to inspect the worksite. The asbestos abatement contractor shall check for proper fit of the respirators of all City personnel authorized to enter the Work Area.

C. Asbestos handlers involved in tent procedures shall wear two (2) disposable suits, including gloves, hood and footwear, and appropriate respiratory equipment. All street clothes shall be removed and stored in a clean room within the work site. The double layer personal protective equipment shall be used for installation of the tent and throughout the procedure, if a decontamination unit (with shower and clean room) is contiguous to the Work Area, only one (1) layer of disposable personal

protective equipment shall be required; in this case, prior to exiting the tent the worker shall HEPA vacuum and wet clean the disposable suit.

D. The outer disposable suit (if 2 suits are worn) shall be removed and remain in the tent upon exiting. Following the tent disposal and work site clean up the workers shall immediately proceed to a shower at the work site. The inner disposal unit and respirator shall be removed in the shower after appropriate wetting. The disposal clothing shall be disposed of as asbestos-containing waste material. The workers shall then fully and vigorously shower with supplied liquid bath soap, shampoo, and clean dry towels.

E. Coveralls: provide disposable full-body coveralls and disposable head covers. Require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes for all workers in the Work Area.

F. Boots: provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Paint uppers of all boots yellow with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason after being contaminated with ACM and/or dust.

G. Hard Hats: provide hard hats as required by OSHA for all workers, and provide a minimum of four spares for Inspectors, visitors, etc. Label all hats with same warning label as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may cause potential head injury. Provide hard hats of the type with polyethylene strap suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean and decontaminate and bag hard hats prior to removing them from the Work Area at the end of the work.

H. Goggles: provide eye protection (goggles) as required by OSHA for all workers involved in any activity that may potentially cause eye injury. Require them to be worn at all times during these activities. Thoroughly clean and decontaminate goggles before removing them from the Work Area.

I. Gloves: provide work gloves to all workers, of the type dictated by the Work and OSHA Standards. Do not remove gloves from the Work Area. Dispose of as asbestos-asbestos contaminated waste at the end of the work. Gloves shall be worn at all times, except during Work Area Preparation activities that do not disturb ACM.

J. Reusable footwear, hard hats and eye protection devices shall be left in the contaminated Equipment Room until the end of the Asbestos Abatement Work.

K. Disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the workspace to the outside through the decontamination facility.

L. Respirators, disposable coveralls, head covers and foot covers shall be provided by the asbestos abatement contractor for the Facilities Representative, Construction Project Manager and any other authorized representative who may inspect the Work Area. Provide two respirators and six respirator filter changes per day.

1.17 AIR MONITORING - ASBESTOS ABATEMENT CONTRACTOR

A. Asbestos abatement contractor shall employ a qualified industrial hygiene laboratory to analyze air samples in accordance with OSHA Regulations, 1926.1101 (Asbestos Standards for Construction) and New York City regulations.

B. The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

C. Industrial hygiene laboratory shall also be a current proficient participant in the NIST/NVLAP Quality Assurance Program for the identification of bulk samples. Laboratory identification number shall be submitted to and approved by the City.

D. Air monitoring responsibilities for the asbestos abatement contractor’s employees, shall be performed by a representative of the industrial hygiene laboratory retained by the asbestos abatement contractor.

E. Asbestos abatement contractor shall submit to the City all credentials of the designated (as defined in OSHA 1926.1101) and industrial hygiene laboratory representative for approval.

F. Air monitoring and inspection shall be conducted by the Asbestos abatement contractor’s competent person (as defined in OSHA 1926.1101).

G. Continuous (daily or per shift) monitoring and inspection will include Work Area samples, personnel samples from the breathing zone of a worker to accurately determine the employees' 8-hour TWA (unless Type C respirators are used) and decontamination unit clean room samples.

H. Work Area samples and employee personnel samples shall be taken using pumps whose flow rates can be determined to an accuracy of +5-percent, at a minimum of two liters per minute. This must be demonstrated at the job site.

I. Sampling and analysis methods shall be per NIOSH 7400A.

J. Test Reports:

1. Promptly process and distribute one copy of the test results, to the Commissioner.

2. Prompt reports are necessary so that if required, modifications to work methods and/or practices may be implemented as soon as possible.

3. Asbestos abatement contractor shall by facsimile notify the Commissioner within 24 hours of the results of each test, followed by written notification within three days.

K. Competent person shall conduct inspections and provide written reports daily. Inspections will include checking the standard operating procedures, engineering control systems, respiratory protection and decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project which may affect the health and safety of the people and environment.

L. All costs for required air monitoring by the asbestos abatement contractor's competent person shall be borne by the asbestos abatement contractor.

M. The City reserves the right to conduct air and surface dust sampling in conjunction with and separate from the Third-Party Air Monitor for the purposes of Quality Assurance.

N. All samples shall be accompanied by a Chain of Custody Record that shall be submitted to the Construction Project Manager upon completion of analysis.

1.18 THIRD PARTY MONITORING AND LABORATORY

A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.

B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM). This laboratory shall meet the standards stated in Paragraph 1.17. B.

C. Observations will include, but not be limited to, checking the standard operating procedures, engineering control systems, respiratory protection, decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project that may affect the health and safety of the environment, Asbestos abatement contractor, and/or facility occupants.

D. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the asbestos abatement contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.

E. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the Asbestos abatement contractor.

F. At a minimum, air sampling shall be conducted in accordance with the following schedule:

Abatement Activity	**Pre-Abatement**	**During Abatement**	**Post-Abatement**
Equal to or greater than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	TEM
Less than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	PCM

Note: TEM is acceptable wherever PCM is required.

G. The number of air samples required per stage of abatement and size of abatement project is listed in the table below:

		Pre-Abatement	During Abatement	Post Abatement
	Large Asbestos Projects			
1.	Full Containment	10	5	10
2.	Glovebag inside Tent	5[a]	5[a]	5[a]
3.	Exterior Foam and Vertical Surfaces	-	5[c]	5[d]
4.	Interior Foam	10	5[c]	10[d]
	Small Asbestos Projects			
1.	Full Containment	6	3	6
2.	Glovebag inside Tent	3[b]	3[b]	3[b]
3.	Tent	3[b]	3[b]	3[b]
4.	Exterior Foam and Vertical Surfaces	-	3[c]	3[d]
5.	Interior Foam	6	3[c]	6[d]

		Pre-Abatement	During Abatement	Post Abatement
	Minor Projects			
1.	Glovebag inside Tent	-	-	1[d]
2.	Tent	-	-	1[d]
3.	Exterior Foam and Vertical Surfaces	-	-	1[d]
4.	Interior Foam	-	-	1[d]

Notes:
a. if more than three (3) tents then two (2) samples required per enclosure.
b. if more than three (3) tents then one (1) sample required per enclosure.
c. samples shall be taken within the work area(s).
d. area sampling is required only if:
- visible emissions are detected during the project
- during-abatement area sampling results exceeded 0.01 f/cc or the pre-abatement area sampling result(s) for interior projects where applicable.
- work area to be reoccupied is an interior space at a school, healthcare, or daycare facility.

H. Prior to commencement of abatement activities, the Third Party Air Monitoring Firm will collect a minimum number of area samples inside each homogeneous work area.

1. Samples will be taken during normal occupancy activities and circumstances at the work site.

2. Samplers shall be located within the proposed work area and at all proposed isolation barrier locations.

3. Samples shall be analyzed using PCM.

4. The number of samples to be collected will be determined by the size of the project and the abatement methods to be utilized.

I. Frequency and duration of the air sampling during abatement shall be representative of the actual conditions during the abatement. The size of the asbestos project will be a factor in the number of samples required to monitor the abatement activities. The following minimum schedule of samples shall be required daily.

1. For large asbestos projects employing full containment, area air sampling shall be performed at the following locations:

a. Two area samples outside the work area in uncontaminated areas of the building, remote from the decontamination facilities.

(1) Primary location selection shall be within 10 feet of isolation barriers.

(2) Where negative ventilation exhaust runs through uncontaminated building areas, one of the area samples will be required in these areas to monitor any potential fiber release.

(3) Where exhaust tubes have been grouped together in banks of up to five (5) tubes, with each tube exhausting separately and the bank of tubes terminating together at the same controlled area, one area air sample shall be taken.

b. One area sample within the uncontaminated entrance to each decontamination enclosure system.

c. Where adjacent non-work areas do not exist, an exterior area sample shall be taken.

d. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct.

e. One area sample outside, but within 25 feet of, the building or voltstructure, if the entire building or structure is the work area.

2. For large asbestos projects involving interior foam method, area air sampling shall be performed at the following sampling locations:

a. One area sample taken outside the work area within 10 feet of isolation barriers.

b. One area sample taken within the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system.

c. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct, if applicable.

d. Three area samples inside the work area.

e. One area sample where the negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.

3. For large asbestos projects employing the glovebag procedure within a tent, a minimum of five continuous air samples shall be taken concurrently with the abatement for each work area, unless there are more than three enclosures, in which case two area samples per enclosure are required.

    a. Four area samples taken outside the work area within ten feet of tent enclosure(s).

    b. One area sample taken within the uncontaminated entrance to each worker and waste decontamination enclosure system.

    c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.

    d. One area sample where negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.

4. For large asbestos projects involving exterior foam method or removal of ACM from vertical surfaces, a minimum of five continuous area samples shall be taken concurrently with the abatement for each work area using the following minimum requirements:

    a. Three area samples inside the work area and remote from the decontamination systems.

    b. One area sample within the uncontaminated entrance to each worker and waste decontamination enclosure system.

    c. One area sample outside the work area within 25 feet of the building or structure, if the entire building or structure is the work area.

    d. One area sample inside the building or structure at the egress point to the work area, if applicable.

5. For small asbestos projects employing full containment, a minimum of three continuous area samples shall be taken concurrently with the abatement for each work area at the following locations:

    a. Two area samples taken outside the work area within ten feet of the isolation barriers.

    b. One area sample within the uncontaminated entrance to each worker or waste decontamination enclosure system.

c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.

d. One area sample where negative ventilation exhaust ducting runs through an uncontaminated building area, if applicable.

6. Tent Procedures:
For projects involving more than 25 linear feet or 10 square feet, a minimum of three continuous samples shall be taken concurrently throughout abatement.

J. Post-abatement clearance air monitoring for projects not solely employing glove-bag procedures shall include a minimum number of area samples inside each homogeneous work area and outside each homogeneous work area (five samples inside/five samples outside for Large Projects and three samples inside/three samples outside for Small Projects). In addition to the five sample inside/five sample outside minimum for Large Projects, one additional representative area sample shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

K. Post-abatement clearance air monitoring for Small Projects solely employing glove-bag procedures is not required unless one or more of the following events occurs. In such cases, post-abatement clearance air monitoring procedures shall be followed. The events requiring post-abatement clearance air monitoring are:

1. The integrity of the glove-bag was compromised,

2. Visible emissions are detected outside the glove-bag, and/or

3. Ambient levels exceed 0.01 f/cc during abatement.

L. Monitoring requirements for other than post-abatement clearance air monitoring are as follows:

1. The sampling zone for indoor air samples shall be representative of the building occupants' breathing zone.

2. If possible, outdoor ambient and baseline samplers should be placed about 6 feet above the ground surface in reasonable proximity to the building and away from obstructions and drafts that may unduly affect airflow.

3. For outdoor samples, if access to electricity and concerns about security dictate a rooftop site, locations near vents and other structures on the roof that would unduly affect airflow shall be avoided.

4. Air sampling equipment shall not be placed in corners of rooms or near obstructions such as furniture.

5. Samples shall have a chain of custody record.

M. Area air sampling during abatement shall be conducted as specified in the following documents except as restricted or modified herein:

1. Measuring Airborne Asbestos Following an Abatement Action, US EPA document 600/4-85-049 (Nov., 1985);

2. Guidance for Controlling Asbestos-Containing Materials in Buildings; US EPA Publication 560/5-85- 024 (June, 1984);

3. Methodology for the Measurement of Airborne Asbestos by Electron Microscopy US EPA Contract No. 68-02- 3266;

4. Mandatory and non-mandatory Electron Microscopy Methods set forth in 40 CFR Part 763, Subpart E, Appendix A.

5. NIOSH 7400 method using "A" counting rules

N. In accordance with the above criteria, area samples (see NYCDEP Asbestos Control Program Regulations) shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM, 25mm cassettes	560 liters	5 to 15 liters/minute
TEM, 25mm cassettes	560 liters	1 to 10 liters/minute
TEM, 37mm cassettes	1,250 liters	1 to 10 liters/minute

O. Post-abatement clearance air monitoring requirements are as follows:

1. Sampling shall not begin until at least one hour after wet cleaning has been completed and no visible pools of water or condensation remain.

2. Samplers shall be placed at random around the work area. If the work area contains the number of rooms equivalent to the number of required samples based on floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples, a representative sample of rooms shall be selected.

3. The representative samplers placed outside the work area but within the building shall be located to avoid any air that might escape through the isolation barriers and shall be approximately 50 feet from the entrance to the work area, and 25 feet from the isolation barriers.

P. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:

1. Before starting the sampling pumps, use forced air equipment (such as a one horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area. This pre-sampling procedure shall take at least five minutes per 1,000 square feet of floor area; then

2. Place a 20-inch diameter fan in the center of the room. Use one fan per 10,000 cubic feet of room space. Place the fan on slow speed and point it toward the ceiling.

3. Start the sampling pumps and sample for the required time or volume.

4. Turn off the pump and then the fan(s) when sampling is completed.

5. Collect a minimum number of area samples inside and outside each homogeneous work area (five inside/five outside samples for Large Projects and three inside/three outside samples for Small Projects). In addition to the minimum for Large Projects, one representative area samples shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

Q. For post-abatement monitoring, area samples shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM	1,800 liters	5 to 15 liters/minute
TEM	1,250 liters	1 to 10 liters/minute

1. Each homogeneous work area that does not meet the clearance criteria shall be thoroughly re-cleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site meets the clearance criteria.

2. For an asbestos project with more than one homogeneous work area, the release criterion shall be applied independently to each work area.

3. Should airborne fiber concentrations exceed the clearance criteria, the asbestos abatement contractor shall re-clean the work area utilizing wet wiping and HEPA-vacuuming techniques. Following completion of re-cleaning activities, the Third-Party Air Monitor will perform an observation of the Work Area. If the Third-Party Air Monitor determines that the work

was performed in accordance with the specifications, the appropriate settling period will be observed and additional air sampling will be performed.

4. All costs resulting from additional air tests and observations shall be borne by the asbestos abatement contractor. These costs may include, but are not limited to, labor, analysis fees, materials, and expenses.

5. After the area has been found to be in compliance, the asbestos abatement contractor may remove Isolation Barriers and perform final cleaning as specified.

R. Clearance and/or Re-occupancy Criteria:

1. The clearance criteria shall be applied to each homogeneous work area independently.

2. For PCM analysis, the clearance air monitoring shall be considered satisfactory when each of the 5 inside/5 outside samples for Large Projects and/or 3 inside/3 outside samples for Small Projects is less than or equal to 0.01 f/cc or the background concentrations, whichever is greater.

3. For TEM analysis, the clearance air monitoring shall be considered satisfactory when the requirements stated in 40 CFR Part 763, Subpart E, Appendix A, Section IV are met.

4. As soon as the air monitoring tests are completed, the Third-Party Air Monitor will send the results of such tests to the City and notify the Asbestos abatement contractor.

5. The asbestos abatement contractor shall initiate the appropriate closeout information into the DEP ARTS database within 24 hours of work area completion to allow the Third Party Air Monitoring Firm to complete and submit the ACP-15 forms for each specific work area.

6. The asbestos abatement contractor shall provide the ACP-20 and ACP-21 forms to the Third Party Air Monitoring Firm within 48 hours of receipt.

1.19 TAMPERING WITH TEST EQUIPMENT

All parties to this Contract are hereby notified that any tampering with testing equipment will be considered an attempt at falsifying reports and records to federal and state agencies and each offense will be prosecuted under applicable state and federal criminal codes to the fullest extent possible.

1.20 GUARANTEE

A. Work performed in compliance with this Contract shall be guaranteed for a period of one year from the date the completed work is accepted by the City.

B. The asbestos abatement contractor shall not be held liable for the guarantee where the repair required under the guarantee is a result of obvious abuse or vandalism, as determined by the Commissioner.

C. The City will notify the asbestos abatement contractor in writing regarding defects in work under the guarantee.

PART 2 – PRODUCTS

2.01 MATERIAL HANDLING

A. Deliver all materials to the job site in their manufacturer's original container, with the manufacturer's label intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. Store all materials on pallets, away from any damp and/or wet surface. Cover materials in order to prevent damage and/or contamination.

3. Promptly remove damaged materials and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the City.

B. The Construction Project Manager may reject as non-complying such material and products that do not bear identification satisfactory to the Construction Project Manager as to manufacturer, grade, quality and other pertinent information.

2.02 MATERIALS

A. Wetting agents: (Surfactant) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.

B. Encapsulants: Liquid material which can be applied to asbestos-containing material which temporarily controls the possible release of asbestos fibers from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the

cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

C. During abatement activities, replacement materials shall be stored outside the work area in a manner to prevent contamination. Materials required for the asbestos project (i.e., plastic sheeting, replacement filters, duct tape, etc.) shall be stored to prevent damage or contamination.

D. Framing Materials and Doors: As required to construct temporary decontamination facilities and isolation barriers. Lumber shall be high grade, new, finished one side and fire retardant.

E. Fire Retardant Polyethylene Sheeting: minimum uniform thickness of 6-mil. Provide largest size possible to minimize seams. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

F. Fire Retardant Reinforced Polyethylene Sheeting: For covering floor of decontamination units, provide translucent, nylon reinforced or woven polyethylene laminated, fire retardant polyethylene sheeting. Provide largest size possible to minimize seams, minimum uniform thickness 6-mil. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

G. Drums: Asbestos-transporting drums, sealable and clearly marked with warning labels as required by OSHA and EPA.

H. Polyethylene Disposal Bags: Asbestos disposal bags, minimum of fire retardant 6-mil thick. Bags shall be clearly marked with warning labels as required by OSHA and EPA.

I. Signs: Asbestos warning signs for posting at perimeter of Work Area, as required by OSHA and EPA.

J. Waste Container Bag Liners and Flexible Trailer Trays: One piece leak-resistant flexible tray with absorbent pad.

K. Tape: Provide tape which is of high quality with an adhesive that is formulated to aggressively stick to sheet polyethylene.

L. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

M. Flexible Duct: Spiral reinforced flex duct for air filtration devices.

N. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Protective clothing shall conform to OSHA Standard 29 CFR 1926.1101.

O. Surfactants, strippers, sealers, or any other chemicals used shall be non-carcinogenic and non-toxic.

P. Materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

2.03 TOOLS AND EQUIPMENT

A. Air Filtration Device (AFD): AFDs shall be equipped with High Efficiency Particulate Air (HEPA) filtration systems and shall be approved by and listed with Underwriter's Laboratory.

B. Scaffolding: All scaffolding shall be designed and constructed in accordance with OSHA (29 CFR 1926/1910), New York City Building Code, and any other applicable federal, state and local government regulations. Whenever there is a conflict or overlap of the above references the most stringent provisions are applicable. All scaffolding and components shall be capable of supporting without failure a minimum of four times the maximum intended load, plus an allowance for impact. All scaffolding and staging must be certified in writing by a Professional Engineer licensed to practice in the State of New York.

1. Equip rungs of all metal ladders, etc., with an abrasive, non-slip surface.

2. Provide non-skid surface on all scaffold surfaces subject to foot traffic. Scaffold ends and joints shall be sealed with tape to prevent penetration of asbestos fibers.

C. Transportation Equipment: Transportation Equipment, as required, shall be suitable for loading, temporary storage, transit and unloading of asbestos contaminated waste without exposure to persons or property. Any temporary storage containers positioned outside the building for temporary storage shall be metal, closed and locked.

D. Vacuum Equipment: All vacuum equipment utilized in the Work Area shall utilize HEPA filtration systems.

E. Vacuum Attachments: Soft Brush Attachment, Asbestos Scraper Tool, Drill Dust Control Kit.

F. Electric Sprayer: An electric airless sprayer suitable for application of encapsulating material and shall be approved by and listed with Underwriters Laboratory.

G. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

H. Water Atomizer: Powered air-misting device equipped with a ground fault interrupter and equipped to operate continuously.

I. Brushes: All brushes shall have nylon bristles. Wire brushes are excluded from use due to their potential to shred asbestos fibers into small, fine fibers. Wire brushes maybe used for cleaning pipe joints within glove-bags upon written approval of the Construction Project Manager.

J. Power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation. Abrasive removal methods, including the use of beadblasters, are prohibited.

K. Other Tools and Equipment: Asbestos abatement contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, sponges, rounded-edge shovels, brooms, and carts.

L. Fans and Leaf Blower: Provide Leaf Blower (one leaf blower per floor) and one 20-inch diameter fans for each 10,000 cubic feet of Work Area volume to be used for aggressive sampling technique for clearance air testing.

M. Fire Extinguishers: At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.

N. First Aid Kits: Asbestos abatement contractor shall maintain adequately stocked first aid kits in the clean rooms of the decontamination units and within Work Areas. The first aid kit shall be approved by a licensed physician for the work to be performed under this Contract.

O. Water Service:

1. Temporary Water Service Connection: All connections to the Facilities water system shall include back flow protection. Valves shall be temperature and pressure rated for operation of the temperature and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping, and equipment. Leaking or dripping fittings/valves shall be repaired and or replaced as required.

2. Water Hoses: Employ new heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each Work Area and to each Decontamination Enclosure Unit. Provide fittings as required for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

3. Water Heater: Provide UL rated 40-gallon electric water heaters to supply hot water for Personal Decontamination Enclosure System Shower. Activate from 30 Amp Circuit breakers located within the Decontamination Enclosure sub panel. Provide relief valve compatible with water heater operations, pipe relief valve down to drip pan at floor level with type 'L' copper piping. Drip pans shall be 6-inch deep and securely fastened to water heater. Wiring of the water heater shall comply with NEMA, NECA, and UL standards.

P. Electrical Service:

1. General: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.

2. Temporary Power: Provide service to decontamination unit sub panel with minimum 60 AMP, two pole circuit breaker or fused disconnect connected to the building's main distribution panel. Sub panel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.

3. Voltage Differences: Provide identification warning signs at power outlets that are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

4. Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate the GFCIs outside the Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in Work Area, decontamination units, exterior, or as otherwise required by NEC, OSHA or other authority.

5. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be least subject to damage from operations.

6. Temporary Wiring: In the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Provide liquid tight enclosures or boxes for all wiring devices. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors.

7. Electrical Power Cords: Use only grounded extension cords; use hard service cords where exposed to traffic and abrasion. Use single lengths of cords only.

8. Temporary Lighting: All lighting within the Work Area shall be liquid and moisture proof and designed for the use intended.

    a. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.

    b. Provide lighting in the Decontamination Unit as required to supply a minimum 50-foot candle light level.

9. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:

    a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

2.04 CLEANING

A. Throughout the construction period, the asbestos abatement contractor shall maintain the building as described in this Section.

1. The asbestos abatement contractor shall prevent building areas other than the Work Area from becoming contaminated with asbestos-containing dust or debris. Should areas outside the Work Area become contaminated with asbestos-containing dust or debris as a consequence of the asbestos abatement contractor's work practices, the asbestos abatement contractor shall be responsible for cleaning these areas in accordance with the procedures appended in Title 15, Chapter 1 of RCNY and NYSDOL ICR56. All costs incurred in cleaning or otherwise decontaminating non-Work Areas and the contents thereof shall be borne by the asbestos abatement contractor at no additional cost to the City.

2. The asbestos abatement contractor shall provide to all personnel and laborers the required equipment and materials needed to maintain the specified standard of cleanliness.

B. General

1. Waste water from asbestos removal operations, including shower water, may be discharged into the public sewer system only after approved filtration is on operation to remove asbestos fibers.

2. Asbestos wastes shall be double bagged in six mil (.006") fire retardant polyethylene bags approved for ACM disposal and shall be properly labeled and handled before disposal.

3. All waste generated shall be bagged, wrapped or containerized immediately upon removal. The personal and waste decontamination enclosure systems and floor and scaffold surfaces shall be HEPA vacuumed and wet cleaned at the end of each work shift at a minimum.

4. The asbestos abatement contractor shall use corrugated cartons or drums for disposal of asbestos-containing waste having sharp edged components (e.g., nails, screws, metal lathe and tin sheeting) that may tear polyethylene bags and sheeting. The waste within the drums or cartons must be double bagged.

5. The asbestos abatement contractor shall transport all bags of waste to disposal site in thirty gallon capacity metal or fiber drums with tight lids, or in locked steel dumpster.

6. Dumping of debris, waste or bagged waste will not be permitted.

7. The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal. When the worker decontamination enclosure shower room alternates as a waste container wash room, the shower room shall be washed immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.

8. Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.

9. ACM shall be collected utilizing rubber dust pans and rubber squeegees.

10. HEPA vacuums shall not be used on wet materials unless specifically designed for that purpose.

11. Metal shovels shall not be used within the work area.

12. Mastic solvent when used will be applied in moderation (e.g., by airless sprayer). Saturation of the concrete floor with mastic solvent must be avoided.

13. The asbestos abatement contractor shall retain all items in the storage area in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection of all materials.

14. The asbestos abatement contractor shall not allow accumulation of scrap, debris, waste material, and other items not required for use in this work. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with New York City Department of Sanitation (NYCDOS) regulation Title 16 Chapter 8, and Federal, State and City laws.

15. At least twice a week (more if necessary), the asbestos abatement contractor shall completely remove all scrap, debris and waste material from the job site.

16. The asbestos abatement contractor shall provide adequate storage space for all items awaiting removal from the job site, observing all requirements for fire protection and concerns for the environment.

17. All respiratory protection equipment shall be selected from the latest NIOSH Certified Equipment list.

18. Daily and more often, if necessary, the asbestos abatement contractor shall inspect the Work Areas and adjoining spaces, and pick up all scrap, debris, and waste material. All such items shall be removed to the place designated for their storage.

19. Weekly, and more often, if necessary, the asbestos abatement contractor shall inspect all arrangements of materials stored on the site; re-stack and tidy them or otherwise service them to meet the requirements of these Specifications.

20. The asbestos abatement contractor shall maintain the site in a neat and orderly condition at all times.

PART 3 – EXECUTION

3.01 WORKER DECONTAMINATION FACILITY

A. Large Asbestos Projects (Small Project Option):

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas

    a. Structure:

        (1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.

        (2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8" thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

        (3) Interior shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of twelve inches.

        (4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into Work Area.

    b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

    c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.

    d. Decontamination Enclosure System shall be placed adjacent to the Work Area and shall consist of three totally enclosed chambers, separated from Work Area and each other by airlocks, as follows:

        (1) Equipment Room: The equipment room shall have a curtain doorway to separate it from the Work Area, and share a common airlock with the shower room. The equipment room shall be large enough to accommodate at least one worker (allowing them enough room to remove their protective

clothing and footwear), and a fire retardant 6-mil disposal bag for collection of discarded clothing and equipment. The equipment room shall be utilized for the storage of equipment and tools after decontamination using a HEPA-vacuum and/or wet cleaning. A one-day supply of replacement filters, in sealed containers, for HEPA-vacuums and negative air machines, extra tools, containers of surfactant, and other materials and equipment required for the project shall be stored here. A walk-off pan filled with water shall be placed in the Work Area just outside the equipment room for persons to clean foot coverings when leaving the Work Area. Contaminated footwear and reusable work clothing shall be stored in this room.

(2) Shower Room: The shower room shall have two airlocks (one that separates it from the equipment room and one that separates it from the clean room). The shower room shall contain at least one shower, with hot and cold water adjustable at the tap, per six workers. Careful attention shall be given to the shower to ensure against leaking of any kind and shall contain a rigid catch basin at least six inches deep. Asbestos abatement contractor shall supply towels, shampoo and liquid soap in the shower room at all times. Shower water shall be continuously drained, collected, and filtered through a system with at least a 5-micron particle size collection capacity. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filters by large particles. Pumps shall be installed, maintained and utilized in accordance with manufacturer's recommendations. Filtered water shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.

(3) Clean Room: The clean room shall share a common airlock with the shower room and shall have a curtained doorway to separate it from outside non-contaminated areas. Lockers, for storage of workers' street clothing, and shelves, for storing respirators, shall be provided in this area. Clean disposable clothing, replacement filters for respirators, and clean dry towels shall be provided in the clean room. The clean room shall not be used for the storage of tool, equipment or other materials.

B. Small Asbestos Projects:

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.

2. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.

3. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Asbestos abatement contractor, and as specified herein.

3.02 WASTE DECONTAMINATION FACILITY

A. Large Asbestos Project (Small Project Option)

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.

a. Structure:

(1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.

(2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8” thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

(3) Interior walls shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of

reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of twelve inches.

(4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into the Work Area.

b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.

d. Decontamination Enclosure System shall be located outside the work area and attached to all locations through which ACM waste will be removed from the work area and shall consist of two totally enclosed chambers, separated from the Work Area and each other by airlocks, as follows:

(1) Washroom: An equipment washroom shall have two air locks (one separating the unit from the Work Area and one common air lock that separates it from the holding area). The washroom shall have facilities for washing material containers and equipment. Gross removal of dust and debris from contaminated material containers and equipment shall be accomplished in the Work Area, prior to moving to the washroom.

(2) Holding Area: A holding area shall share a common air lock with the equipment washroom and shall have a curtained doorway to outside areas. A hinged, lockable door shall be placed at the holding area entrance to prevent unauthorized access into the Work Area.

B. Small Asbestos Project:

1. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.

2. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Asbestos abatement contractor, and as specified herein.

3.03 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING REMOTE DECONTAMINATION FACILITIES

A. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall fully identify the facility, agents, asbestos abatement contractor(s), the project, each Work Area, and worker respiratory protection employed. The job supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.

B. Each worker shall remove street clothes in the clean room; wear two disposable suits, including gloves, hoods and non-skid footwear; and put on a clean respirator (with new filters) before entering the Work Area.

C. Each worker shall, before leaving the Work Area or tent, clean the outside of the respirators and outer layer of protective clothing by wet cleaning and/or HEPA-vacuuming. The outer disposable suit shall be removed in the airlock prior to proceeding to the Worker Decontamination Unit. The inner disposable suit and respirator shall be wet wiped and HEPA vacuumed thoroughly before removing and prior to aggressive shower.

D. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately.

3.04 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING ATTACHED DECONTAMINATION FACILITIES

A. All workers and authorized visitors shall enter the Work Area through the worker decontamination facility.

B. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, asbestos abatement contractor(s), the project, each

Work Area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.

C. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator with filters, and clean protective clothing before entering the Work Area through the shower room and equipment room.

D. Each worker or authorized visitor shall, each time he leaves the Work Area, remove gross contamination from clothing before leaving the Work Area; proceed to the equipment room and remove clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.

E. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the Work Area is not permitted outside the Work Area.

3.05 MAINTENANCE OF DECONTAMINATION ENCLOSURE FACILITIES AND BARRIERS

The following procedures shall be followed during abatement activities.

A. All polyethylene barriers inside the work place and partitions constructed to isolate the Work Area from occupied areas shall be inspected by the asbestos handler supervisor at least twice per shift.

B. Smoke tubes shall be used to test the integrity of the Work Area barriers and the decontamination enclosure systems daily before abatement activity begins and at the end of each shift.

C. Damage and defects in the decontamination enclosure system shall be repaired immediately upon discovery. The decontamination enclosure system shall be maintained in a clean and sanitary condition at all times.

D. At any time during the abatement activity, if visible emissions are observed, or elevated asbestos fiber counts outside the Work Area are measured, or if damage occurs to barriers, abatement shall stop. The source of the contamination shall be located, the integrity of the barriers shall be restored and extended to include the contaminated area, and visible residue shall be cleaned up using appropriate HEPA-vacuuming and wet cleaning.

E. Inspections and observations shall be documented in the daily project log by the asbestos handler supervisor.

F. The daily inspection to ensure that exits have been checked against exterior blockage or impediments to exiting shall be documented in the log book. If exits are found to be blocked, abatement activities shall stop until the blockage is cleared.

3.06 MODIFICATIONS TO HVAC SYSTEMS

A. Shut down, isolate or seal, all existing HVAC units, fans, exhaust fans, perimeter convection air units, supply and/or return air ducts, etc., situated in, traversing or servicing the work zone.

B. Seal all seams with duct tape. Wrap entire duct with a minimum of two layers of fire retardant 6-mil polyethylene sheeting. All shutdowns are to be coordinated with the Facility. Where systems must be maintained, i.e., traversing Work Areas to non-Work Areas, only supply ducts will be maintained, protect as described above. All returns must be blanked off in Work Area and adjacent areas, including floor above and below Work Area. When required Asbestos abatement contractor shall apply for a clarification from NYCDEP. The Asbestos abatement contractor shall implement the following engineering procedures:

1. Maintenance of a positive pressure within the HVAC system of 0.01 inch water gauge (or greater) with respect to the ambient pressure outside the Work Area. The conditions for this system shall be maintained and be operational 24 hours per day from the initiation of Work Area preparation until successful final air clearance. Positive pressurization of HVAC system shall be applied only under the direction and control of professional engineer, or other knowledgeable licensed professional;

2. The positive pressurization of the duct shall be tested, inspected and recorded both at the beginning and at the end of each shift;

3. The positive pressurization shall be monitored using instrumentation which will provide a written record of pressurization and that will trigger an audible alarm, if the static pressure falls below the set value;

4. The supply air fan and the supply air damper for the active positive-pressurized duct shall be placed in the manual “on” positions to prevent shutdown by fail-safe mechanisms;

5. The return air fan and the return air dampers shall be shut down and locked-out;

6. All the seams of the HVAC ducts that pass through the Work Area shall be sealed;

7. The HVAC ducts that pass through the Work Area shall be covered with two (2) layers of fire retardant 6-mil polyethylene sheeting, and all seams and edges of both layers shall be sealed airtight;

8. The supply air fans, return air fans, and all dampers servicing the Work Area itself shall be shut down and locked-out. All openings within the Work Area of supply and return air ducts shall be sealed with 3/8-inch fire rated plywood and two layers of fire retardant 6-mil polyethylene;

9. When abatement occurs during periods while the HVAC system is shut down an alternative method of pressurization of the duct passing through the Work Area should be employed (e.g., by low-pressure "blowers", etc., directly coupled into the duct). Item #4 above shall be deleted and shall be replaced by the requirement to set the dampers of the HVAC duct in the manual closed positions, in order to effect pressurization.

C. Asbestos abatement contractor to coordinate this item with the Facility and Construction Project Manager at the commencement of work. Where present HVAC systems (ducts) service an area and that air system cannot be shut down, asbestos abatement contractor shall isolate and seal the ducts, both supply and return, at the boundary of that zone.

1. To isolate, cap, or seal a duct, the asbestos abatement contractor shall remove insulation from duct (if necessary), then disconnect linkage to fold shut all fire dampers. Asbestos abatement contractor shall seal all edges and seams with caulk and duct-tape.

2. Asbestos abatement contractor shall then cut existing duct and fold metal in and secure with approved fasteners. Asbestos abatement contractor shall caulk and duct-tape all seams and edges.

3. All ducts shall then be completely wrapped and sealed with duct-tape and three (3) layers of reinforced polyethylene sheeting.

4. All ducts shall be restored to original working order at the end of the project.

D. Where present HVAC systems (ducts) service occupied areas (non-Work Areas), the Asbestos abatement contractor shall blank off the ducts.

1. To isolate or seal the return duct, the asbestos abatement contractor shall remove any insulation (if necessary) from the duct. Then disconnect linkage to fold shut all fire dampers and insert a fiberglass board within the duct. Asbestos abatement contractor shall seal all edges and seams with caulk, duct-tape and three (3) layers of reinforced polyethylene sheeting.

2. All isolation of return ducts and any other activity that requires removal of ceiling by the asbestos abatement contractor shall be conducted under controls. Work is to be coordinated with the Construction Project Manager and the Facility and is described as follows:

   a. Work shall occur as scheduled.

   b. Horizontal surfaces near the blanking operations shall be protected with fire retardant 6-mil polyethylene sheeting.

   c. Plastic drapes shall be used to enclose the immediate area.

   d. Asbestos abatement contractor to position and operate air filtration devices and HEPA-vacuums in the area to clean space after blanking operations.

   e. All personnel involved with this work shall receive personal protection (i.e., respirators and disposable suits).

E. Upon loss of negative pressure or electric power, all work activities in an area shall cease immediately and shall not resume until negative pressure and/or electric power has been fully restored. When a power failure or loss of negative pressure lasts, or is expected to last, longer than thirty (30) minutes, the following sequence of events shall occur.

   1. All make up air inlets shall be sealed airtight.

   2. All decontamination facilities shall be sealed airtight after evacuation of all personnel from the Work Area.

   3. All adjacent areas shall be monitored for potential fiber release upon discovery of and subsequently throughout, power failure.

3.07 LOCKOUT OF HVAC SYSTEMS, ELECTRIC POWER, & ACTIVE BOILERS

Prior to the start of any prep work, the asbestos abatement contractor shall employ skilled tradesmen with limited asbestos licenses for the following work:

A. Disable all ventilating systems or other systems bringing air into or exhausting air out of the Work Area. Disable system by disconnecting wires removing circuit breakers, by lockable switch or other positive means to ensure against accidental re-starting of equipment.

B. Lock out power to the Work Area by switching off all breakers and removing them from panels or by switching and locking entire panel. Label panel with following notation: “DANGER CIRCUIT BEING WORKED ON”. Give all keys to Facility.

C. Lock out power to circuits running through Work Area whenever possible by switching off and removing breakers from panel. If circuits must remain live, the Facility shall notify asbestos abatement contractor in order that he may secure a variance from NYCDEP. The asbestos abatement contractor shall protect all conduit and wires to remain and label all active circuits at intervals not to exceed 3 feet with tags having the following notation: "DANGER LIVE ELECTROCUTION HAZARD". The asbestos abatement contractor shall label all circuits in all locations including hidden locations that may be affected by the work in a similar manner.

D. All boilers and other equipment within the work area shall be shut down, locked out, tagged out and the burner/boiler/equipment accesses and openings shall be sealed until abatement activities are complete. If the boiler or other exhausted equipment will be subject to abatement, all breeching, stacks, columns, flues, shafts, and double-walled enclosures serving as exhausts or vents shall be segregated from the affected boiler or equipment and sealed airtight to eliminate potential chimney effects within the work area.

PART 4 – PREPARATION OF WORK AREA AND REMOVAL PROCEDURES

4.01 REMOVAL OF ASBESTOS-CONTAINING MATERIAL

A. Asbestos abatement contractor Responsibility

Asbestos abatement contractor shall be responsible for the proper removal of ACM from the Work Area using standard industry techniques. The Third-Party Air Monitor representative shall observe the Work.

1. General Requirements:

a. Removal of ACM shall be performed using wet methods. Dry removal of ACM is prohibited.

b. Spray ACM with amended water with sufficient frequency and quantity to enhance penetration. Sufficient time shall be allowed for amended water to penetrate the material to the substrate prior to removal. All ACM shall be thoroughly wetted while work is being conducted.

c. Accumulation of standing water on the floor of the Work Area is prohibited.

d. Apply removal encapsulants, when used, in accordance with the manufacturer's recommendations and guidelines.

e. Containerize ACM immediately upon detachment from the substrate. Alternately, ACM may be dropped in to a flexible catch basin and promptly bagged. Detached ACM is not permitted to lie on the floor for any period of time. Excess air within the bag shall be removed before sealing. ACM shall not be dropped from a height of greater than 10 feet. Above 10 feet, dust free inclined chutes may be used. Maximum inclination from horizontal shall be 60-degrees for all chutes.

f. Exits from the work area shall be maintained, or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.

g. Signs clearly indicating the direction of exits shall be maintained and prominently displayed within the work area.

h. No smoking signs shall be maintained and prominently displayed within the work place.

i. At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.

j. If the containment area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors the cut off switch shall be able to turn off the equipment on all floors.

B. Removal of ACM Utilizing Full Containment Procedures shall be as follows:

1. Preparation Procedures:

a. Ensure that the Third-Party Air Monitor has performed area monitoring and established a background count prior to the preparatory operations for each removal area, as applicable.

b. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC

components shall be sealed with tape and two layers of fire retardant polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos-asbestos contaminated waste.

c. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.

d. Provide and install decontamination enclosure systems in accordance with Sections 3.01 and 3.02 of this Section.

e. Remove ACM that may be disturbed by the erection of partitions using tent procedures and wet removal methods. Removal shall be limited to a one-foot wide strip running the length/height of the partition.

f. Pre-clean and remove moveable objects from the Work Area. Pre-cleaning shall be accomplished using HEPA-vacuum and wet-cleaning techniques. Store moveable objects at a location determined by the City.

g. Protect carpeting that will remain in the Work Area.

(1) Pre-clean carpeting utilizing wet-cleaning techniques.

(2) Install a minimum of two layers of fire retardant 6-mil reinforced polyethylene sheeting over carpeting.

(3) Place a rigid flooring material, minimum thickness of 3/8-inch, over polyethylene sheeting.

h. Pre-clean all fixed objects to remain within the Work Area using HEPA-vacuum and wet-cleaning techniques.

i. Seal fixed objects with two individual layers, minimum, of 6-mil fire retardant polyethylene sheeting.

j. Pre-clean entire Work Area utilizing HEPA-vacuum and wet-cleaning techniques. Methods of cleaning that raise dust; such as dry sweeping or use of vacuum equipment not equipped with HEPA-filters, is prohibited.

k. Install isolation barriers (i.e., sealing of all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and other penetrations within the Work Area) using two layers of 6-mil fire retardant polyethylene sheeting and duct-tape.

l. Construct rigid framework to support Work Area barriers.

(1) Framework shall be constructed using 2-inch by 4-inch wooden or metal studs placed 16 inch on center when existing walls and/or ceiling do not exist for all openings greater than 32 square feet. Framework is not required except where one dimension is one foot or less or the opening will be used as an emergency exit.

(2) Apply a solid construction material, minimum thickness of 3/8-inch to the Work Area side of the framing. In secure interior areas, not subject to access from the public or building occupants, an additional layer of 6-mil fire retardant polyethylene sheeting may be substituted for the rigid construction material.

(3) Caulk all wall, floor, ceiling, and fixture joints to form a leak tight seal.

m. Seal floor drains, sumps, shower tubs, and other collection devices with two layers of 6-mil fire retardant plastic and fire rated plywood, as necessary, and provide a system to collect all water used by the asbestos abatement contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.

n. Remove ceiling mounted objects not previously sealed that will interfere with removal operations. Mist object and surrounding ACM with amended water prior to removal to minimize fiber dispersal. Clean all moveable objects using HEPA-vacuum and wet-cleaning techniques prior to removal from the Work Area.

o. Fiberglass insulation with intact coverings shall be protected in place during abatement activities. These materials shall be protected with two layers of 6-mil fire retardant polyethylene sheeting as isolation barriers and two additional layers of 6-mil fire retardant polyethylene sheeting serving as primary and secondary surface barriers.

p. Install and initiate operation of AFDs to provide a negative pressure and a minimum of four air changes per hour within the Work Area relative to surrounding non-Work Areas. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures. The use of HEPA-filtered vacuum to produce a negative air pressure inside the enclosure is prohibited.

q. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the Work Area. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

r. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.

s. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.

t. Prior to being plasticized, the Work Areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.

u. Plasticize the area after pre-cleaning, using the following procedures.

(1) Cover floors with one layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 6 inches up wall, and seal layer to wall.

(2) Cover walls with one layer of 6-mil fire retardant polyethylene sheeting, overlapping wall layer a minimum of 6 inches, and seal layer to floor layer.

(3) Cover floors with a second layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 12 inches up wall, and seal layer to wall.

(4) Cover walls with a second layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to floor layer.

(5) In areas where demolition is required to access ACM, a layer of fire retardant 6-mil reinforced polyethylene sheeting shall be placed on the floor of the enclosure.

(6) Perform demolition required to access ACM. Debris resulting from demolition activities shall be disposed of as ACM waste as described in this Specification.

(7) Repeat preparation of areas accessed by demolition activities as described above.

v. Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the Work Area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.

w. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.

x. Means of egress shall not be obstructed by hardwall barriers.

y. Pre-Removal Inspections.

(1) Prior to removal of any ACM, the asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Within Full Containment:

a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

b. Remove the material using hand tools such as scrapers or putty knives. Wire-mesh or wood lathe reinforcing, when present, shall be cut into manageable pieces and disposed of as ACM.

c. Remove any residual material from the substrate using wet cleaning methods and nylon-bristled hand brushes.

d. Place the removal material immediately into a properly labeled fire retardant 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

e. Following the completion of removal of insulation, all visible residue shall be removed from the substrate.

3. Following Removal of ACM utilizing Full Containment Procedures:

a. First Cleaning:

(1) Remove any visible accumulation of asbestos material and debris. HEPA-vacuuming and wet cleaning shall be performed on all surfaces inside the Work Area. All sealed drums, plastic bags, and equipment used in the Work Area shall be removed from the Work Area.

(2) Upon request of the asbestos abatement contractor, the Third-Party Air Monitor will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.

(3) Remove first layer of plastic sheathing inside the Work Area. The isolation barriers and decontamination facility shall remain in place and be utilized.

b. Second Cleaning:

(1) After the first cleaning, the Work Area shall be vacated for twelve hours to allow fibers to settle.

(2) All objects and surfaces in the Work Area shall be HEPA - vacuumed and wet cleaned for a second cleaning.

(3) A thin coat of lockdown encapsulant shall be applied to all plastic covered surfaces in the Work Area.

(4) When the encapsulant is dry, second layer of polyethylene sheeting on the walls, ceiling and floors shall be removed. Do not remove seals from doors, windows, Isolation Barriers or disconnect the negative pressure equipment.

c. Third Cleaning:

(1) A minimum of four hours after the second cleaning, all the surfaces in the Work Area shall be HEPA-vacuumed and wet cleaned for a third cleaning.

(2) Upon the request of the asbestos abatement contractor, the Third-Party Air Monitor will do final visual inspection for re-occupancy. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.

(3) When the Work Area passes the Third-Party Air Monitor's visual re-occupancy inspection, air sampling shall not begin until at least one hour after the completion of the third cleaning. The Third-Party Air Monitor shall perform air monitoring using aggressive testing techniques. The Third-Party Air Monitor will approve re-occupancy if the specified fiber count in the Work Area is achieved according to the Third-Party Air Monitor.

(4) When the Work Area passes the re-occupancy test, all controls and seals established shall be removed.

(5) The cleaned layer of the surface barriers shall be removed from walls and floors.

(6) The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

d. Final Barrier Removal:

(1) Upon receipt of acceptable clearance testing results, polyethylene sheeting and Isolation Barriers shall be removed and disposed accordingly as asbestos-containing material.

(2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

e. The Third-Party Air Monitor will conduct a final visual observation. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization.

C. Removal of ACM Roofing and Flashing Materials utilizing NYC DEP § 1-107 Foam Procedure for Roof Removal shall be as follows:

1. Preparation procedures:

a. These procedures apply only to the removal of asbestos-containing roofing material (ACRM) from exterior roof surfaces. The work area on the roof shall be cordoned off with clearly visible barriers such as caution tape, and only authorized persons shall have access.

b. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection for handling, and shall not affect the handling and disposal of the waste.

c. The foam or viscous liquid shall coat and maintain a stable blanket (minimum 1" thickness) for the duration of the removal process and shall leave an identifiable colored residue when it dissipates.

d. The foam or viscous liquid shall wet the ACRM. The ACRM shall be kept wet through the bagging process.

e. Persons entering the work area shall wear correctly-fitting, good traction rubber boots.

f. Abatement shall not be carried out during adverse weather conditions (e.g., precipitation, high winds, ambient temperature below 32 degrees Fahrenheit, etc.).

g. The worker decontamination unit may be attached to each work area at an entry/exit from each work area, or may be remote, in which case it shall be equipped with an airlock at the entrance. In addition to the shower head(s), the shower room shall be equipped with a flexible hose for waste decontamination for removal of less than 1,000 square feet of ACRM. For 1,000 square feet or more of ACRM removal, a separate waste decontamination facility shall be located at an entry/exit from each work area. Remote holding areas for the asbestos containing waste shall comply with Title 16, Chapter 8, Rules of the City of New York (16 RCNY 8 et. seq.).

h. Movable objects shall be removed from the work area, or kept in place and wrapped in one sheet of fire retardant 6 mil plastic sheeting.

i. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings shall be sealed with 2 layers of fire retardant 6 mil plastic or fitting with HEPA filters

when appropriate. Temporary extensions may be installed to a height of 10 feet to ensure adequate air exchange instead of sealing vents, air intakes, etc., with 2 layers of plastic or HEPA filters. Drains may be equipped with 5 micron filtering system in lieu of being sealed.

j. Fixed objects including perimeter walls, bulkheads, cooling towers, ducts and other rooftop appurtenances shall be covered in one sheet of fire retardant 6 mil plastic up to a height of at least six feet.

k. THE ASBESTOS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE INTERIOR SPACES BENEATH THE ROOF.

l. All office equipment and furniture, including but not limited to desks, chairs, computers, printers, cabinets, etc., carpeted and wooden floors shall be covered with one layer of 6- mil plastic sheeting.

m. THE ASBESTOS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR IN THE INTERIOR SPACES, INCLUDING BUT NOT LIMITED TO OFFICE EQUIPMENT, FURNITURE, FLOORS, ETC., BENEATH THE ROOF DURING ALL PHASES OF THE ROOF ABATEMENT.

n. The asbestos abatement contractor shall provide temporary roof protection consisting of 10-mil polyethylene sheeting following abatement over the open roof areas. Strict coordination with the General Asbestos abatement contractor, Construction Project Manager and/or Architect is required and necessary during this phase of abatement.

o. Preliminary examination shall be conducted and precautions shall be taken to prevent damage to the interior of the building, including but not limited to office equipment, furniture, carpeted and wooden floors, etc., and to ensure no adverse effect on the structural stability of the roof due to the abatement activity.

p. Abatement activities shall not be carried out during adverse weather conditions (e.g., precipitation, heavy winds, etc.).

q. The floor area between the remote decontamination facility and the Work Area must be protected with 2 layers of 6-mil. polyethylene sheeting suitably anchored.

r. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and

doors opening onto the roof, and all other openings are to be sealed with two layers of 6-mil plastic or fitted with HEPA-filters where appropriate. In lieu of sealing vents, air intakes, etc., with two layers of plastic or HEPA-filters, temporary extensions may be installed to a height of 10 feet to ensure adequate air exchange. Drains may be equipped with 5 micron filtering systems in lieu of being sealed.

s. Pre-Removal Inspections:

(1) Prior to removal of any ACM, the Asbestos abatement contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Roofing and Flashing Materials:

a. The asbestos abatement contractor shall be responsible for the removal of all roofing components, including multiple layers of built-up membrane, tar, vapor barrier and/or flashing down to the substrate/deck.

b. Prior to actual removal, the built-up roofing shall be blanketed and wetted with a minimum 1" coating of the acceptable foam or viscous liquid which shall be maintained for the duration of the removal until the material is bagged. The foam or viscous liquid shall be confined to the work area.

c. Hand-held power tools used to drill, cut into, or otherwise disturb the ACRM shall be equipped with the HEPA-filtered local exhaust ventilation and operated to prevent potential fiber release.

d. Abatement shall not be performed in adverse weather conditions (e.g., precipitation, heavy winds, etc.). Asbestos abatement contractor shall protect all exposed roof during adverse weather conditions.

e. Portable HEPA-vacuum machines shall be available during abatement.

f. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed, and then wet-cleaned and transferred into the shower room for double bagging. The double-bagged waste shall be transferred outside the clean room for its final transfer for storage in an enclosed waste container.

3. Following Removal of ACM Roofing and/or Flashing:

a. Upon completion of the abatement in roof work area, clean-up procedures shall involve removal and bagging of:

b. The asbestos containing roofing material (ACRM)

c. Visible accumulations of asbestos containing waste

d. All excess foam or similar viscous liquid

e. All debris, and shall be followed by a thorough wet cleaning.

f. All tools shall be wet cleaned and HEPA-vacuumed, and then removed from the work area upon completion.

g. Following the removal of all debris, the work area shall be thoroughly wet cleaned. The work area shall be allowed to dry completely before the visual inspection is conducted. The inspection shall confirm the absence in the work area of:

(1) ACM, debris, bagged ACM waste,

(2) Excess foam or other viscous liquid.

h. If the work area fails visual inspection, it shall undergo another wet cleaning and/or HEPA vacuuming until it passes the visual inspection.

i. When the visual inspection and clearance testing is successful, all plastic may be removed.

j. Air monitoring shall be conducted in accordance with the relevant provisions of Air sampling shall be conducted in compliance with NYC DEP Title 15 Chapter 1, §1-41 Air Sampling Schedule.

D. Removal of ACM from Vertical Exterior Surfaces utilizing NYCDEP Title 15, Chapter 1 §1-109 Abatement from Vertical Exterior Surfaces procedures shall be as follows:

1. Preparation procedures:

   a. This procedure shall apply to the abatement of asbestos-containing materials from vertical exterior surfaces such as, but not limited to caulking or glazing compounds, asphaltic materials or tar, cement siding or shingles (including transite), paints, sealants coping stone caps or clay roof tiles.

   b. The entire surface to be abated and ground-level perimeter shall be considered the work area unless partitions and warning tape are used to define the work area.

   c. A restricted area shall be established using warning tape extending at least 25 feet from the affected areas of the building or to the nearest vertical obstruction or the curb.

   d. The restricted area may be entered only by certified workers or authorized visitors.

   e. Before plasticizing, the restricted area shall be inspected for ACM debris and, if necessary, pre-cleaned using HEPA vacuums and wet methods.

   f. All openings to the building or structure's interior which are within 25 feet of the affected ACM shall be closed and sealed.

   g. Scaffolding erected to access the ACM shall be constructed, maintained, and used in accordance with applicable federal, state, and city laws.

   h. Horizontal surfaces beneath the affected ACM shall be covered with two layers of fire-retardant 6-mil plastic to a width of six feet.

   i. Elevated platforms being used to access the affected ACM shall be plasticized with two layers of fire-retardant 6-mil plastic, which shall extend up from the platform to at least the height of the mid-rail on three sides, and shall be attached directly to the building just below the surfaces under abatement.

   j. The ground-level restricted area shall be cleared of all moveable objects and plasticized with two sheets of fire-retardant 6-mil plastic, which shall be extended one foot up the side of the building. The plasticized area shall be ten feet wide for every floor up to a maximum width of thirty feet, or to the curb. This plastic shall be cleaned, replaced, and disposed of as asbestos waste at the end of each shift.

k. Sidewalk bridges in the restricted area shall be covered with two layers of fire retardant 6-mil plastic, placed over and secured to the bridge, spread across the full width, draped over the side to ground level, and extended to a width of at least thirty feet.

l. Establish a remote decontamination unit in accordance with Section 3.01 within the restricted area.

m. Construct all elevated work platforms a minimum of one foot below the surface to be abated.

n. Pre-Removal Inspections

(1) Prior to removal of any ACM, the asbestos abatement contractor shall notify the Project Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

(2) Asbestos abatement contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.

(3) Following the Project Monitor's approval of the Work Area preparations, removal of ACM may commence.

2. Removal of ACM Materials:

a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.

b. Remove the caulk using hand tools such as knives or scrapers.

c. Exercise caution when removing caulking material to prevent damage to windows or skylight openings.

d. Remove any residual asbestos-containing caulking material from the substrate using wet cleaning methods and nylon-bristled hand brushes. The use of metal bristled brushes is prohibited.

e. Place the removed material immediately into a properly labeled 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.

f. Following the completion of removal of caulking, all visible residues shall be removed from the substrate.

g. Air sampling shall be conducted in compliance with NYC DEP Title 15 Chapter 1, §1-41 Air Sampling Schedule. This sampling shall be performed by the Third Party Air Monitoring Firm.

3. Following Removal of ACM :

a. The stripped substrate shall be HEPA vacuumed and wet-wiped.

b. A visual clearance inspection shall be conducted by the asbestos handler supervisor and project monitor after the work area dries, to ensure the absence of ACM residue or debris in the work area.

c. After the inspection is completed, the warning tapes and barriers may be removed.

d. The clearance inspection shall be documented in the log and the project air sampling log.

e. Air monitoring shall be conducted in accordance with relevant provisions.

f. Asbestos abatement contractor shall request and pass a visual inspection performed by the consultant before proceeding to the next step. Documentation of passing this inspection shall be recorded in a daily logbook.

g. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.

h. If the Work is accepted by the Third-Party Air Monitor based on the inspection, asbestos abatement contractor shall be notified. Conduct the following activities in accordance with the contract and all applicable laws, codes, rules and regulations:

(1) All waste shall be removed from the Work Area and holding areas.

(2) All tools and equipment are to be removed and decontaminated in the decontamination enclosure system.

i. If the Work is not approved, the Third-Party Air Monitor will inform Asbestos abatement contractor who will then HEPA-vacuum and/or wet-clean the Work Area. The Third-Party Air Monitor will then

perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.

j. Final Barrier Removal

(1) Upon receipt of acceptable observation results, polyethylene sheeting and barrier tape shall be removed and disposed accordingly as ACM.

(2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

The Third-Party Air Monitor will conduct final visual inspection. Approval must be granted prior to break down of decontamination facility and asbestos abatement contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.

4.02 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS

A. Ensure that barriers are installed in a manner appropriate to the expected weather conditions during the project and for its duration. Repair damaged barriers and remedy defects immediately upon their discovery. Visually inspect barriers at the beginning and end of each work period.

B. Visually inspect non-Work Areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of two times for each 8-hour work shift.

PART 5 – ASBESTOS WASTE MANAGEMENT

5.01 ACM WASTE REQUIREMENTS

A. The asbestos abatement contractor and all sub-asbestos abatement contractors are specifically alerted to the illegal practice of combining asbestos-containing waste (ACW) from one project with the ACW of other projects without using the services of a permitted waste transfer station as defined by 6 NYCRR Part 360 and 364. As part of the shop drawing submittals, the Asbestos abatement contractor must submit for approval the proposed method of transportation and disposal that will be utilized to manage the ACW of this Contract. If a permitted transfer station is to be used, the cost shall be included in the work. The asbestos abatement contractor must submit a waste manifest consistent with whatever approved method is utilized as part of the invoicing and payment procedures.

B. The asbestos abatement contractor shall maintain compliance with the strictest set of regulations of Title 15, Chapter 1 of RCNY, NYC LL 70/85, NYS DOL ICR 56, USEPA, Asbestos Regulation 40 CFR Section 61.152, 29 CFR 1926.1101, 29 CFR 1910.1200 (F) of OSHA's Hazard Communication Standards, and other applicable standards.

NOTE: Any penalties incurred for failure to comply with any of the above regulations will be the sole responsibility for fines imposed due to negligence of the Asbestos abatement contractor.

C. When presenting ACW for storage at the generation site, the Asbestos abatement contractor shall:

1. Wet down ACW in a manner sufficient to prevent all visible emissions of dust into the air.

2. Seal material in a leak tight container while wet.

3. Keep ACW separate from any other waste.

D. When presenting ACW for storage away from the site of generation, the Asbestos abatement contractor shall:

1. Ensure that ACW has been properly packaged as per requirements above.

2. Examine the containers of ACW to ensure that there are no breaks in the containers and that no visible dust is being released into the air.

3. If examination reveals damage to a container of ACW the Asbestos abatement contractor or person accepting the waste shall immediately wet down the ACW and repackage it into a clean leak tight container. The subsequent repackaging shall be the financial responsibility of the Asbestos abatement contractor and occur at no extra cost to the City.

4. Keep ACW separate from any other waste.

E. When storing ACW – The Asbestos abatement contractor shall:

1. Ensure that the ACW has been sufficiently wetted down in tight containers.

2. Re-wet and repackage any damaged containers.

3. Maintain at storage site an adequate supply of spare leak tight containers.

4. Maintain at storage site an adequate supply of amended water.

5. Keep ACW separate from any other waste.

6. Keep ACW in a secured, enclosed, and locked container.

7. If the Asbestos abatement contractor has intention of sorting a quantity of ACW greater than or equal to 50 cubic yards, the Asbestos abatement contractor shall:

   a. Submit a written request and receive written approval from the City.

F. When presenting for transport, the Asbestos abatement contractor shall:

1. Ensure that ACW has been sufficiently wetted down.

2. Examine the integrity of the container's airtight seal.

3. Re-wet and repackage any damaged containers.

4. Keep ACW separate from all other waste.

5. Ensure that a person transporting asbestos waste holds a valid permit issued pursuant to law.

6. Frequency of Waste Removal:

   a. Properly packaged and labeled asbestos waste shall be removed from the site on a daily basis. Under no circumstance shall asbestos waste be stored on site without written approval from the City. The Waste Hauler and landfill shall be as indicated on the notifications to regulatory agencies.

G. Waste Load-out Through Equipment Decontamination Enclosure (Full Decontamination Facility): Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick polyethylene sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA-vacuuming in a designated part of the Work Area. Move wrapped asbestos waste to the equipment washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil polyethylene sheeting, as the item's physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.

1. The clean containerized items shall be moved to the equipment decontamination enclosure holding area pending load-out to storage or disposal facilities.

2. Workers who have entered the equipment decontamination enclosure system from the uncontaminated non-Work Area shall perform load-out of containers from the decontamination enclosure holding area. Dress workers moving asbestos waste to storage or disposal facilities in clean overalls of a color different than from that of coveralls used in the Work Area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the Work Area. Ensure that contaminated workers do not exit the Work Area through the equipment decontamination enclosure system.

3. Thoroughly clean the equipment decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.

4. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, including those turned “inside-out”, shall be handled and disposed of as ACM waste.

H. All asbestos materials, wastes, shower water, polyethylene, disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York Department of Environmental Conservation and New York City Department of Sanitation.

I. All asbestos materials shall be prepared for transportation in accordance with this specification and all applicable Federal, State, County and City Regulations. asbestos abatement contractor shall submit the following documentation:

1. Where applicable, an EPA Generator's identification number which has been obtained from the EPA for all asbestos waste generated from the project.

2. Applicable State Waste Hauler license and registration numbers.

3. Federal Hazardous Materials Waste Hauler number.

4. Designated landfill EPA Permit numbers.

J. Prior to loading asbestos waste the enclosed cargo areas (dumpster) shall be prepared as follows:

1. Clean via HEPA-vacuum and wet wipe techniques the enclosed cargo areas of all visible debris prior to preparing with polyethylene.

2. Line the cargo area with two layers of 6-mil polyethylene sheeting to prevent contamination from damaged or leaking containers. Floor sheeting shall be installed first and extend up the walls a minimum of 24-inches. Wall sheeting shall be overlapped and taped securely into place.

K. Asbestos-containing waste shall be placed on level surfaces in the cargo area of the dumpster and shall be packed tightly to prevent any shifting or tipping of the waste during transportation.

L. Asbestos-containing waste shall not be thrown into or dropped from the dumpster. All material shall be handled carefully to prevent rupture of the containers.

M. All personnel engaged in handling and loading of asbestos contaminated waste outside of the Work Area shall wear protective clothing. The disposable clothing shall include head, body and foot protection and color of clothing shall be different from abatement personnel in the Work Area. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters.

N. Asbestos abatement contractor shall immediately clean debris or residue observed on containers or surfaces outside of the Work Area. Cleaning shall be via HEPA equipped wet/dry vacuums only.

O. All asbestos-containing waste shall be transported from the abatement site to the landfill by a registered Waste Hauler. When transporting ACW:

1. Ensure that the ACW has been sufficiently wetted down in a leak tight container.

2. Re-wet and repackage any damaged containers.

3. Maintain at storage site an adequate supply of spare leak tight containers.

4. Maintain at storage site an adequate supply of amended water.

5. Keep ACW separate from any other waste.

P. Keep ACW in a secured, enclosed, and locked container.

Q. Waste transport documents shall conform to the requirements of the U.S. Department of Transportation, Hazardous Materials Transportation Regulation, 49 CFR Part 173 and EPA 40 CFR 61.150 (d)(1)(2). Shipping documents shall be clearly marked with the required designation "RQ Asbestos". Asbestos abatement contractor shall provide a copy of this document to the City.

R. A uniform hazardous waste manifest shall be prepared by the asbestos abatement contractor and signed by the asbestos abatement contractor each time the asbestos abatement contractor ships a dumpster load of Asbestos-Containing Waste Material. The uniform hazardous waste manifest shall include the site of waste generation, the names and addresses of the Transporter, the asbestos abatement contractor, and the landfill operator with information on the type and number of

asbestos-waste containers, time and date. Asbestos abatement contractor shall provide the Construction Project Manager, Third-Party Air Monitor or authorized designated representative with signed copies of the waste manifest before each departure.

S. Asbestos abatement contractor or his registered hazardous Waste Hauler shall transport asbestos-containing waste material from the abatement site directly to the specified disposal site. Asbestos abatement contractor or their Waste Hauler shall not accept material from any other site when transporting asbestos-containing waste material from the abatement site. The authorized DDC representative or Construction Project Manager reserves the right to travel with asbestos abatement contractor's Waste Hauler to the waste disposal site. No intermediate storage of waste material (i.e., asbestos abatement contractor's warehouse) shall be permitted.

T. Final or progress application for payments will not be processed unless all hazardous waste manifests generated to date have been received and reviewed by the Construction Project Manager.

U. All asbestos materials, wastes, shower water, polyethylene disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York State Department of Environmental Conservation and the New York Department of Sanitation.

V. Asbestos abatement contractor shall transport all sealed drums to a landfill disposal site approved by the Department of Environmental Conservation and the EPA. Transportation shall be performed by a New York State registered Waste Hauler, where required. When presenting the ACW for disposal the Asbestos abatement contractor or sub Asbestos abatement contractor shall:

1. Ensure that waste container is properly labeled according to the National Emission Standard for Hazardous Air Pollutants (NESHAP); Asbestos Revision, 40 CFR, Part 61, Subpart M. The labels shall include the name of the waste generator and the location where the waste was generated.

2. Comply with all applicable orders issued pursuant to asbestos disposal.

3. Ensure that ACW has been sufficiently wetted down.

4. Re-wet and repackage any damaged containers.

5. Keep ACW separate from all other wastes.

W. Asbestos abatement contractor shall notify the waste disposal site, at least 24 hours prior to transportation of asbestos contaminated waste to be delivered. Asbestos abatement contractor shall determine if a larger notification period is required.

X. At the site asbestos abatement contractors or Waste Hauler trucks shall approach the dump location as close as possible for unloading asbestos waste. Containers shall be carefully placed in the ground. Do not throw containers from truck.

Y. Asbestos abatement contractor or Waste Hauler shall inspect containers as they are unloaded at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.

Z. Asbestos abatement contractor or Waste Hauler shall not remove asbestos-containing waste Material from drums unless required to do so by the disposal site City. Used drums shall be disposed of as asbestos-asbestos contaminated waste.

AA. All personnel engaged in unloading of the containers at the waste site shall wear protective clothing. The disposable clothing shall include head, body and foot protection. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters. Workers shall remove their protective clothing at the disposal site, place it in labeled disposal bags and leave them with the deposited waste shipment.

BB. For the compaction operation, the asbestos abatement contractor shall ensure that disposal sites personnel have been provided with personal protective equipment by the disposal operator. If the disposal site City has not provided this protective equipment, the asbestos abatement contractor shall supply protective clothing and respiratory protection for the duration of this operation (PAPR respirators are mandatory).

CC. If containers are broken or damaged, the asbestos abatement contractor or Waste Hauler shall, using personnel who are properly trained and wearing proper protective equipment, shall repackage the waste in properly labeled containers. Asbestos abatement contractor shall then clean the entire truck and its contents using HEPA-vacuums and wet cleaning techniques until no visible residue is observed.

DD. Following the removal of all containerized waste, the asbestos abatement contractor shall decontaminate the truck cargo area using HEPA-vacuums and/or wet cleaning techniques until no residue is observed. All 6-mil polyethylene sheeting shall be removed and discarded as asbestos-containing waste material along with contaminated cleaning material and protective clothing, in containers at the disposal site.

EE. The transporter(s) of all asbestos waste shall not back-haul any items on his return from landfill/disposal site.

FF. All asbestos waste shall be disposed of in an approved Asbestos Landfill site only.

1. NO PERSON UNDER ANY CIRCUMSTANCES SHALL ABANDON ACW. The same shall be disposed of only by certified persons in approved landfills.

2. A manifest form will be signed by the Landfill documenting receipt and acceptance of the asbestos-containing waste. This manifest will be furnished to the City of New York within thirty calendar days from the project completion date.

3. It is the responsibility of the Asbestos abatement contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Asbestos abatement contractor must comply fully with these regulations and all appropriate U.S. Department of Transportation, EPA and other Federal, State and Local entities' regulations and all other current legal requirements.

4. The asbestos abatement contractor shall obtain an agreement from the transporter (s) that the practice of "Back-Hauling" will not be engaged in, with respect to any and all waste loads taken from this site during the work.

5. The asbestos abatement contractor will document actual disposal of the waste at the designated landfill by having completed a Disposal Certificate and will provide a copy of the same to the Department of Design and Construction.

PART 6 – ACCEPTANCE

6.01 ACCEPTANCE

Upon satisfactory completion of all decontamination procedures, a certificate will be issued by the Construction Project Manager with copies to all parties.

A. A letter of Compliance stating that all the work on the project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations.

B. All warranties as stated in the Specifications.

END OF SECTION 028213

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SECTION 03 00 00 - CONCRETE

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2. WORK INCLUDED

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the removal and restoration of floor area as required herein including, the following:

1. Cut the existing slab and construct the reinforced concrete.

2. Provide waterproofing on the exterior walls underside of slab below grade level.

1.3. RELATED WORK

A. The following Section contains requirements that relate to the Work of this Section:

2. Section 31 23 33 – Trenching, Backfilling and Compaction.

1.4. DELIVERY, STORAGE & HANDLING

A. Deliver materials properly identified as to type, size, manufacturer's name, specification code, etc., and undamaged.

B. Do not store exposed to weather; cover with suitable type material to protect from damage.

C. Store and protect all materials from injury prior to installation. Do not store any materials directly on the ground or floor. Keep materials as clean and dry as possible and free from damage or deteriorating elements.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Cement: ASTM C-150.

B. Sand, Stone and Gravel for Concrete: ASTM C-33.

C. Sand for Mortar and Grout: ASTM C-144.

D. Steel Reinforcement:

1. Epoxy Coated Reinforcing Bars: ASTM A 775/A 775M, and as follows:
   Steel Reinforcement: ASTM A 615/A 615M, Grade 60, Deformed.

E. Reinforcing Wire mesh: ASTM A-185.

F. Form Work:

1. Smooth Formed Finished Concrete – Form – facing panels that will provide continuous, true, and smooth concrete surfaces. Use appropriate size panels to minimize number of joints.

2. Form Ties – Factory fabricated, removable or snap-off metal or glass-fiber- reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

G. Concrete shall be well mixed stone concrete using Portland cement. Exposed concrete shall have float finish, f'c = 4,000 PSI at 28 days. All concrete materials, construction, shall be in accordance with the American Concrete Institute (ACI 318-05) and the latest New York City Building Code.

H. Water: complying with ASTM C 94, (Maximum allowable: 5 gallons per sack of cement) Clean, clear, potable and free from deleterious chemicals and substances.

I. Curing Materials:

1. Liquid Membrane Forming Compound: ASTM C309, Type 1 with fugitive dye or type 2; formulated to disintegrate after 28 days, and guaranteed not to affect the bond of applied finishes.

2. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz. / sq. yd. (305 g/sq. m.) dry.

3. Moisture Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

4. Water: Potable.

J. Waterproofing for exterior face and slabs of Pump Pit and Sump Pit: W/GM High Density Polyethylene (HDPE) with expandable quality granular Bentonite Waterproofing System. - ASTM D412, ASTM D751.

PART 3 - EXECUTION

3.1. EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2. SLAB OPENING

A. All cutting shall be saw cut and shall be done as neatly as possible. All concrete steel mesh or steel bar removed as result of the required cutting shall be replaced with new material in kind and tied to existing mesh or bars. Restore/retouch all cracked and spalled concrete floor.

B. Legally dispose of all debris materials.

3.3. CONCRETE

A. All concrete shall be job mixed or ready-mixed in accordance with RS 10-3 of the New York City Building Code. Aggregates shall be measured by weight. Admixtures will be added to the concrete only as specifically called for by the Commissioner.

B. The consistency of the concrete shall be such that it can be placed without segregation of the materials. Slumps for stone concrete of over 5 inches and for lightweight concrete of over 4 inches will not be permitted unless approved by the Commissioner.

C. The old and new slab shall be well bonded. Isolation joints shall be used at junctions with wall, columns and other points of restraint such as drain pipes and stairways.

D. Forms for concrete work shall conform to the requirements of the New York Building Code. Forms for all concrete work shall be held to true horizontal and vertical planes and shall conform to the lines, dimensions and shapes of concrete indicated as required, for the members for which provided. They shall be tight to prevent leakage of concrete, shall be securely braced and maintained in position to prevent any possibility of movement after the concrete is poured and shall insure safety to workmen and the public.

E. All concrete shall be kept wet for a period of 7 days by covering with orange label sisalkraft, HD Supply curing blankets, Sika Ultracure, or approved equal.

END OF SECTION 03 00 00

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SECTION 03 11 00 - CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract]

1.2 REFERENCES

A. Refer to DDC General Conditions

B. Reinforcement Bars: Section 03 21 00.

C. Cast-In-Place Concrete: Section 03 30 00.

D. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of Specifications for Structural Concrete for Buildings ACI 301-99 of the American Concrete Institute.

1.3 REQUIREMENTS

A. ACI 301, Section 2.1 – Formwork and formwork accessories.

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Field Examples: Provide formwork for mock-up of cast-in-place concrete. Construct forms using facing materials required to provide specified finishes and textures. Do not proceed with structure formwork until sample panels and forms have been approved by the Commissioner in writing.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Chamfer Strips: Wood, metal, PVC or rubber; 1-inch chamfer, unless otherwise indicated on the Drawings.

PART 3 - EXECUTION

3.1. EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2. PREPARATION OF FORM SURFACES

A. Apply form-coating material in accordance with manufacturer's instructions.

3.3. INSTALLATION

A. Provide chamfer on all exposed external corners of concrete.

B. Provisions for Work of Related Contracts: Provide openings in concrete formwork to accommodate Work of related contracts. Obtain information for size and location of openings, recesses and chases from contractor requiring such items.

C. Shores and Supports:

1. Concrete members subject to additional loads during construction shall be shored in such a manner as will protect the member from damage by the loads.
2. Place shores supporting successive stories directly over those below or engineer the shores to transmit the load directly to them.
3. Do not remove shores until the member supported has acquired sufficient strength to safely support its weight and any weight imposed thereon.

3.4. REMOVAL OF FORMS

A. ACI 301, Section 2.3.2 - Removal of Forms

3.5. RE-USE OF FORMS

A. Split, frayed, delaminated or otherwise damaged form facing material shall not be used.

END OF SECTION 03 11 00

SECTION 03 15 00 - CONCRETE ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

B. Section Includes:

1. Anchors installed in hardened concrete:
   a. Expansion type anchors, including wedge-type, and shell type (drop-in) anchors.
   b. Powder driven fasteners.
   c. Epoxy anchors.
   d. Inspection and testing of concrete anchors.

1.2 REFERENCES

A. Refer to DDC General Conditions.

B. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

1.5 PROJECT CONDITIONS

A. Fill over deck is lightweight concrete.

B. Cast-in-place normal weight concrete.

PART 2 - PRODUCTS

2.1 CONCRETE ANCHORS

A. Torque-Controlled Expansion Anchors: Kwik Bolt TZ, by Hilti (ICC ESR-1917), Strong-Bolt by Simpson (ICC ESR-1771), PK5 DeWalt Engineered by Power Fasteners or approved equal.

B. Shell-type (drop-in) Anchors: HDI by Hilti, Drop-in by Simpson, DeWalt Engineered by Power Fasteners or approved equal.

C. Powder Driven Fasteners: X-U fasteners as manufactured by Hilti, Inc.(ICC- ESR-2269), Ramset, DeWalt Engineered by Powers or approved equal.

D. Epoxy Adhesive (Cartridge-Type): Approved as per NYC Building Code, two component structural epoxy; prepackaged in cartridges for manually or pneumatically operated caulk gun and automatically mixed at nozzle. Subject to compliance with requirements provide one of the following:

1. HIT RE500-SD Adhesive Anchoring System, Hilti, Inc. (ICC ESR-2322).
2. SET-XP Adhesive Anchoring Systems, Simpson Strong-Tie Co. (ICC ESR-2508).
3. Red Head Epcon C6+ (ICC ESR-4046)
4. HIT-HY 150 MAX-SD Adhesive Anchoring System, Hilti, Inc. (ICC ESR-3013).
5. Approved Equal

2.2 ANCHOR RESTRICTIONS

A. Wedge-type Anchors: Acceptable for applications within the limitations of the applicable NYC Building Code.

B. Shell-type (drop-in) Anchors: Shall not be used in applications requiring resistance to forces due to wind or earthquake or tension forces due to gravity.

C. Powder Driven Fasteners: Shall not be used in applications requiring resistance to forces due to wind or earthquake forces or tension forces due to gravity.

D. Epoxy Anchors: Acceptable for applications within the limitations of the applicable NYC Building Code and shall not be used to fasten overhead, wall mounted or fire resistive construction. Epoxy dowels shall not be used for substitution of lap splices.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine areas to be drilled to verify conditions of access, interferences, and existing materials.

B. Locate existing reinforcing steel, which might interfere with drilling, with a suitable metal detector.

3.3 INSTALLATION

A. Holes for anchors and dowels shall be located to miss existing reinforcing steel wherever practical.

1. Where reinforcement is encountered and anchor cannot be shifted, install wedge type anchor with minimum 4 anchor diameter embedment above bottom of reinforcement.

B. Hole diameter shall be as specified in the applicable NYC Building Code for the size and type of anchor or dowel to be installed. Hole depth shall be as necessary to obtain the embedment specified on the drawings.

1. Torque controlled mechanical anchors installed in applications to resist tension due to gravity or seismic forces shall have an embedment equal to 8 anchor diameters, wherever practical.

C. Holes shall be prepared as specified in the applicable NYC Building Code. At a minimum, holes shall be cleaned of all dust and debris prior to installation of anchors or dowels. Cleaning shall consist of removal of debris with oil free compressed air (90 psi (632 gr/cm²), minimum), brushing of the hole twice in a twisting motion with a nylon brush and removal of debris with oil free compressed air (90 psi (632 gr/cm²), minimum).

D. Wedge-type anchors shall be installed to the minimum torque specified in the applicable NYC Building Code.

3.4 FIELD QUALITY CONTROL

A. The Testing Laboratory will:

1. Develop and utilize an effective method of field marking anchor and dowel test locations and results.

B. Test 25 percent of torque controlled mechanical anchors installed on a given day in tension using pullout procedure. Test to 80% of specified yield strength of the dowel or 200% of the NYC Building Code rated static capacity for 2500 psi concrete whichever is the lesser. Anchors specifically noted on the drawings as “No test required” do not require tension testing.

C. Test 25 percent of reinforcing steel dowels and threaded rods installed with epoxy on a given day in tension using pullout procedure. Test to 80% of specified yield strength of the dowel or 150% of the NYC Building Code rated static capacity whichever is the lesser with special inspection. Dowels specifically noted on the drawings as "No test required" do not require tension testing.

D. Pull test 25 percent of epoxy-type anchors installed on a given day in tension using pullout procedure. Test to 150 percent of the NYC Building Code rated static capacity with special inspection.

E. If the failure rate of anchors or dowels exceeds 10 percent, testing will be increased to 100 percent of that day's installation of similar anchors or dowels. Testing will be reduced to 25 percent of that day's installation when the failure rate is reduced to 10 percent or less.

F. Failed anchors and dowels shall be replaced at no additional cost to the City of New York.

END OF SECTION 03 15 00

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

B. Section Includes: Concrete reinforcement and accessories.

1.2. REFERENCES

A. Refer to DDC General Conditions.

B. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.

C. ACI – American Concrete Institute:

1. ACI 117 Tolerances for Concrete Construction
2. ACI 301 Specifications for Structural Concrete
3. ACI 315 Standard Practice for Detailing Reinforced Concrete Structures

D. ASTM :

1. ASTM A185 / A185M Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
2. ASTM A615 / A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3. ASTM A706 / A706M Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
4. ASTM A970 / A970M Standard Specification for Headed Steel Bars for Concrete Reinforcement

E. CRSI - Manual of Standard Practice.

F. ICBO - Evaluation Reports.

1.3. SUBMITTALS

A. Refer to DDC General Conditions.

B. Shop Drawings: Prepare placing drawings in accordance with ACI 315. Show size, shape and location of bars and wire fabric in structure. Show splice locations and lengths. Where details are not shown, conform to standards of practice indicated in ACI 315 and submit for approval.

1. Bill reinforcing bars for walls on elevations. Bill reinforcing bars for slabs on plans. Plans and elevations need not be true views. When more than one wall or slab are identical, only one such wall or slab is required. Take sections to clarify the arrangement of reinforcement. Identify, but do not bill bars on sections.
2. Unless the location of reinforcing is clear, give dimensions to some structural feature that will be readily distinguishable at time bars are placed.
3. Make placing drawings complete, including the location of support bars and chairs, without reference to the design drawings.

C. Submit data required to evaluate proposed mechanical splices.

D. Submit manufacturer's certified mill test reports on each heat of reinforcing steel delivered, showing physical and chemical analysis before placing reinforcement.

1.4. QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of ACI 301 CRSI's "Manual of Standard Practice", except where more stringent requirements are shown or specified.

B. Requirements of Regulatory Agencies: Proprietary products, including bar couplers.

C. Material Quality Assurance: Mill test reports including chemical analysis, tensile properties and bend test shall be examined for all reinforcing. Conform to one of the following:

D. Maintain positive identification of reinforcing by heat number. Provide certified mill test reports to Testing Laboratory.

E. Where positive identification cannot be made and procedures are not deemed adequate to ensure compliance, Testing Laboratory will randomly sample and make one tensile and one bend test from each 2-1/2 tons or fraction thereof of each size of reinforcement. Contractor will bear the cost of testing.

PART 2 - PRODUCTS

2.1. REINFORCING MATERIALS

A. Bar Reinforcement: ASTM A615, Grade 60, deformed billet bars.

1. ASTM A706, where noted on Drawings.
2. Recycled content shall be a minimum of 75 percent recycled post consumer steel.

B. Headed Bar Reinforcement: ASTM A970.

C. Spirals: ASTM A82.

D. Welded Wire Fabric: ASTM A185.

E. Threaded Bars: Grade 75, manufactured by DYWIDAY Systems International, Williams Form Engineering Corp., Steel Supply, Hillman Steelworks or approved equal.

F. Smooth Dowels, ASTM A615, Grade 40 or 60, smooth; sawcut or grind one end to remove offsets; shop paint with iron oxide zinc chromate primer.

G. Welded Deformed Bar Anchors: ASTM A-108 f_y = 70,000 psi, flux-filled deformed bar anchors welded to structural steel.

H. Mechanical Bar Couplers: Provide mechanical couplers. Coupler shall develop 160% percent of specified minimum yield strength of spliced reinforcement. Subject to compliance with requirements provide one of the following, or approved equal:

1. Baeteck Dextra Inc.
2. Lenton Taper Threaded Connection, Erico Inc.
3. Bar Lock, Dayton Superior Inc.

2.2. ACCESSORIES

A. Tie Wire: Minimum 16-gage black annealed wire.

B. Bar Supports:

1. At surfaces not exposed to view in completed structure: Precast concrete bar supports with two 16 ga. embedded wires or CRSI Class 2 wire supports.
2. Supports placed against ground or on top of vapor barrier: Precast concrete blocks not less than 3 inches square (1935 mm²) with two 16 ga. embedded wires.
3. At Architectural Concrete and surfaces exposed to weather: CRSI Class 2 stainless steel or CRSI Class 1 plastic protected.
4. Where support is no closer to concrete surface than 1/2 inch (13 mm): CRSI Class 3 wire supports.

2.3. FABRICATION

A. Fabricate reinforcement in accordance with ACI 315 where specific details are not shown.

PART 3 - EXECUTION

3.1. PLACEMENT

A. Surface Condition of Reinforcement: Before placing concrete, clean reinforcement of loose scale, dirt, grease and other substances which would impair bond with concrete.

B. Place reinforcement in accordance with the Drawings and the CRSI Manual.
1. Steel bars shall be of size and length indicated, accurately bent or formed to shapes detailed or scheduled by experienced shops by methods that will not injure the materials. Reinforcing bars shall be shop fabricated to lengths and bends shown on the drawings. Fabrication tolerance shall be in accordance with the requirements of ACI 315.

2. Reinforcing bars shall be as long as possible with a minimum number of joints.
3. Steel reinforcement shall not be bent or straightened in a manner that will injure the material or the embedding concrete. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of reinforcement for bending will not be permitted.
4. Reinforcement shall be tagged with suitable identification to facilitate sorting and placing.

C. Place reinforcing bars accurately as to spacing and clearance and securely tied at intersections and supports with wire and in such a manner as will preclude displacement during pouring of concrete. Placing tolerances shall be in conformance with the requirements of ACI 117.

D. Place and secure reinforcement to maintain the proper distance and clearance between parallel bars and from the forms. Provide vertical steel with metal spreaders to maintain steel properly centered in the forms. Horizontal reinforcement shall be supported at proper height on concrete pads, chairs or transverse steel bars.

E. After placing, maintain bars in a clean condition until completely embedded in concrete.

F. Bars shall not be spaced closer than 1-1/2 diameters of the largest of two adjacent bars, 1-1/2 times the maximum aggregate size, nor one inch, except at bar laps. Where reinforcement in members is placed in two layers, the clear distance between layers shall be not less than one inch (25 mm) or more than 1-1/2 inches (13 mm) unless otherwise noted on the drawings. The bars in the upper layer shall be placed directly above those in the bottom layer unless otherwise detailed.

G. Coverage of bars shall be as shown and scheduled. Conform to ACI 301 where not indicated.

H. Where obstruction prevents the intended placement of reinforcement, provide additional reinforcement as directed by the City of New York around the obstruction.

I. Splice bars as indicated by lapping and securely wiring together. Splices at locations other than those indicated are subject to the approval of the City of New York. Splices of reinforcement shall not be made at the point of maximum stress. Splices shall provide sufficient lap to transfer the stress between bars by bond and shear. Bars shall be spread the minimum distance specified. Stagger splices of adjacent bars where possible.

J. Reinforcing bars shall not have welded joints.

K. Mechanical Bar Couplers: Install in accordance with applicable NYC Building Code. Maintain clearance and coverage at coupler. Stagger couplers wherever practical.

3.2. FIELD INSPECTION

A. The City of New York Testing Laboratory will:

1. Review Quality Assurance procedures for maintaining identification of steel. Collect certificates of compliance and test reports for reinforcing steel.
2. Special Inspect placement of reinforcement for conformance with the Contract Documents and as required by NYC Building Code.

3. Special Inspect installation of mechanical couplers in accordance with requirements of applicable NYC Building Code.
4. Special Inspect shop and field welding as required by NYC Building Code.

END OF SECTION 03 20 00

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SECTION 03 21 00 - REINFORCEMENT BARS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2. RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Formwork: Section 03 11 00.

B. Cast-In-Place Concrete: Section 03 30 00.

1.3. REFERENCES

A. Refer to DDC General Conditions

B. Except as shown or specified otherwise, the Work of this Section shall conform to the applicable requirements of the following:

1. Specifications for Structural Concrete, ACI 301-99 of the American Concrete Institute.
2. Manual of Standard Practice, MSP-1-01 of the Concrete Reinforcing Steel Institute.

1.4. SUBMITTALS

A. Refer to DDC General Conditions
B. Shop Drawings: Placing drawings for bar reinforcement.

C. Samples:

1. Bar Supports: Full size.
2. Fabric Reinforcement: 8 inches square, each wire size.
3. Fabric Reinforcement Supports: 3’-0” long pieces.
4. Reed Clips: 2’-6” long pieces.

D. Quality Control Submittals:

1. Certificates: Affidavit required under Quality Assurance Article.

1.5. QUALITY ASSURANCE

A. Refer to DDC General Conditions

B. Certifications: Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.

1. Submit evidence of steel material compliance with this Specification. Evidence shall consist of certification of source of material, copies of purchase orders and manufacturer's certifications. For stock material, submit copies of latest mill or purchase orders for material replacement.
   a. Documentation to confirm compliance with General Conditions Article 25.4 Domestic Steel.
2. Fabricator's and Erector's Qualifications Data: 3 years of experience performing similar work.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.

B. Fabric Reinforcement: ASTM A 185, welded wire fabric, fabricated into flat sheets unless otherwise indicated.

C. Bar Supports; Either of the Following Types:
1. Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.
2. Insoluble plastic, with minimum 1,500 psi tensile strength and capable of retaining fabricated shape at temperatures between 5 degrees F and 170 degrees F.

D. Fabric Reinforcement Supports:

1. Uni Zag by Universal Form Clamp
2. Continuous Support, “CS” by Dayton Superior
3. Concrete Wire mesh, by Beton

E. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

PART 3 – EXECUTION

3.1. EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution

3.2. PLACING

B. ACI 301, Section 3.3 Execution

3.3. SCHEDULE

A. Unless other reinforcing is shown on the drawings, reinforce the following items of concrete as indicated below:
   1. Concrete Slabs on Grade: 4 x 4 – W4.0x W4.0 welded wire fabric.
   2. Concrete Floor Fills 2-1/2 Inches Thick or Less: 6 x 6 - W2.1 x W2.1 welded wire fabric.
   3. Concrete Floor Fills Greater than 2-1/2 Inches Thick: 6 x 6 - W4 x W4 welded wire fabric.
   4. Concrete Slabs Supported by Steel Joists: 6 x 6 - W2.1 x W2.1 welded wire fabric.

END OF SECTION 03 21 00

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Formwork: Section 03 11 00.

B. Reinforcement Bars: Section 03 21 00.

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of American Concrete Institute (ACI) and American Society for Testing and Materials (ASTM) documents.

1. ACI 301-05: Specification for Structural Concrete for Buildings.
2. ACI 302.1R-04: Guide for Concrete Floor and Slab Construction.
3. ACI 302.2R-06: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
4. ACI 304.2R-96: Placing Concrete by Pumping Methods.
5. ACI 305R-10: Hot Weather Concreting.
6. ACI 306R-10: Cold Weather Concreting.
7. ACI 308.1-11: Standard Specification for Curing Concrete.
8. ACI 318 -05 Building Code Requirements for Structural Concrete.
9. ASTM C 94/C 94M – 11b: Standard Specification for Ready- Mixed Concrete.
10. ASTM C 494/C 494M - 11: Standard Specification for Chemical Admixtures for Concrete.
11. ASTM F 710- 11: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.4 DEFINITIONS

A. Refer to DDC General Conditions.

B. ACI 301, Section 1.2 – Definitions.

1.5 SUBMITTALS

A. Refer to DDC General Conditions.

B. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.

C. Product Data:

1. Mix Design: Submit proposed concrete design mix(es) together with name and location of batching plant at least 28 days prior to the start of concrete work.

   a. Include test results of proposed concrete proportions based on previous field experience or laboratory trial batches in accordance with ACI 301, Section 4.
   b. Pumped Concrete: Include test results of proposed design mix(es) tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.

2. Portland Cement: Brand and manufacturer's name.
3. Fly Ash: Name and location of source, and DOT test numbers.
4. Air-entraining Admixture: Brand and manufacturer's name.
5. Water-reducing Admixture: Brand and manufacturer's name.
6. High Range Water-reducing Admixture (Superplasticizer): Brand and manufacturer's name.
7. Corrosion Inhibitor Admixture: Brand and manufacturer's name.
8. Accelerating Admixture: Brand and manufacturer's name.
9. Aggregates: Name and location of source, and DOT test numbers.
10. Lightweight Coarse Aggregates: Brand and manufacturer's name.
11. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
12. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
13. Expansion Joint Fillers: Brand and manufacturer's name.
14. Waterstop: Brand and manufacturer's name, and installation instructions.
15. Emery Aggregate: Brand and manufacturer's name, and application instructions.
16. Integral Water-Repellent Admixture: Brand, manufacturer name, specifications, and application instructions.

D. Quality Control Submittals:

1. Batching Plant Records: At the end of each day of placing concrete, furnish the Commissioner with a legible copy of all batch records for the concrete placed.
2. Concrete Pumping Equipment Data: Include manufacturer's name and model of principal components, type of pump, and type and diameter of pipe/hose.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Qualifications of Crew Pumping Concrete: Workers pumping concrete shall have had at least one year of experience pumping concrete.

C. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.

D. Truck mixers for concrete shall be currently approved by the New York State Department of Transportation.

E. Pumping equipment for pumped concrete shall be subject to the approval of the Commissioner.

F. Fly ash supplier shall be on the New York State Department of Transportation's current "Approved List of Suppliers of Fly Ash".

G. Source Quality Control: The Commissioner reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:

1. Batching and mixing facilities and equipment.
2. Sources of materials.

H. ACI 301, Section 1.3 Reference standards and cited publications.

I. Pre-Construction Conference: A minimum of 14 days prior to the initial submission of shop drawings, a conference will be held by the Commissioner at the Site for the purpose of reviewing the Contract Documents and discussing the requirements and procedures for submittals and for the Work. The conference shall be attended by the Contractor, the concrete supplier representative, and the reinforcement fabricator's project coordinator.

1. If resilient flooring is to be placed on slab-on-grade, the meeting will also include discussion of curing procedures and moisture mitigation measures.

1.7 DELIVERY

A. ASTM C 94/C 94M, Article 14 - Batch Ticket Information: In addition to the information required by Paragraph 14.1, also include the following:

1. Type and brand, and amount of cement.
2. Weights of fine and coarse aggregates.
3. Class and brand, and amount of fly ash (if any).

PART 2 PRODUCTS

2.1. MATERIALS

A. Cement: ASTM C 150, Type I or II Portland cement. Do not use Type I cement if soil report indicates sulphate concentrations.

B. Water: Potable

C. Air-entraining Admixture: ASTM C 260, and on the New York State Department of Transportation's current "Approved List".

D. Water-reducing Admixture: ASTM C 494/C 494M, Type A, and on the New York State Department of Transportation's current "Approved List".

E. High Range Water-reducing Admixture (Superplasticizer): ASTM C 494/C 494M, Type F, and on the New York State Department of Transportation's current "Approved List".

F. Corrosion-Inhibiting Admixture: ASTM C 494/C 494M, for use in resisting corrosion of steel reinforcement.
1. DCI Corrosion Inhibitor by W. R. Grace & Co
2. Rheocrete CNI by Master Builders/ BASF Building Systems
3. Sika CNI by Sika Corporation
4. DCI - S Corrosion Inhibitor by W. R. Grace & Co
5. Or approved equal.

G. Retarding Admixture: ASTM C 494, Type D, Water-reducing and retarding, for use in hot weather concreting, and on the New York State Department of Transportation's current "Approved List".

H. Accelerating Admixture: Non-corrosive admixture, containing no chloride, complying with ASTM C 494, Type C or E, and on the New York State Department of Transportation's current "Approved List".

I. Fly Ash: ASTM C 618, including Table 1 (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.

J. ACI 301, Section 4.2.1.2 – Aggregates.

K. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate.

1. Lapidolith by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.

2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.
3. Pena-Lith by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372
7. Or approved equal.

L. Type 1 Expansion Joint Filler: Preformed, resilient, nonextruding cork units complying with ASTM D 1752, Type II.

M. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).

1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
3. Epogrip by Sonneborn/-BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517
4. Or approved equal.

N. Emery Aggregate: Natural emery, crushed, polyhedral in shape, with not more than 10 percent flat or elongated pieces, properly screened, graded and packaged in the manufacturer's plant, and delivered to the Site in sealed, labeled packages.

1. Emerundum by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
2. Non-Slip Aggregate by Setcon Industries, Inc., 5 Mathews Ave., Riverdale, NJ 07457-1020, (201) 283-0500.
3. Frictex H by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517
4. Or approved equal.

O. Expansion Joint Dowels: Smooth steel expansion joint dowel with minimum 5-inch-long steel dowel cap, unless otherwise indicated.

P. Integral Water-Repellent Admixture:

1. Hydrocide Powder by Sonneborn/ BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517,

2. Darapel by W. R. Grace & Co., - Conn., 62 Whittemore Ave., Cambridge, MA 02140, (617) 876-1400, Sikamix W-10
3. Sikamix W-10
4. Or approved equal.

2.2. PROPORTIONING OF MIXES

A. Cast-in-place concrete shall be air-entrained normal weight concrete.

1. Normal weight concrete, except as otherwise specified, shall have a minimum compressive strength of 3000 psi with a minimum of 564 pounds per cubic yard or 4000 psi, with a minimum of 611 pounds of cement per cubic yard. Slump: Maximum 4 inches; minimum 2 inches before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the Site.
2. Normal weight concrete for garage floors, and for exterior slabs, ramps and stairs shall have a minimum compressive strength of 4000 psi, with a minimum of 611 pounds of cement per cubic yard. Slump: Maximum 3 inches; minimum 2 inches before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the Site.
3. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight and lightweight concrete up to a maximum of 15 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.

    a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.
    b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

B. Slump for Pumped Concrete: When a water-reducing admixture is not used, maximum slump shall be 4 inches. When a water-reducing admixture is used, maximum slump shall be 6 inches and when a high-range water-reducing admixture (superplasticizers) is used, maximum slump shall be 8 inches.

C. Design Air Content: Air content for concrete shall be 6 percent by volume, with an allowable tolerance of plus or minus 1.5 percent for total air content, except as otherwise specified. Use air-entraining admixture, not air-entrained cement.

D. Water-Cement Ratio: Cast-in-place concrete shall have a maximum water-cement ratio of 0.40.

E. ACI 301, Section 4.2.2.3.

F. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Commissioner.

G. ACI 301, Section 4.1.2.1 - Mixture Proportions.

H. Application Rate for Integral Water Repellent Admixture:

1. Hydrocide Powder, 1 lb. for each 94 lb. of cement
2. Darapel, 3 to 6 oz. for each 100 lb. of cement.

2.3. JOINTS

A. ACI 301, Section 5.3.2.6 - Construction joints and other bonded joints.

B. ACI 301, Section 10.2.5 – Isolation-joint filler materials.

2.4. PRODUCTION OF CONCRETE

A. Provide ready-mixed concrete, either central-mixed or truck-mixed, unless otherwise approved in writing by the Commissioner.

B. ACI 301, Section 5.3.2.1 Weather considerations.

C. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.

1. In cold weather, comply with ACI 306R.

a. When air temperature is below 40 degrees F (4 degrees C) heat the mixing water and, if necessary, the aggregates to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement. If the mixing water is heated, do not exceed a temperature of 140 degrees F at the time it is added to the cement and aggregates.

2. In hot weather, comply with ACI 305R.

a. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1. EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2. EXAMINATION AND PREPARATION

A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.

B. Check items of aluminum required to be embedded in the concrete and ensure that they are coated, painted or otherwise isolated in an approved manner.

C. Install waterstops in accordance with manufacturer's printed instructions.

D. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.

E. Do not deposit concrete in water. Keep excavations free of water by pumping or by other approved methods.

F. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.3. ADMIXTURE ADDITIONS AT THE SITE

A. Site additions shall be limited to high-range water-reducers, non-chloride accelerators, and corrosion inhibitors. Comply with manufacturers' printed instructions for discharge of admixtures shall be furnished.

B. High-Range Water-Reducers:

1. Concrete shall arrive at a slump of 2 to 4 inches (50 to 100 mm). Water additions at the Site shall be limited to comply with water-to-cementitious ratio requirements.
2. Following addition of high-range water-reduced concrete, a minimum of 70 revolutions or 5 minutes of mixing shall be completed to assure a consistent mixture.

C. All concrete with other admixture additions shall mix a minimum of 70 revolutions or 5 minutes to assure a consistent mixture.

3.4. PLACING

A. ACI 301, Section 5.3.2.3 Conveying equipment.

B. ACI 301, Section 5.3.2.2 – Conveying.

C. ACI 301, Section 5.3.2.4 – Depositing.

3.5. RESTORING/RETOUCHING SURFACE DEFECTS

A. ACI 301, Section 5.3.7 – Restore/retouch of surface defects.

B. ACI 301, Section 5.3.7.2 - Restore/retouch of tie holes.

3.6. FINISHING FORMED SURFACES

A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:

1. Rough Form Finish for concrete surfaces not exposed to view.
2. Smooth Form Finish for concrete surfaces exposed to view.

B. ACI 301, Section 5.3.3.3 - As-cast Finishes.

3.7. SLABS

A. Slabs on Grade: Provide key type joints unless otherwise shown. Tool exposed joints.

B. ACI 301, Section 5.3.4 – Finishing unformed surfaces.

C. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:

1. Floated Finish for:

a. Slabs and fill over which waterproofing, roofing, vapor barrier, insulation, terrazzo, or resin bound flooring is required.

2. Troweled Finish for:

a. Interior slabs that are to be exposed to view.
b. Slabs and fill over which thin-set ceramic tile is required, except fine-broom finished surface.
c. Treads and platforms of interior steps and stairs.

3. Broom or Belt Finish for:

a. Exterior slabs. Texture as approved by the Commissioner.

4. Scratched Finish for:

a. Surfaces to be covered with floor topping.

5. Integral Emery Aggregate Surfacing with Floated Finish

D. ACI 302 Chapter 8.2.8.2 - Tools for jointing; Saw-cutting.

E. ACI 302 Chapter 8.3.12 – Saw-cut joints.

F. Exposed surfaces with fibrous reinforcement: After curing of the concrete, remove any protruding fibers in a manner which will not harm the parent concrete.

G. Floor flatness and levelness tolerances: For flatness and levelness tolerances of floor slabs refer to ACI 302 Chapter 8.15 – Floor flatness and levelness. Floor surface tolerances shall be 1/8 inch over a horizontal distance of 10 feet in any direction, unless otherwise specified by floor profile quality classifications in ACI 302.

1. When flatness or levelness tolerances are not met then the floor shall be ground or scarified and repoured to meet specifications.

3.8. CURING AND PROTECTION

A. Hot Weather Concreting: Comply with ACI 305R (Guide to Hot Weather Concreting) whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.

B. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.

C. Curing and Moisture Mitigation for Resilient Flooring:

1. Acceptable curing and drying conditions include a minimum ambient temperature of 70 degrees F and a maximum relative humidity of 50%.

   a. Air movement at 15 mph.

2. Do not cure slabs by adding water; ponding or wet burlap method.
3. Do not use curing compounds or cure-and-seal materials unless such use is approved in writing by the adhesive and floor covering manufacturers. The curing product manufacturer's conformance to ASTM c 1315 is not a substitute for the adhesive and floor covering manufacturer's approval.
4. Cure the slab by covering with waterproof paper, plastic sheets, or a combination of the two for 3 to 7 days.

3.9. CHEMICAL HARDENER (DUSTPROOFING)

A. Apply chemical hardener to all troweled finished interior floors which are to be left exposed.

B. Do not apply chemical hardener until concrete has cured the number of days recommended in manufacturer's instructions.

C. Prepare surfaces and apply chemical hardener in accordance with manufacturer's printed instructions and recommendations.

3.10. FIELD QUALITY CONTROL

A. ACI 301, Section 1.6.4.2 - Testing Services.

B. ACI 301, Section 1.6.3.3 – Tests required of Contractor's testing agency.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the City of New York and as accepted by the Commissioner. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Commissioner before using in the work.

D. Test results will be reported in writing to the Commissioner, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

E. Nondestructive Testing: Impact hammer, Windsor probe, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional Tests: The Commissioner shall make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure. The testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

G. Moisture Testing: Test all slabs-on-grade for moisture content that will receive resilient flooring. For a preferred moisture testing method and limits; consult the written instructions of the floor covering manufacturer, the adhesive manufacturer, the patching/underlayment manufacturer, or combination thereof. Test repeatedly until the desired moisture content is obtained.

H. pH Testing: Test concrete floors for pH level prior to the installation of resilient flooring. Do not exceed the recommended pH level of the resilient flooring manufacturer or the adhesive manufacturer, or both.

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SECTION 04 20 00 – UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Scope of Work in this section includes the following:

1. Selective face brick replacement at existing and rebuilt parapets, roof curbs and infill wall as indicated on drawings. New face bricks shall match existing face brick in profile, finish, texture and color. The coursing and pattern of bricks shall match existing coursing and pattern.

2. Concrete masonry units at rebuilt and raised parapets and at infill wall, as indicated on drawings.

1.3 REFERENCES

A. Refer to DDC General Conditions

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications or mandated by NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society of Testing and Materials (ASTM) standards, latest editions.

a. A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Products.

b. A240 Standard Specification for Heat-Resisting Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.

c. A615 Standard Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.

d. A706 Standard Specifications for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

e. A951 Standard Specification for Steel Wire for Joint Reinforcement.

f. C62 Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale.

g. C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50 MM Cube Specimens).

h. C144 Standard Specifications for Aggregate for Masonry Mortar.

i. C150 Standard Specification for Portland Cement.

j. C207 Standard Specification for Hydrated Lime for Masonry Purposes.

k. C216 Standard Specification for Facing Brick (Solid Masonry Units made from Clay or Shale).

l. C270 Standard Specification for Mortar for Unit Masonry.

m. C404 Standard Specifications for Aggregates for Masonry Grout.

n. C476 Standard Specification for Grout for Reinforced and Nonreinforced Masonry.

o. C652 Standard Specification for Hollow Brick

p. C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

q. C979 Standard Specification for Pigments for Integrally Colored Concrete.

r. C1019 Method of Sampling and Testing Grout.

2. American Welding Society – AWS D1.4 – Structural Welding Code – Reinforcing Steel

3. Underwriters Laboratory- UL 618, Standard for Concrete Masonry Units.

1.4 DESIGN REQUIREMENTS

A. No air-entraining admixtures or material containing such shall be permitted in the mortar. Also, no anti-freeze compounds, calcium chloride, or other compounds, unless expressly permitted otherwise, shall be permitted in the mortar.

B. Mortar types to be used shall be 'Type N', unless otherwise stated

1.5 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Submit manufacturer supplied Product Data for following items to show compliance with specified requirements.

1. Complete data for each type of masonry units used in work. Laboratory test reports for brick shall be no more than two years old.

2. A list indicating the maximum dry weight of each type and size of CMU to be used in the project.

3. Complete date for reinforcements, anchors and ties, of each type.

4. Portland Cement: Brand and manufacturer's name and data.

5. Lime: Brand and manufacturer's name.

6. Mortar Pigments: Brand and manufacturer's name.

7. Packaged Products: Brand and manufacturer's name.

8. Sand: Location of pit, name of owner and previous test data.

9. Masonry reinforcement, anchors.

C. Samples

1. Submit samples of brick:

a. Submit minimum 3 samples of face bricks for each color and type for selection by the commissioner. Brick samples shall closely match existing, surrounding brick after cleaning of existing brick surfaces. Note that different brick finishes exist at different locations.

b. No brick is to be installed without the approval of the Commissioner.

2. Submit mortar samples for each location of new brick masonry work. New mortar is to match the color, texture and general appearance of the existing cleaned mortar.

D. Mock Up

1. Provide sample mock up installation of face brick at following 3 different conditions for review and approval by commissioner prior to installation. The sample installation shall illustrate mortar, bonding, jointing and course heights and conform with appearance and workmanship indicted in the drawings and specifications. Exact location for mock up samples to be determined in the field by the commissioner.

    a. 24”x24”face brick sample installation at rebuilt parapet in one of the corners of two story roofs.

    b. 24” long face brick installation at the raised roof curb along the single story roof.

2. Do not proceed with face brick masonry work until written approval of mock ups are obtained from the Commissioner.

3. Approved mock up installations may remain in place as part of the project work.

E. Quality Control Submittals

1. Schedule of Uses: By mortar type.

2. Certificates

    a. Submit Building Department affidavit from masonry manufacturer (Form 10H) stating materials delivered to project comply with the Specification requirements.

    b. Submit Building Department affidavit from masonry supplier (Form 10J) stating materials delivered to project comply with the Specification requirements.

    c. Submit lightweight CMU producer’s certificate stating aggregate used is 100% lightweight, expanded shale, clay, or slate (rotary kiln) aggregate, in accordance with ASTM C331. To provide the required recycled content, it is acceptable to provide up to 20% lightweight recycled aggregate that will maintain the same fire resistance equivalent thickness of 100% expanded shale, clay, or slate without a decrease in block strength.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Qualifications

1. Installers specializing in the Work of this Section shall have a minimum of three years experience with similar scope of work and quantity of materials. Experience shall include

experience for all masonry work indicated, including mortar matching, masonry cleaning and unit masonry installation.

C. Regulatory Requirements

1. Work of this Section shall conform to all requirements of the NYC Building Code. Where more severe requirements than those contained in the New York City Building Code are given in this Section, the requirements of this Section shall govern.

2. NYC Board of Standards and Appeals (BSA) approvals, NYC Materials and Equipment Acceptance (MEA) approvals or Office of Technical Certification and Research (OTCR)

D. Certifications

1. Masonry construction shall conform to the material acceptance, certification and inspection requirements of the NYC Building Code.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in undamaged condition per ASTM guidelines. Store in an enclosed location or off the ground with waterproof covering as needed to protect all materials from moisture, contaminants, corrosion, deleterious temperature changes, and other harmful conditions. Insure proper identification of reinforcement after bundles are broken. Masonry units may not be stored on roofs.

B. Packaged Products:

1. Deliver materials to the site in manufacturer's original, sealed containers. Do not deliver materials which have exceeded shelf life limitation set forth by the manufacturer.

2. Material containers shall bear the manufacturer's label indicating manufacturer's name, trade name of product, lot number, shelf life of product, and mix ratio (if applicable). This includes individual bags of pre-bagged mortar mixes.

3. Comply with manufacturer's printed instructions for storing and protecting materials.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Construction Requirements

1. Salt or other chemicals for lowering the freezing temperature of the mortar shall not be used.

2. Masonry units, mortar, and grout shall be preconditioned and masonry protected for the following cold weather conditions per Section 2104.3 of the NYC Building Code:

   a. Air temperature 40 deg. F to 32 deg. F:

      1) Heat mixing water ‘or’ sand to minimum 70 deg. F and max.140 deg. F.

      2) Mortar and grout temperature shall be between 40 deg. F and 120 deg. F at the time of mixing.

   b. Air temperature 32 deg. F to 25 deg. F:

      1) Heat mixing water ‘or’ sand to minimum 70 deg. F and max.140 deg. F.

      2) Mortar and grout temperature shall be between 40 deg. F and 120 deg. F at the time of mixing. Grout temperature shall be maintained to above 70 deg. F at the time of grout placement.

      3) Provide heat source to maintain temperature of 32 deg. F on each side of masonry construction.

   c. Air temperature 25 deg. F to 20 deg. F:

      1) Heat mixing water and sand to minimum of 70°F and to maximum of 120°F.

      2) Provide heat source to maintain a minimum air temperature of 32° on each side of masonry construction.

      3) Provide wind breaks for wind in excess of 15 miles per hour.

      4) Keep temperature of masonry units a minimum of 40oF when laid and prior to grout placement

   d. Air temperature 20 deg. F and below:

      1) Heat mixing water and sand to a minimum of 70oF and to maximum of 120oF.

      2) Provide enclosures and heat source to maintain a minimum air temperature of 32oF on each side of masonry construction during construction.

      3) Keep temperature of masonry units a minimum of 40oF when laid and prior to grout placement.

B. Cold Weather Protection Requirements

1. Mean Daily Air Temperature of 40°F to 32°F:

    a. Protect masonry with weather resistive membrane from rain or snow for 24 hours.

2. Mean Daily Air Temperature of 32°F and Below:

    a. Protect masonry with weather resistive membrane from rain or snow for 24 hours.

    b. An air temperature of at least 32°F shall be maintained on each side of masonry for a period of at least 48 hours if Type M or S mortar is used and at least 72 hours if Type N or O mortar is used.

C. Hot Weather Construction

1. Follow the requirements of NYC BC 2104.4. When temperatures exceed 100°F, or 90°F with a wind speed of 8 mph, provide necessary conditions and equipment to produce mortar having a temperature below 120oF and to maintain the mortar and grout below 120oF.

D. Wetting of Clay Masonry Units

1. Provide pre-wetting of masonry for units with initial rates of absorption that require their wetting before laying (21.42 grams per 30 square inches or 0.025 ounce psi). In cold weather requirements, follow the following requirements:

    a. If surface temperatures are above 32ºF, use water heated to about 70ºF.

    b. If surface temperatures are below 32oF, use water heated to about 120oF.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Facebrick Distributors

1. Consolidated Brick and Building Supplies, NY

2. Tri-Stte Brick & Building Materials, Inc., NY

3. Belden Brick Sales & Service, Inc., NY

4. Or approved equal

B. Reinforcement and Ties

1. Hohmann & Barbard, Inc., Hauppage, NY
2. Dur-O-Wall, Arlington Heights, IL
3. Wire Bond, Charlotte, NC
4. Or approved equal

C. Mortar Coloring

1. "SGS" Mortar Colors, Solomin Grind- Chem Services Inc.
2. "True Tone Mortar Colors", Rockwood Industries Inc.,
3. "Flamingo Colors", Lehigh Corp
4. Or approved equal

D. Mortar Additives

1. Biordi Co.
2. Master Builders INC., Cleveland, OH
3. Sika Corp, Lyndhurst, NJ
4. Or approved equal

E. Mortar Weeps

1. Mortar Net USA
2. Hohmann & Bernard Inc., Hauppauge, NY
3. Wire Bond, Charlotte, NC
4. Or approved equal

2.2 MATERIALS

A. Facebrick: Clay or Shale, ASTM C216, grade SW, type FBX, cored or solid, Size shall match existing construction, unless otherwise indicated. Colors and textures to closely match existing, and as selected by the Commissioner. Brick shall be manufactured to special sizes and shapes, not cut in the field. Brick shall be tested for efflorescence in accordance with ASTM Test Methods C67 and the rating shall be "Not Effloresced".

B. Concrete Masonry Units (CMU)

1. Concrete Masonry Units (CMU) shall be of type indicated in the drawings:

a. Hollow Load-Bearing: ASTM C90. Aggregate shall conform to ASTM C331.

b. Solid Load-Bearing (units with 75% or more net area), including Bond Beam Units: ASTM C90. Aggregate shall conform to ASTM C331.

c. High Strength CMU: Compressive strength shall be 3500 psi. Provide only where indicated on Drawings. Aggregate shall conform to ASTM C331.

d. Unit weight: Unit weight of concrete for CMU not to exceed 90 pcf when tested in accordance with ASTM C140 (105 pcf for the high strength CMU).

2. The size of CMU shall be 8”x16” or as indicated on drawings. The nominal face dimensions, type and coursing shall match existing CMU used in the building and/or as indicated in drawings.

C. Reinforcements and Ties

1. Reinforcements and ties used on exterior walls shall beformed of stainless steel, type 304.

2. All components of the reinforcement and tie assemblies shall be from single manufacturer.

D. Portland Cement: Shall conform to ASTM C150 Type II (Maximum 8% C3A) unless otherwise permitted by the Commissioner and shall be of the non air-entrained type. Provide Type II for exterior pavements.

1. Slag Cement: Shall conform to ASTM C989, Grade 100 or 120.

2. No other alternate cementitious materials may be utilized.

E. Sand for mortar mix shall be washed natural sand with 100% passing through no.8 sieve and conforming to ASTM C144. Mix shall not contain and chlorides.

F. Aggregate for masonry grout shall conform to ASTM C404, Standard Specification for Aggregates for Masonry Grouts.

G. Hydrated Lime shall be ‘Type S’, conforming to ASTM C207

H. Water shall be clean potable water free of injurious foreign matter conforming to the requirements of Section BC 1903.4 of NYC Building Code.

I. Mortar Coloring: Provide pure mineral pigments, natural and synthetic iron oxides, and chromium oxides compounded for use in mortart mixes. Material shall conform to ASTM C979. Coloring shall not contain alkalyde salts or chlorides. No liquid colorants shall be permitted.

J. Premixed sand and lime for mortar mixes is not permitted. The use of batched material by and factory-packaged cement-lime-pigment by major mortar manufacturers is permitted. Each individual bag of material shall have the manufacturer's label identifying the mortar type.

K. Reinforcing Steel

1. Deformed bars conforming to ASTM A615, Grade 60. Reinforcement to be welded shall conform to the requirements of ASTM A706, Grade 60.

2. Reinforcement in exterior construction, such as parapets, shall be galvanized in accordance with ASTM A767 or epoxy coated in accordance with ASTM A775.Touch up coating for galvanized material shall be in accordance with ASTM A780. Touch-up epoxy coating in accordance with coating manufacturer’s instructions.

L. Miscellaneous Accessories

1. Weeps shall be of high density polyester, polypropylene or polyethylene woven mesh, 90% open full height of brick and full width of joint, recessed 1/4" from face of brick and extending to full depth of brick.

2.3 MIXES

A. Mortar

1. Shall conform to ASTM C270, Standard Specification for Mortar for Unit Masonry, and BIA M1-88. Provide Type I Portland cement (Type II Portland Cement when used for manholes). Masonry cement shall not be used as a substitute. Preconstruction testing with the proportions carefully monitored is to be used to establish the upper end of the strength range, which should generally be near the minimum strength of the next higher strength mortar.

a. Type N: 1 part gray cement, 1 part lime, 6 parts dry sand. Minimum compressive strength shall be 750 psi at 28 days.

b. Type N "White": 1 part white cement, 1 part lime, 6 parts dry white sand. Minimum compressive strength shall be 750 psi at 28 days.

B. Mortar Color

1. Proportion mortar coloring with other components of mortar mix to obtain color for mortar approved by commissioner for the project. Provide white cement instead of grey cement where required to obtain desired color. Do not exceed 1 part pigment to 10 parts cement, by weight.

C. Grout for Masonry

1. Fine Grout: 1 part Portland Cement, 0-1/10 part Hydrated Lime, 21/4-3 times the sum of volumes of cementitious materials of fine aggregate (Proportions by volumes).

2. Course Grout: 1 part Portland Cement, 0-1/10 part Hydrated Lime, 21/4-3 times the sum of volumes of cementitious materials of fine aggregate, and 1-2 times the sum of the volumes of cementitious materials of coarse aggregate (Portions by volume).

3. Aggregates for Mixes: ASTM C 404.

4. Slump: 8" minimum, 11" maximum.

5. Compressive Strength: At least equal to the strength of the masonry, and not less than 2000 psi as determined by ASTM C1019 - Method of Sampling and Testing Grout.

6. For locations less than 2” in any direction, use fine grout and for locations more than 2” in any directions use course grout.

D. Normal Weight Concrete

1. Unless otherwise specified, proportion and produce normal weight concrete to have a maximum slump of 4” or less. A tolerance of up to 1" above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. The slump shall be determined by ASTM C143. Concrete containing High Range Water Reducer shall have a slump not exceeding 9”, unless other wise approved by the Commissioner. The concrete shall arrive at the job site at a slump of 2" to 3", be verified by the Commissioner, and the HRWR admixture added to increase the slump to the approved level.

2.4 SOURCE QUALITY CONTROL

A. Inspection

1. Special Inspector: The City of New York will assign, under the requirements of Section BC 1704.4 a Special Inspector who will inspect masonry construction under the requirements of Section BC 1704.5 of the NYC Building Code.

B. Preconstruction Testing

1. Preconstruction testing of mortar properties shall be done in accordance with ASTM C780, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry. Do not proceed with masonry work until the preconstruction testing is completed. Contractor shall mix mortar as it intends for the actual construction.

2. Preconstruction testing of masonry grout properties will be done in accordance with ASTM C1019, Standard Test Method for Sampling and Testing Grout. Do not proceed with masonry work until the preconstruction testing is completed. Contractor shall mix mortar as it intends for the actual construction.

3. Compressive strength tests of field mixed mortar and factory batched/prepackaged mortar are to be done during construction of the mock-up, or earlier if desired by the Contractor, to provide a benchmark for the strength based on actual field conditions and proportioning of the mortar. If mortar strengths are too high or too low, proportions and material source may be required to be modified if directed by the Commissioner.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Commissioner any condition that prevents the performance of this Work.

3.3 PROTECTION

A. Cover top of masonry wall with waterproof plastic membrane at the end of the work period, when work is not in progress, and at other times when Work needs to be protected from rain and other precipitation. Extend cover down sides as needed to thoroughly protect the Work.

B. During cold weather, do not use wet masonry units and frozen masonry units.

C. Do not use frozen materials or lay masonry on frozen materials; remove frozen materials from wall. Refer to Part 1 of this Section, "Environmental Requirements" for temperature restrictions.

D. Remove excess mortar from walls as soon after laying units as practicable to prevent staining and to facilitate cleaning of wall.

E. Prevent masonry cleaners from coming in contact with adjacent glass, metal, and other masonry surfaces such as cast stone. Protect adjoining glass and metal surfaces and all other adjacent materials and property from masonry operations.

3.4 MIXING PROCEDURES FOR MORTAR

A. Measure material by volume or equivalent weight. In measuring by volume, measure ingredients by container. Do not measure by shovel.

B. Mix ingredients in a clean mechanical mixer for a minimum of 3 minutes, maximum of 5, with the minimum amount of water to produce a workable consistency. Water rententivity must be appropriate for the IRA of the brick. Bricks of 3 grams per minute per 30 sq in require a lower water retentivity property to maintain production by allowing the mortar to give up the water easier to the brick.

C. Mortar that has stiffened because of evaporation of water from the mortar may be retempered only once, and only during the first hour of placement to restore the required consistency. Do not over water to make mortar “soupy” as water retentivity must be appropriate for the IRA of the brick. Mortar shall be used within 21/2 hours after initial mixing. Limit amount of mortar batched at one time to stay within these requirements.

3.5 LAYING

A. Lay units true to dimensions, plumb and level, square; exterior and interior bond work as indicated on the Drawings or specified herein. Lay courses level with joints uniform; vertical joints spaced properly for plumb alignment. Provide masonry lines, plumb bobs, and utilize a 4 foot level to maintain wall within ¼” of theoretical dimensions.

B. Fill bed joints and cross joints solid with mortar. Furrowed bed and spotted cross joints not permitted. For hollow block units, apply mortar full length on all bearing surfaces.

C. "Tooth" temporary openings in exposed masonry walls, to maintain proper bond when closed.

D. All raking and repointing work shall be done by hand.

E. Tool joints in exposed masonry with a concave jointer to provide a neat, smooth, compacted surface.

F. Remove excess mortar, leaving masonry surface clean.

G. Cut brick and concrete masonry units with circular masonry wet saw.

H. Build-in miscellaneous metal inserts and other items not furnished under this Section but specified to be installed under this Section.

I. Lay brick in bond patterns as shown on the Drawings. If bond is not indicated on Drawings, bond patterns shall match existing adjacent walls.

J. Installation of new face brick shall be plumb and flush with adjacent existing face brick.

3.6 FIELD QUALITY CONTROL

A. Special Inspection

1. The City of New York will assign under the requirements of Section 1704.5 of the NYC Building Code a Special Inspector who will inspect the masonry construction.

2. The Special Inspector will make inspections and any testing deemed necessary. Testing of mortar properties shall be in accordance with ASTM C780. Mortar suspected or tested to be too strong or too weak will be subject to petrographic analysis or other methods deemed necessary by the Commissioner and Special Inspector. Testing of masonry grout shall be in accordance with ASTM C1019. The Contractor shall pay for all tests if they verify improper work. Inspections will include, but not be limited to, the following:

   a. Proper installation of reinforcement and placement of brick on angles.
   b. Proper installation of mortar, including proportioning and mixing. Those mortar properties listed in the Appendix of ASTM C780 are to be tested at the discretion of the Special Inspector. Mortar strengths, when tested, will be determined in accordance with ASTM C780 using cylinders.
   c. Proper installation of weeps, flashing, drip edges, mortar mesh, cleaning of cavity (if cavity wall construction), etc.
   d. For cavity wall construction, all bed and head joints are filled completely. At solid masonry construction, all bed, head, and collar joints are filled completely.

3. If any results are found to be not in conformance with the applicable ASTM, industry practice, and/or the Specifications, the masonry in question shall be removed and redone by the contractor at no additional cost to the City of New York. No additional costs for testing shall be borne by the City of New York if results of testing verify improper workmanship or proportions not in conformance with the specifications and ASTM standards.

4. Contractor shall cooperate with the Special Inspector, the testing laboratory performing the testing required by the specifications, and any other agency contracted by the City of New York to inspect or test the work.

3.7 CLEANING

A. Before cleaning masonry walls, examine faces for holes, cracks, and other defects. If corrections cannot be made to provide an appearance acceptable to the Commissioner, replace defective units

B. Concrete Masonry Units

1. Clean wall surfaces to be painted; rub with carborundum stone: remove mortar from surfaces; remove rough edges from joints.
2. Point up holes and joints. Brush with stiff bristle brush. Leave surface in condition to receive paint.
3. Clean other wall surfaces with stiff-bristle brush. Do not use wire brush.

END OF SECTION 04 20 00

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SECTION 04 43 50 – CAST STONE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Scope of Work in this section includes the following:

1. Provide cast stone copings at existing and rebuilt parapets and roof curbs at all roofs, as indicated on the drawings, specified herein and as required for a complete and proper installation.

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Concrete Institute (ACI).

a. ACI 211.1 Selecting Proportions for Normal, Heavyweight, and Mass Concrete

b. ACI 318/318R Building Code Requirements for Structural Concrete (ACI 318-05) and Commentary (ACI 318R-05)

c. ACI/MCP 205 Manual of Concrete Practice Part 2 - ACI 224R-01 to ACI 313R-97

d. ACI/MCP 305 Manual of Concrete Practice Part 3:315-99 to 343R-95

2. Concrete Reinforcing Steel Institute (CRSI)

   a. CRSI 1 MSP Manual of Standard Practise

3. Precast Prestressed Concrete Institute (PCI)

   a. PCI MNL-116 Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products

4. American Society of Testing and Materials (ASTM)

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data:

1. Materials list of items to be provided under this section.

C. Shop Drawings

1. Submit shop drawings showing complete information for fabrication and erection of work in this section for review and approval by the Commissioner.

2. The shop drawings shall be based on actual, verified, field dimensions and shall be fully coordinated with all existing conditions related to the work.

3. Shop drawings shall be legible, drawn to scale, indicate all dimensions.

4. Show layout with all individual cast stone coping pieces identified with unique numbering/labeling over entire extent of work.

5. Clearly show all typical installation details including enlarged plans and cross sections.

6. Show all anchorages reinforcements and ties, clearly identified for their constituent parts.

7. Coordinate with new and existing unit masonry work, coping flashings and roofing work and include them in details to clearly show relationship. Include location and details of anchorage devices that are to be embedded in other construction.

8. Show all erection procedures, sequence of erection, and required handling equipment.

D. Samples

1. Color Selection

   a. Provide color chart with full range of colors available for coping stone for initial selection of color by the commissioner. Color for coping stone shall closely match color of existing brick coping.

   b. Samples for Initial Selection of Mortar Color: Submit the full range of colors available. Where mortar color is to match existing, provide proposed colors.

2. Product Samples

   a. Submit 3 cast stone samples 6”x6”x2”, showing quality, texture, and color of the proposed finish.

   b. Submit samples of anchorages and other attachments and accessories.

   c. Full Size Cast Stone Samples: Prior to start of installation, and after the review of finish Samples, submit one full size Sample of each shape of required cast stone unit, delivered to the job site. Acceptable full size samples may be incorporated in the construction.

   d. Review of samples by the Commissioner will be for color, texture, and general condition only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

E. Quality Control Submittals

1. Provide certifications and proof of qualifications for all requirements for manufacturer, installer and testing laboratories that are listed under the ‘Quality Assurance’ article of this specification.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Qualifications

1. Installers qualification:

   a. A firm with at least 3 years experience in installing cast stone units of a type and quantity similar to those indicated for this Project.

   b. Use adequate numbers of skilled workman who are properly trained and experienced in the necessary crafts and who are completely familiar with the

specified requirements and the methods needed for proper performance of the work of this Section.

2. Manufacturer qualification:

a. Precast decorative concrete units shall be designed and fabricated by an experienced and acceptable precast concrete manufacturer certified under the PCI Plant Certification Program.

b. The manufacturer shall have been regularly and continuously engaged in the manufacture of precast concrete work similar to that indicated on the drawings for at least 3 years.

c. The Contractor shall submit a statement detailing the Manufacturer's Qualifications.

3. Testing Laboratory qualification:

a. An independent testing laboratory qualified according to ASTM E329 to conduct the testing specified.

C. Source Limitations

1. Obtain all precast coping stones from one source from a single manufacturer.

2. Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver the Work of this Section to the job site in such quantities and at such times as to assure the continuity of construction; carefully pack or crate to prevent damage.

B. Store units at the job site in a manner to prevent cracking, distortion, warping, staining, and other physical damage, and in a manner to keep markings visible.

C. Lift and support the units only at designated lifting points or supporting points as shown on the approved Shop Drawings.

D. Any units damaged before final acceptance shall be replaced. Patching of units will not be acceptable.

E. Pack, handle, and ship cast stone units in suitable packs or pallets.

a. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.

b. Store cast stone units on wood skids or pallets with non-staining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

F. Store installation materials on elevated platforms, under cover, and in a dry location.

G. Store mortar aggregates where grading and other required characteristics can be maintained and contamination avoided.

PART 2 - PRODUCTS

2.1 CAST STONE MATERIALS

A. General: Comply with ASTM C1364 – Standard Specification for Architectural Cast Stone, and the following for each ingredient.

B. Portland Cement: ASTM C150 – Standard Specification for Portland Cement, Type I, white, containing not more than 0.60 percent total alkali when tested according to ASTM C114.

C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C33 – Standard Specification for Concrete Aggregates; gradation as needed to produce required textures. Used for wet mix process.

D. Fine Aggregates: Manufactured or natural sands complying with ASTM C33 – Standard Specification for Concrete Aggregates, gradation as needed to produce required textures.

E. Coloring Admixture for Cast Stone: ASTM C979 – Standard Specification for Pigments for Integrally Colored Concrete, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, non-fading, and alkali resistant.

F. Air-Entraining Admixture: ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete, certified by the manufacturer to be compatible with other admixtures used.

G. Other Admixtures: ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.

H. Reinforcement: Deformed steel bars complying with ASTM A615/A615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

I. Epoxy Coating: ASTM A775/A775M – Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

J. Anchors, pins and Inserts: Fabricated from stainless steel complying with ASTM A276 – Standard Specification for Stainless Steel Bars and Shapes or ASTM A666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, Type 304.

2.2 CAST STONE UNITS

A. Provide cast stone units complying with ASTM C1364 – Standard Specification for Architectural Cast Stone

1. Compressive Strength: At 28 days after manufacture, not less than 6500 psi, when tested in accordance with Test Method ASTM C1194 – Standard Test Method for Compressive Strength of Architectural Cast Stone.

2. Absorption, Cold Water: At 28 days after manufacture, not greater than 6%, when tested in accordance with Method A, Cold Water of Test Method ASTM C1195 – Standard Test Method for Absorption of Architectural Cast Stone.

3. Absorption, Hot Water: At 28 days after manufacture, not greater than 10%, when tested in accordance with Method B, Boiling Water Test of Test Method ASTM C1195 – Standard Test Method for Absorption of Architectural Cast Stone.

4. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar, Procedure A, as modified by ASTM C1364 – Standard Specification for Architectural Cast Stone.

5. Fabricate the Work of this Section to the sizes and shapes indicated, and of texture matching the approved Samples.

6. Provide finished units that are straight, true to size and shape, and within the specified casting tolerances.

7. Make exposed edges sharp, straight, and square, unless indicated otherwise. Make flat surfaces into a true plane.

8. Warped, cracked, broken, spalled, stained, and otherwise defective units will not be acceptable.

9. Place and secure in the forms all anchors, clips, stud bolts, inserts, lifting devices, shear ties, and other devices required for handling and installing the precast units and for attachment of subsequent items as indicated or specified.

B. Reinforce units as indicated and as required by ASTM C1364 – Standard Specification for Architectural Cast Stone. Use epoxy-coated reinforcement.

C. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated. Match existing units in texture, color and shape where units are being replaced. Take all molds as necessary.

1. Slope exposed horizontal surfaces at least 1:12, unless otherwise indicated.

2. Provide drips on projecting elements, unless otherwise indicated.

D. Colors and Textures

1. Colors and textures shall be as indicated in drawings and as selected by commissioner from color range submitted for selection.

2. Color and texture shall be uniform for each unit and consistent for all units.

E. Casting tolerances

1. Maintain casting, bowing, warping, and dimension tolerance below the following maximums:

a. Overall dimension for height and width of units: Plus zero, and minus 1/16" of unit length.

b. Make thickness of units plus or minus 1/8" maximum.

c. Bowing or warping: Do not exceed 1/360 of the length.

d. Insert locations: Place within plus or minus 1/4" in each direction.

F. Cure and finish units as follow:

1. Cure units in totally enclosed curing room under dense fog and water spray at 95 percent relative humidity for a minimum of 24 hours. Follow PCI recommendations.

2. Yard cure units until the sum of the mean daily temperatures for each day equals or exceeds 350˚F.

3. Acid etch units to remove cement film from surfaces indicated to be finished.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color, white, or a blend to produce mortar color indicated.

B. Hydrated Lime: ASTM C207, Type S.

C. Mortar Aggregate: ASTM C144.

1. White-Mortar Aggregates: Natural, white sand or ground, white stone.

D. Mortar Coloring: Provide pure mineral pigments, natural and synthetic iron oxides, and chromium oxides compounded for use in mortar mixes. Material shall conform to ASTM C979. Coloring shall not contain alkalyde salts. No liquid colorants shall be permitted. Use only pigments with record of satisfactory performance in masonry mortars.

E. Water: Potable

2.4 MORTAR MIXES

A. Setting Mortar: Comply with ASTM C 270 - Standard Specification for Mortar for Unit Masonry, Proportion Specification, Type S.

1. Limit cementitious materials to Portland cement and lime. The use of masonry cement is not permitted.

2. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ratio of 1:10, by weight.

2.5 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from stainless steel complying with ASTM A276 or ASTM A666, Type 304.

B. Dowels: Round stainless-steel bars complying with ASTM A276, Type 304, 1/2-inch (12-mm) diameter.

C. Job-Mixed Detergent Solution: Solution of 1/2 cup (125 mL) of dry-measure tetrasodium polyphosphate and 1/2 cup (125 mL) of dry-measure laundry detergent dissolved in 1 gal. (4 L) of water.

D. Sealant

1. Sealant as specified in Section 07 90 00 - Joint Sealers, as applicable for vertical joints and for horizontal joints.

2. Bond breaker tape as specified in Section 07 90 00 - Joint Sealers.

2.6 SOURCE QUALITY CONTROL

A. Employ an independent testing agency to sample and test cast stone according to ASTM C1364 – Standard Specification for Architectural Cast Stone, and the specific test methods specified in Article "2.2 Cast Stone Units", of this specifications. The testing shall include:
   1. Compressive Strength in accordance with Test Method ASTM C1194 - Standard Test Method for Compressive Strength of Architectural Cast Stone. Test units from each 500 ft^3 of cast stone.
   2. Absorption, Cold Water and Hot Water, in accordance with Test Method ASTM C1195 - Standard Test Method for Absorption of Architectural Cast Stone. Test units from each 500 ft^3 of cast stone.
   3. Resistance to Freezing and Thawing in accordance with Test Method ASTM C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing, Procedure A. Test one unit from each cast stone mixture design.

B. If test specimens fail, the specimens and the entire 500 ft^3 lot they came from shall be rejected and shall not be used in the project.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine substrates and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate accommodation with the Work of this Section.

B. Set cast stone as indicated on Drawings and as per approved shop drawing submittals. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in

place. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

C. Drench units with clear water just before setting.

D. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build anchors and ties into mortar joints as units are set. Anchors to be set in substrate with non-shrink grout.
   1. Set 3/8" of mortar prior to installation of flashing providing full bed. Rake joint to allow for sealant installation. Seal flashing penetrations with sealant. Install another 3/8" mortar on top of flashing and place stone. Provide full bed of mortar. After stones are set and mortar cured, install bond breaker tape and sealant under the flashing.
   2. Fill dowel holes and anchor slots with mortar.
   3. Fill collar joint solid as units are set.
   4. Build concealed flashing into mortar joints as units are set.

E. After coping units are set in or on the wall they shall have all top surfaces covered and protected from the elements at the close of each day's work and shall be kept covered and protected until all the Work is completed.

F. Lead, Plastic or hard rubber buttons shall be used in setting large units to sustain the weight until mortar has set.

G. All joints in units shall be raked out 3/8" deep and shall be filled with joint sealer, (after bond breaker tape) as specified in Article titled “Accessories”.

H. Expansion Joints
   1. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
   2. Provide expansion joints at a maximum spacing of approximately 40 feet on center. Match joint spacing with parapet expansion joints.
   3. Provide filler seal, bond breaker tape, and joint sealers at expansion joints where indicated on the Drawings and where required for proper installation. (See Section 07 90 00 Joint Sealers).
   4. Keep joints free of mortar and other rigid materials.

I. Weather Protection
   1. Protect mortar and cast stone units from freezing during construction and maintain an ambient temperature for cast stone work of at least 32 deg F for a period of at least 72 hours.
   2. At 40 deg F and below, heat water or sand to a minimum of 70 deg F and to maximum of 160 deg F.
   3. At 32 deg F and below, heat mixing water and sand to a minimum of 70 deg F and to maximum of 160 deg F.
   4. Do not use admixtures to lower the freezing temperature of the mortar

J. If there are any discrepancies in installation with drawings and specifications, immediately notify commissioner. Do not proceed until discrepancy is addressed and fully corrected to the satisfaction of the commissioner.

3.4 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch (1.5-mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.5 FIELD QUALITY CONTROL

A. If there is evidence that the strength of cast stone units may be deficient or may not comply with the specified requirements, the City of New York will employ an independent testing laboratory to obtain, prepare, and test cores drilled from hardened cast stone units to determine the compressive strength according to ASTM C 42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete. A minimum of 3 units shall be field tested and destroyed. If the units are found to be defective, other units will be tested and replaced at no additional cost to the City of New York.
   1. Allow the testing laboratory and special inspection agency employed by the Commissioner, access to material storage areas. Cooperate and provide samples of materials and concrete mixes as may be requested for testing and evaluation.
   2. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by the commissioner.
   3. Cores will be tested in an air-dry condition.
   4. The strength of the cast stone for each series of 3 cores will be considered satisfactory if the average compressive strength is equal to at least 85 percent of the 28-day design compressive strength and no single core is less than 75 percent of the 28-day design compressive strength.
      a. Test results will be made in writing on the same day that tests are performed, with copies to the Commissioner, Contractor, and cast stone fabricator. Test reports will include the following:
         1) Project identification name and number.
         2) Date when tests were performed.
         3) Name of cast stone fabricator.

4) Name of testing laboratory.
5) Identification letter, name, and type of cast stone unit or units represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of cast stone as placed.

B. Defective Work
1. Cast Stone units that do not comply with the specified requirements, including compressive strength, manufacturing tolerances, and finishes, are unacceptable. The Contractor shall remove and replace defective Work with cast stone units that comply with the specified requirements at no cost to the City of New York.
2. Contractor shall perform additional testing of corrected work to determine compliance to the specifications, at no cost to City of New York.

3.6 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses. Remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, and after completion of other work liable to damage or soil cast stone units, clean exposed cast stone as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
3. Clean in conjunction with the cleaning of all other masonry work. Do not clean in temperature below 50 degrees F. Clean by scrubbing with soap powder and water, applied vigorously with stiff fiber brushes, adding clean, sharp, fine, white sand to the soap and water mixture where necessary. After scrubbing, drench all surfaces of the cast stone units thoroughly with clean water. The use of sand blast, wire brushes; or acids of any kind will not be permitted under any circumstances for the cleaning of cast stone Work. Start the cleaning operation at the top of the structure and proceed downward.

END OF SECTION 04 43 50

SECTION 05 12 10 – STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Furnish and erect all structural steel as shown on Drawings.

B. Provide shop or field painting, finish painting, and galvanizing as specified.

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society of Testing and Materials (ASTM) standards, latest editions.
   a. A36 Standard Specification for Carbon Structural Steel
   b. A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
   c. A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
   d. A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
   e. A563 Standard Specification for Carbon and Alloy Steel Nut
   f. A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
   g. A992 Standard Specification for Structural Steel Shapes
   h. D1654 Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

i. D1735 Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
j. D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
k. F436 Standard Specification for Hardened Steel Washers Inch and Metric Dimensions
l. F1554 Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
m. F3125 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

2. "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" 13th edition, including supplements. (AISC 335).

3. American Welding Society (AWS) standards for procedures and materials.

4. "Code of Standard Practice for Steel Buildings and Bridges" (AISC 303)

5. Steel Structures Painting Council (SSPC) standards.
   a. SSPC-SP10 Near-White Metal Blast Cleaning

1.4 DEFINITIONS

A. Refer to DDC General Conditions.

B. Structural Steel: Structural Steel consists of the steel elements of the structural steel frame essential to support the design loads. These elements consist of material as shown on the structural steel plan and listed in Article 2.1 of the AISC "Code of Standard Practice for Steel Buildings and Bridges.", 2016 version. Structural steel also includes structural lintels framing over masonry openings bearing on masonry.

1.5 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Submit manufacturer's information for the following:

1. Primer paint, finish paint, and galvanizing touch up paint

2. Expansion/adhesive anchors

3. Zinc Metallizing

C. Shop Drawings

1. Failure to submit legible shop drawings will be cause for return without review.

2. Provide a set of shop drawings showing all connections, bolting, welding, and size of material. Shop drawing shall show intended method of reinforcing existing members and making connections to existing steel as developed by the detailer based on conditions and actual dimensions. Shop Drawings for MEP equipment dunnage and access platforms shall not be submitted until after approval of the submitted MEP units. Ensure shop drawings submitted for MEP equipment dunnage and access platforms are coordinated and based on unit approved. The Contractor shall take into account in their schedule the potential time impact in the sequencing of the steel drawings.

3. Do not order steel in advance of approval of shop drawings, except at own risk.

4. Shop drawings shall be specific for the Project and shall be prepared under supervision of and bear the seal of a Professional Engineer licensed in the State of New York. Connections not designed on the Drawings shall be done by the detailer's licensed Engineer. Do not submit unchecked shop drawings. After final approval of all shop drawings, submit a final set sealed and signed by the Professional Engineer.

5. Shop drawings will be checked for size of material and strength of connection by the Commissioner, which shall not render the Commissioner responsible for any errors in construction dimensions, etc. that have been made in preparation of shop drawings. The Contractor shall assume full responsibility for the correctness of dimensions and fit.

6. Calculations shall be submitted upon request.

7. After shop drawings are 100% complete and approved and all field changes have been made, submit a set of as-built drawings to the Commissioner.

D. Quality Control Submittals

1. Certificates and Affidavits

a. Furnish Building Department affidavit from steel manufacturer (Form SS24) certifying materials conform to Specification requirements and material was erected as designed.

b. Furnish bolt manufacturer's test reports, covering physical and chemical tests, for each lot of high strength bolts submitted.

c. Furnish steel manufacturer's certificate certifying welders employed on the Work have met AWS qualifications within the previous twelve months, and for work performed in the field are NYC licensed welders as per §28 407.1 of the Administrative Code of the NYC Construction Code.

d. Furnish complete listing of ASTM's of materials listed in Part 2 of this Section and certification that materials supplied meet those listed.

e. For mechanical and adhesive anchors installed in concrete, submit ICC certification for use in cracked concrete.

2. Contractor Qualification

a. Provide proof of Installer, Producer, and Rebar Detailer qualifications specified under "Quality Assurance".

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Qualifications

1. Fabricator: Company specializing in the fabrication of steel products to be used in this Contract shall have a minimum of three years' experience.

2. Erector: Company specializing in performing the Work of this Section shall have a minimum of three years' experience.

3. Zinc metallizer: The company or individual responsible for application of zinc metallizing shall be certified as qualified to perform this process by the Thermal Spray Certification by The Society for Protective Coatings (SSPC).

4. The firm providing the zinc metallizing shall also perform the painting of the members at the shop also to provide a single source responsibility.

C. Regulatory Requirements

1. Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations. Where more severe requirements than those contained in the New York City Building Code are given in this Section, the requirements of this Section shall govern.

2. New York City Board of Standards and Appeals (BSA): Rules for Arc and Gas Welding and Oxygen Cutting and Steel Covering the Specifications for Design, Fabrication, and

Inspection of Arc and Gas Welded Steel Structures and Qualification of Welders and Supervisors.

3. Standards specified in Article 1.3 apply to Work of this Section. Where more severe requirements then those contained in the Standards are given in this Section or the New York City Building Code, requirements of this Section or the New York City Building Code shall govern.

D. Certifications

1. Structural steel shall conform to the material acceptance, certification, and inspection requirements of Section BC 1701 of the NYC Building Code.

2. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site at such intervals as to insure uninterrupted progress of Work.

B. Deliver anchor bolts and other anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time so as not to delay Work.

C. Store materials to permit easy access for inspection and identification. Store material of the ground and protect from the weather and contamination.

1.8 FIELD MEASUREMENTS

A. Take field measurements as required by Drawings. Where possible, take field measurements of existing conditions prior to fabrication. Verify that field measurements are the same as those shown on Drawings and shop drawings. Report all deviations to the Commissioner in writing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Zinc Metallizing

1. Atlantic Coast Metallizing & Coatings Corp., Melville, NY

2. East Coast Metallizing & Coating Systems Inc., Westbury, NY

3. Island Wide Sandblasting Inc., Wyandanch, NY

4. Or approved equal

B. Structural Thermal Break

1. Fabreeka International, Inc, Boston, MA

2. Armatherm, Acushnet, MA

3. Farrat Ltd, United Kingdom

4. Or approved equal

2.2 MATERIAL

A. Structural Steel Shapes, Shims, Plates, and Bars
1. Structural steel shall conform to the provisions of ASTM A36 or ASTM A992, pipe steel to the provisions of ASTM A53, Grade B, and tube steel to the provisions of ASTM A500, Grade B, unless otherwise noted.

B. Bolts
1. Anchor Bolts: Shall conform to the provisions of ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength, Grade 36, unless different grade is specified elsewhere. Size and detailing indicated on Drawings.
2. Unfinished Bolts: Shall conform to the provision of ASTM A325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum tensile Strength.
3. Expansion/Screw/Adhesive Anchors, Fasteners Provide types as indicated on Drawings. As a minimum, all anchors exposed to weather or embedded in masonry are to be Type 316 stainless steel. Anchors installed in concrete shall be ICC certified for cracked concrete as per BC 1912 of the NYC Building Code.
   a. Wedge Expansion and Undercut Anchors/ expansion bolts shall have an ICC-ES Evaluation Service Report (ESR) issued in accordance with ACI 355.2 for use in cracked concrete, and including seismic applicability loading.
   b. Adhesive anchors shall have an ICC-ES Evaluation Service report (ESR) issued in accordance with ICC-ES AC308 - Post-installed Adhesive Anchors in Concrete Elements, and for use in cracked concrete, and seismic loading and pursuant to the Office of Technical Certification and Research (OTCR) Building Bulletin 2009-019.

C. Hardware

1. Nuts for anchor bolts and unfinished bolts shall conform to the requirements of ASTM A563.

2. Washers shall conform to the provisions of ASTM F436.

D. Filler Metal for Welding

1. Welding electrode shall conform to E70XX classification of AWS A5.1 - Specification for Carbon Steel Electrodes for Shielded Metal ArcWelding, for welding of new steel to new steel.

2. Welding electrode shall be compatible with existing steel where connections are made to steel of existing building. Electrode shall be E7018 unless determined otherwise. E7018 are low hydrogen electrodes that must be kept extremely dry.

E. Galvanizing by the Zinc Metallizing Process

1. Zinc/aluminum metallizing (referred to herein as zinc metallizing) is the process of thermally applying an 85/15 zinc-aluminum wire over the surface of steel. Zinc metallizing and finish coating system shall have the following performance characteristics and results of tests performed on representative samples (hot dip galvanizing is not acceptable):

a. Adhesion: Test zinc metallizing with complete finish coating (epoxy primer and polyurethane topcoat system) in accordance with ASTM D4541, Test Method E. Pull-off strength throughout the system shall be not less than 750 psi before and after environmental cycling. Environmental cycling shall be 10 cycles of the following: 4 hrs at 100% humidity per ASTM D1735; 16 hours below 0°F; and 4 hours at 140°F.

b. Corrosion resistance of zinc metallizing with epoxy primer and polyurethane topcoat system: A rating of 10 after 1000 hours salt fog (prohesion method) when tested in accordance with ASTM D1654, Procedure A. Scribe shall be cut through all coatings to bare steel substrate. Expose specimens in accordance with ASTM G85

2. Galvanizing touch up paint for regalvanizing welds and damaged areas shall conform to ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

2.3 SHOP ASSEMBLY- FABRICATION

A. General

1. Do not fabricate until shop drawings have been reviewed.

2. Fabricate and assemble steel in shop to greatest extent possible. Fabricate items and assemblies in accordance with AISC Specifications and the shop drawings. Properly mark members for field assembly.

B. Shop Connection

1. Weld or high-strength bolt shop connections as indicated on Drawings.

2. Comply with "Structural Welding Code", 2015, for procedures, appearance, and quality of welds and methods used in correcting welded work.

C. Holes for other work

1. Provide holes and openings required for securing other Work to steel framing and for passage of other Work through framing members. Coordinate with Drawings of other Work.

2. Cut, drill, flame cut, or punch holes perpendicular to metal surfaces. Method of cutting must not produce a roughness of over 1000 microinches. Surfaces exceeding these limits must be restored by machine grinding. Reinforce all openings with steel shapes as shown on shop drawings

2.4 GALVANIZING

A. General: All steel shall be galvanized by the zinc metallizing process.

B. Cleaning and Surface Preparation

1. Hardware (bolts, nuts, etc.): Clean and leave free of mill scale before galvanizing.

2. Clean all steel first in accordance with SSPC-SP1 – Solvent Cleaning, if needed.

3. Steel members: Clean in accordance with SSPC-SP10 – Near-White Metal Blast Cleaning, before zinc metallizing. Surface shall have a 3-4 mil anchor pattern. Moisture cannot be present on steel and temperature cannot be less than 5°F above the dew point. Thermal spray must be applied within 4 hours of blasting.

C. Shop Coat – Zinc Metallizing – Provide for galvanized items to have finish paint - All items exposed to public view and other items shown on Drawings or specified herein.

1. Thermally spray material at a rate of 4-5 mils DFT. Sprayed coating shall be free of lumps, blisters, and loosely adhering particles.

2. After material has cured, apply shop coats of paint.

2.5 SOURCE QUALITY CONTROL

A. Testing

1. General

a. Structural steel work is subject to all tests required by the Special Inspection requirements of the NYC Building Code.

b. Cooperate with the Testing Laboratory in making all required tests.

2. Tests

a. Shop bolted connections: Tested in accordance with AISC – American Institute of Steel Construction, specifications.

b. Shop welding - The laboratory will perform the following functions

1) Certify Welders

2) Visually inspect all welds, record type and locations of defects, and perform tests if necessary. Check all corrected work.

3) Perform non-destructive tests if necessary or as required by the Special Inspector.

B. Inspection

1. Testing Laboratory

a. City of New York will engage a special inspection agency or a testing laboratory to assist in inspection of steel fabrication and to conduct tests at mill, shop or foundry. The laboratory will assist in checking erection tolerances and provide shop and field testing required for all structural steel and metal deck work, including metal deck and studs.

b. The Testing Laboratory will be responsible to and under the supervision of a Special Inspector.

2. Special Inspector

a. The City of New York will assign, under the requirements of Section 1704.3 of the NYC Building Code, a Special Inspector to supervise the Work listed above under "Testing Laboratory".

3. Notification: Notify the Commissioner before beginning fabrication of the structural steel and supply laboratory with copies of agreements, approved drawings, approved prints of all shop details, etc., and all necessary information relating thereto. Do not ship material to job site until after inspection and approval by the Testing Laboratory.

4. Reports: Shop and field reports, including shipments, will be submitted by the Testing Laboratory to the Commissioner as the work proceeds at the shop or job site. A final report will be submitted by the Testing Laboratory when work is completed at the shop, and again when work is completed in the field. The Special Inspector reserves right to reject material not in compliance with specified requirements at any time.

5. Corrections: Correct deficiencies in work which inspections and tests have indicated to not be in compliance with requirements. Pay for additional tests, at own expense, necessary to reconfirm any non-compliance of original work and as necessary to show compliance of corrected work.

6. Contractor's Responsibility: Inspection and acceptance or failure to inspect shall in no way relieve the Contractor or the mill and shops from their responsibility to furnish satisfactory material strictly in accordance with Drawings and Specifications.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Verify that field conditions are acceptable and that erection may proceed. Notify the Commissioner in writing of conditions that adversely affect the Work. Do not proceed with erection until conditions have been corrected. Beginning of installation means the erector accepts existing conditions.

3.3 ERECTION

A. General

1. Erection shall conform to Section BC 3305 – Material Placement and Installation, of the NYC Building Code and AISC 360 – Specification for Structural Steel Buildings.

2. All work shall be erected plumb, square, and true to lines and levels in strict accordance with the structural requirements of the building.

3. Provide all machinery, apparatus, and staging required for the erection of steel work in a thoroughly safe and efficient manner. Install, maintain and remove, without injury to other Work, such temporary bracing, scaffolding, etc. as may be necessary or required. Care shall be taken that no part of the structure is overloaded during construction.

4. Arrange for deliveries of material to facilitate the rapid and continuous progress of operation, but the site or streets adjacent to same shall not be used for the storage of material unless absolutely necessary and then only with special permission of the Commissioner.

5. Employ a Licensed Professional Engineer (licensed in the state of New York) and Land Surveyor (licensed in the state of New York) to ensure accurate erection of the steel.

6. Do not alter or cut structural members without written approval of the Commissioner. Flame cutting in field of members to correct fabrication errors is to be avoided and to be done only upon approval of the Commissioner based on the method proposed. Roughness cannot exceed 1000 microinches. Restoration of surfaces shall be by mechanical grinding.

B. Temporary Shoring and Bracing

1. Provide temporary shoring and bracing members with connections of sufficient strength to bear erection loads and guy wires to maintain structure plumb and in true alignment until completion of erection. Remove temporary work when permanent members and bracing are in place and final connections are made. Fill erection bolt-holes on exposed to view members with plug welds and grind smooth.

C. Anchor Bolts

1. Furnish to the concrete masons anchor bolts and other connectors required for securing structural steel to cast-in-place concrete work, together with instructions, templates, etc. necessary for setting them. Anchor bolts are to be surveyed and any approved modifications made prior to placement of columns.

2. For expansion/adhesive anchors used as anchor bolts, drill holes of depth and size required by the manufacturer for the required loading.

3. Tighten anchor bolts after support members have been positioned and plumbed. Cut off protruding edges of wedges or shims flush with edge of base or bearing plate prior to packing with grout. Tighten expansion bolts/anchors to torque required by manufacturer.

D. Field Assembly

1. Erect structural frames accurately to lines and elevations indicated. Align and adjust members forming a part of a complete frame or structure before permanently fastening.

2. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.

3. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

4. Level and plumb individual members of structure within specified AISC tolerances.

5. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

6. Splice members only where indicated and accepted on shop drawings.

E. Connections

1. Field connections between new steel members will typically be bolted unless otherwise indicated on Drawings. Connections made to existing steel shall be welded utilizing E7018 electrode. Follow preheat and interpass temperature requirements given in AWS.

   a. Provide unfinished bolts where indicated on Drawings. Lock nuts by upsetting bolt end or by similar method when unfinished bolts are not encased in concrete. Tighten all bolts and nuts fully.

   b. For ASTM A307 bolts, hardened washer shall be installed under the turned element.

   c. Where connections are to be made to the vertical face of existing concrete, drill holes to the proper diameter and depth required for installation of expansion/ adhesive anchors and install the anchors as per manufacturer's instructions. Tighten to the torque values specified by the manufacturer. Attach plates flush with concrete surfaces after the surfaces have been cleaned.

2. Holes

   a. The size of bolt holes shall be in accordance with American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."

   b. Ream holes that must be enlarged to admit bolts. Burning or use of drift pins is not permitted.

F. Field Touch up

1. Painted Members: After erection, clean all damaged areas in shop coat, exposed surfaces of bolts, bolt heads, nuts and washers, abrasions, and all field welds and unpainted areas adjacent to field welds to the same standards as the shop coat and paint with same paint to same thickness as the shop coat. These areas shall be thoroughly cleaned of rust and other bond inhibiting materials before applying the touch-up paint.

2. Galvanized Members: After erection, clean and paint all damaged areas to the galvanizing, welds, and areas adjacent to welds with the galvanizing touch up paint.

3.4 TOLERANCES

A. Erection tolerances shall be in accordance with "Code of Standard Practice for Steel Buildings and Bridges".

3.5 FIELD QUALITY CONTROL

A. Cooperate with the Special Inspector and the Testing Laboratory performing Special Inspection testing.Unless otherwise permitted, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.

B. The Special Inspector will review erection of structural framework and test field bolting and welding as listed in Part 2 of this Section. Lifting of bars and welded wire fabric into position during placement of concrete is not permitted.

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SECTION 05 30 00 – METAL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Furnish material, labor, equipment, services necessary to erect all metal deck, including connections, welding and accessories required for installation of Work. Field cut and fit deck as required and cut all openings.

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society of Testing and Materials (ASTM) standards, latest editions.

a. A29 Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought.

b. A36 Standard Specification for Carbon Structural Steel.

c. A108 Standard Specification for Steel Bars, Carbon, Cold-finished, Standard Quality.

d. A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

e. A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coating.

f. A992 Standard Specification for Steel for Structural Shapes for Use in Building Framing

g. B633 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

2. "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" 13th edition, including supplements. (AISC 335).

3. “Load and Resistance Factor Design Specification for Structural Steel Buildings” 2nd edition, including supplements. - American Institute of Steel Constructors (AISC LRFD 1999), as modified by the NYC Building Code.
4. Seismic Provisions for Structural Steel Buildings AISC 341-05.
5. Section BC 2209 of the NYC Building Code

6. International Code Council Evaluation Service (ICC-ES):

a. International Building Code, 2015

b. Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43)

c. Steel Deck Diaphragms (ESR-2199)

7. "Structural Welding Code - AWS D1.1" - American Welding Society (AWS).

8. "Specifications for Mild Steel Covered Arc - Welding Electrodes - AWS A5.1" - AWS.

9. "Diaphragm Design Manual for Floor Decks and Roof Decks" 3rd Edition - Steel Deck Institute (SDI).

10. "Fire Resistance Directory" - Underwriters Laboratory (UL).

1.4 ENGINEERING REQUIREMENTS

A. Engineering of metal deck is governed by Section BC 2209 – Cold-formed Steel, of the NYC Building Code. Structural integrity requirements of the Section BC 2213.3 shall be met.

B. Metal deck unit sizes and gages are indicated on the Drawings.

C. Units shall be of three-span length except where framing layout does not permit. Deck sheets shall be butted over supports.

D. Use of integral and non-piercing hanger tabs to support ceiling systems is not permitted. Piercing hanger tabs with a safe working loading of 250 lbs or greater are permitted for ceilings

weights below the hanger tab capacity. Integral hanger tabs are to be used for venting purposes only.

E. Units included in a fire rated assembly must be classified in appropriate UL designs or have MEA, BSA, or OTCR approval.

F. Use fasteners or welds for decking attachment that provide adequate diaphragm shear strength, uplift resistance and stiffness for imposed load combinations.

1.5 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Submit manufacturer's information for the following:

1. Metal Deck

2. Deck Fasteners, if used

3. Primer Paint

C. Shop Drawings

1. Failure to submit legible shop drawings will be cause for return without review.

2. Shop drawings shall include the following:

a. Type and gage of metal deck.

b. Metal deck layout and orientation including clear indication where shoring is required.

c. Welding or fastener types, sizes and patterns.

d. Side and End details for metal deck.

e. Supplementary framing details.

f. Location of all openings and fittings.

g. Shop finish.

h. Size, location and spacing of stud shear connectors, where required, for each beam.

i. Designation of the welding electrode strength to be used.

3. Do not order steel in advance of approval of shop drawings, except at own risk.

4. Shop drawings reviewed by the Commissioner for general conformity with the Drawings shall not relieve the Contractor or the metal deck supplier of responsibility for correctness of fit, quantities of materials, and adequacy of attachment details of deck and accessories to the structural steel. Deck must have UL or OTCR approval as part of the fire rated assembly. Approval of shop drawings does not absolve the Contractor of this requirement.

5. Shop drawings shall be specific for the Project and shall be prepared under supervision of and bear the seal of a Professional Engineer licensed in the State of New York. Required connections not designed on the Drawings shall be done by the detailer's licensed Engineer. Do not submit unchecked shop drawings. After final approval of all shop drawings, submit a final set sealed and signed by the Professional Engineer.

6. Calculations in accordance with ICC-ES AC 43 – Steel Deck Roof and Floor Systems or SDI Design Method verifying diaphragm shear strength and stiffness: Submit calculations for the load tables of the metal deck supplied. Calculations shall be signed and sealed by a Professional Engineer licensed in the State of New York. Calculations shall be submitted upon request.

D. Quality Control Submittals

1. Certificates and Affidavits

a. Submit certificates from the manufacturers of the specified materials stating compliance with the applicable requirements set forth for all materials specified in this Section. Furnish bolt manufacturer's test reports, covering physical and chemical tests, for each lot of high strength bolts submitted.

b. Submit certificates from the manufacturers of the specified materials stating compliance with the applicable requirements set forth for all materials specified in this Section.

c. Furnish proof that deck to be used is part of a UL, MEA, BSA, or OTCR approved fire-rated assembly if other than deck shown on Drawings.

d. Submit certificate stating deck manufacturer is a member producer of SDI.

2. Manufacturers' Instructions

a. Furnish manufacturers' printed material, specifications and installation instructions for each type of decking and accessories.

3. Contractor Qualification

   a. Provide proof of Installer, Producer, and Rebar Detailer qualifications specified under "Quality Assurance".

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Qualifications

1. Manufacturer: Company specializing in the manufacture of metal deck as used in this Contract shall have a minimum of three years experience and is a member producer of SDI.

2. Erector: Company specializing in performing the Work of this Section shall have a minimum of three years experience and have done at least three projects with similar quantity of material.

3. Welders: All steel roof deck welders shall be AWS certified for welding of sheet steel and NYC licensed.

C. Regulatory Requirements

1. Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations. Where more severe requirements than those contained in the NYC Building Code are given in this Section, the requirements of this Section shall govern. The City of New York shall hire a Professional Engineer licensed in the State of New York to conduct all Special Inspections required by the New York City Building Code. Any corrections to the installed Work shall be done at no cost to the City of New York.
2. New York City Board of Standards and Appeals (BSA): Rules for Arc and Gas Welding and Oxygen Cutting and Steel Covering the Specifications for Design, Fabrication, and Inspection of Arc and Gas Welded Steel Structures and Qualification of Welders and Supervisors.

3. Standards specified in Article 1.3 apply to Work of this Section. Where more severe requirements then those contained in the Standards are given in this Section or the New York City Building Code, requirements of this Section or the New York City Building Code shall govern.

D. Certifications

1. Structural metal deck and stud shear connectors shall conform to the material acceptance, certification and inspection requirements of Section BC 1701 – Structural tests and special inspections of the NYC Building Code..

2. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver deck to site undamaged. With each deck unit bearing the UL label and marking for specific system detailed.

B. Store deck units off the ground with one end elevated to provide drainage. Protect units from the elements with a waterproof covering.

C. Store materials to permit easy access for inspection and identification.

1.8 FIELD MEASUREMENTS

A. Take field measurements as required by Drawings. Where possible, take field measurements of existing conditions prior to fabrication. Verify that field measurements are the same as those shown on Drawings and shop drawings. Report all deviations to the Commissioner in writing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Metal Deck

1. Vulcraft (Nucor Corporation)

2. Wheeling Corrugating Co.

3. United Steel Deck, Inc.

4. Or approved equal.

2.2 MATERIALS

A. Steel for Roof Metal Deck

1. Formed from galvanic steel sheets conforming to ASTM A653. Size of deck is to follow SDI requirements for thickness and tolerances.

2. Minimum yield strength of 33,000 psi.

3. Formed with integral locking lugs.

B. Miscellaneous Steel Shapes

1. Shall conform to the requirements of ASTM A36 – Standard Specification for Carbon Structural Steel or A992 – Standard Specification for Structural Steel Shapes. Members to receive fireproofing shall be unprimed and free of lubricants or oils that would impair the adhesion of the fireproofing material

C. Shop Finish

1. Steel sheet shall receive before being formed a coating of zinc conforming to ASTM A653 coating class G60 (both sides). Salt spray resistance of paint shall be 100+ hours when tested in accordance with ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Appartatus.

D. Metal Deck Accessories (cants, pour stops, closure pieces, etc.)

1. Shall conform to the requirements of ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated(Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, coating class G60. Unless a thicker gage is required by design considerations, such as at cantilever edge conditions, minimum thickness shall be same gage as metal deck.

E. Welds

1. Welding electrodes shall conform to either E60XX or E70XX classification of AWS A5.1 as selected by the licensed welder depending on the gauge of steel deck and strength of steel member being welded to and is subject to approval by the Commissioner.

F. Galvanizing by the Zinc Metallizing Process

1. Zinc/aluminum metallizing (referred to herein as zinc metallizing) is the process of thermally applying an 85/15 zinc-aluminum wire over the surface of steel. Zinc metallizing and finish coating system shall have the following performance characteristics and results of tests performed on representative samples (hot dip galvanizing is not acceptable):

a. Adhesion: Test zinc metallizing with complete finish coating (epoxy primer and polyurethane topcoat system) in accordance with ASTM D4541 – Standard Test

Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers, Test Method E. Pull-off strength throughout the system shall be not less than 750 psi before and after environmental cycling. Environmental cycling shall be 10 cycles of the following: 4 hrs at 100% humidity per ASTM D1735; 16 hours below 0°F; and 4 hours at 140°F.

b. Corrosion resistance of zinc metallizing with epoxy primer and polyurethane topcoat system: A rating of 10 after 1000 hours salt fog (prohesion method) when tested in accordance with ASTM D1654, Procedure A. Scribe shall be cut through all coatings to bare steel substrate. Expose specimens in accordance with ASTM G85 – Standard Practice for Modified Salt Spray(fog) Testing.

G. Galvanizing Paint Repair

1. Galvanizing touch up paint for regalvanizing welds and damaged areas shall conform to ASTM A780 and comply with Military Specification MIL-P-21035, such as ZRC Cold Galvanizing Compound.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Do not begin placement of metal deck until all surfaces and members are deemed acceptable to receive the deck. Do not proceed with Work until any unsatisfactory conditions have been corrected to the satisfaction of the Commissioner.

3.3 ERECTION

A. General

1. Care should be taken to avoid overloading the supporting structural elements when placing bundles of metal deck or other construction loads on floors.

2. Do not use floor deck units for storage or working platforms until they are permanently secured.

B. Temporary Shoring and Bracing

1. Provide temporary shoring and bracing members with connections of sufficient strength to bear erection loads until completion of erection. Remove temporary work when permanent members are in place and final connections are made.

C. Metal Deck and Accessories Installation

1. Lay units in strict accordance with manufacturer's instructions and requirements and as shown on Drawings.

2. Adjust units in place before permanent fastening and accurately align end to end. Rectify inaccuracies in alignment and level of bearing before units are finally placed.

3. Provide proper bearing at all supports. Metal deck must be placed to bear fully on surface of beam flanges.

4. Fasten side laps of adjacent units between supports by crimping or mechanically fastening with sheet metal screws of size and spacing required by manufacturer. In no case shall fasteners exceed two feet.

5. Furnish, install, and weld in position all accessories, including pour stops, closures, cant strips, etc., where required.

a. Furnish sheet metal pour stops and closures for open ends of walls, and openings shown on Drawings. Pour stop gage is to be selected by manufacturer based on overhang. Revise gage if survey shows overhang exceeds that designed. Provide additional supports to strengthen pour stop at wedge inserts if required.

b. Provide welding hole cover, with friction fastening, to close welding access holes when required.

D. Cutting, Drilling, and Reinforcing of Openings

1. Where predetermined openings are framed by structural steel beams on all sides (shown on the Drawings), the metal deck shall be engineered by the manufacturer to fit these conditions. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.

2. Any opening which is not framed by structural steel beams on all sides, and which is required in steel decking, shall be cut by the respective trades requiring it.

3. Reinforcing of Openings in Steel Deck

a. Holes 6" or less in dimension need not be reinforced.

b. Holes greater than 6" but less than 30" in any dimension shall be reinforced by the Contractor as shown on the Structural Contract Drawings.

E. Field Touch Up

1. Clean scarred and rusted areas in galvanizing after deck installation is completed and paint welds and the scarred and rusted areas with the galvanizing repair paint. Apply in accordance with the manufacturer's instructions.

3.4 CLEANING

A. After installation, metal deck surfaces to receive fire proofing shall be clean of dust, greese, excessive oils, loose material and any other matter that would impair the adhesion of fire proofing material to deck and accessories.

END OF SECTION 05 30 00

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

Provide rough carpentry Work as indicated on the Drawings, as required for the completed Work of this Contract, and as specified herein, including, the following:

1. Blocking and cants for roofing work

2. Plywood substrates for liquid applied roofing

3. Miscellaneous lumber.

1.3 REFERENCE DOCUMENTS

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. U.S. Department of Commerce.

a. American Softwood Lumber Standard PS 20

b. Product Standard PS 1 for Softwood Plywood

2. APA Engineered Wood Association. APA Design/Construction Guide

3. Grading Rules by:

a. Western Wood Product Association (WWPA)

b. Southern Pine Inspection Bureau (SPIB).

c. Redwood Inspection Service (RIS).

d. West Coast Lumber Inspection Bureau (WCLIB).

4. American Wood Preservers' Association (AWPA).

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Quality Control Submittals

1. Certifications for the following wood treatments

a. Dip Treatment: Certification by treating plant stating chemical solutions used, submersion period, and conformance with applicable standards.

b. Waterborne Preservative: Certified written statement that moisture content of treated materials was reduced to a maximum of 19 percent prior to shipment to Project site.

c. Pressure Treatment: Certification by treating plant stating chemicals and process used, net amount of chemical retained, and conformance with specified standards.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Mill and Producers Mark
1. Each piece of lumber and plywood shall be grade stamped indicating type, grade, mill, and grading agency certified by the Board of Review of the American Lumber Standards Committee. Mark shall appear on unfinished surface, or ends of pieces with finished surfaces.

C. Standards
1. Comply with following standards unless otherwise stated in drawings
a. Lumber: Shall conform with applicable provisions of American Softwood Lumber Standard PS 20 by the U.S. Department of Commerce.
b. Grading Rules:
1) Douglas Fir, Hem-Fir, Idaho White Pine, and other Western Woods: Western Wood Products Association (WWPA) or West Coast Lumber Inspection Bureau (WCLIB).

2) Southern Pine: Southern Pine Inspection Bureau (SPIB).
3) Redwood: Redwood Inspection Service (RIS).

c. Preservative Treatment: American Wood Preservers' Association (AWPA) Standards, quality control methods, and inspection requirements

1.6 DELIVERY, STORAGE AND HANDLING

A. Keep materials dry during delivery. Store materials 6" minimum above ground surface. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation between stacks.

B. Cover stored materials until ready for use for protection from moisture. Place and anchor covering in a manner which will assure good ventilation under the covering.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Preservatives shall have a maximum VOC content of 350 gms/liter.

PART 2 - PRODUCTS

2.1 LUMBER

A. General

1. Furnish seasoned dimensional lumber dressed to nominal sizes indicated with 19 percent maximum moisture content at time of dressing, marked "S-DRY". Comply with dry size requirements of PS 20.

a. Dress: Surfaced 4 sides (S4S) unless otherwise indicated.

B. Board Lumber; less than 2" thick: Southern Pine No. 3 (SPIB), any species No. 4 (WWPA) or any species Standard (WCLIB), or Redwood Merchantable (RIS).

C. Plywood shall be ‘Exterior Grade’ with minimum ¾” thickness.

D. Miscellaneous Lumber

1. Standard grade, No. 3 grade, or better grade of the following species unless otherwise indicated:

a. Nailers and Blocking: Douglas Fir, Hem-Fir, Idaho White Pine or Southern Pine.

2.2 PRESERVATIVE TREATMENT

A. Treat lumber where indicated and as specified. Comply with applicable AWPA Standards and quality control and inspection requirements.

1. Fasteners and anchoring devices to be used with wood treated with waterborne preservatives shall be hot-dip galvanized or stainless steel if the wood will be exposed to moisture.

B. Complete fabrication of items to be treated to the greatest extent possible, prior to treatment. Where items must be cut after treatment, coat cut surfaces with heavy brush coat of the same chemical used for treatment or other solution recommended by AWPA Standards for the treatment.

C. Inspect wood after treating and drying. Discard warped or twisted items.

D. Pressure Treatment (Above Ground Use)

1. Treat the following wood items with waterborne preservatives for above ground use, complying with AWPA Standards C2 & C9. Redry wood to a maximum moisture content of 19 percent after treatments.

a. Nailers, blocking, cants, shim stock, and similar members used in conjunction with roofing (including related flashings, trim and vapor barrier), coping, and waterproofing.

b. Nailers, blocking, furring, stripping, and similar concealed members in contact with exterior masonry and concrete (including interior wythe of exterior walls), and all sills for framing.

PART 3 - EXECUTION

3.1 RELATED DOCUMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine substrate and supporting structure on which rough carpentry is to be installed for defects that will adversely affect the execution and quality of the Work. Do not proceed with installation until unsatisfactory conditions are corrected.

3.3 INSTALLATION

A. Do not use units of material with defects which impair the quality of the Work and units which are too small to fabricate the Work with minimum joints or with optimum joint arrangement.

B. Install Work accurately to required lines and levels with members plumb and true, accurately cut and fitted and securely fastened. Closely fit rough carpentry to other associated construction.

C. Securely attach carpentry Work to substrates by anchoring and fastening as indicated, or, if not indicated, as required by the referenced standards. Select fasteners of size that will not penetrate through members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required. Set nail heads in exposed Work which is to be painted or stained and fill resulting holes.

END OF SECTION 06 10 00

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SECTION 07 27 00 – FIRESTOPPING / SMOKE SEALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide firestopping at all penetrations and juncture joints of fire-rated walls, floors and ceilings in accordance with the requirements of the New York City Building Code.

B. Firestopping and Smoke Seals shall be provided to the following specific locations:

1. Penetrations for the passage of duct, cable, conduit, piping and electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor slabs and floor/ceiling assemblies), and vertical service shafts. Provide 3 hour rated firestops at all new floor slab penetrations. Provide 2 hour firestops at penetrations through rated interior partitions.

2. New and existing openings and penetrations in fire-rated partitions or walls.

3. Locations shown specifically on the Drawings.

1.3 REFERENCE DOCUMENTS

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society for Testing and Materials (ASTM)

2. Underwriters Laboratories, Inc. (UL)

3. National Fire Protection Association (NFPA)

4. Warnock Hersey

1.4 DEFINITIONS

A. Penetration: Any opening or foreign material passing through or into a fire-rated barrier.

B. Fire-Rated: Have the ability to withstand the effects of a standard fire exposure for a specified time period, as determined by qualified testing.

C. Fire-Rated Barrier: A floor, wall, partition or floor-ceiling assembly able to withstand a standard fire and hose stream test without failure.

D. Fire resistance rating: The ability of a structure to act as a barrier to the spread of fire and to confine it to the area of origin. Ratings are expressed in hours and apply to beams, columns, floors, ceilings, roofs, walls and partitions.

E. Firestopping: A means of sealing openings in fire-rated barriers to preserve or restore the fire resistance rating.

F. Firestop System: A material, or combination of materials, installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke or gases through penetrations in fire-rated barriers.

G. F Rating: The time period that the through-penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E814.

H. T Rating: The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise to 325°F (163°C) above its initial temperature through the penetration on the non-fire side when tested in accordance with ASTM E814.

1.5 REQUIREMENTS

A. Technical Requirements

1. Firestopping materials shall be UL Classified as "Fill, Void or Cavity Material" for use in Through-Penetration Firestop Systems.

2. Firestop Systems shall provide a fire resistance rating at least equal to the hourly resistance rating of the fire-rated barrier and resist passage of smoke and other gases.

B. General Considerations

1. Firestop Systems do not re-establish the structural integrity of load bearing partitions. The Contractor shall consult the Commissioner prior to penetrating any load bearing assembly.

2. Firestop systems are not intended to support live loads or traffic. Contractor shall consult the Commissioner if there is reason to believe these limitations may be violated.

1.6 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Submit manufacturer's product information for each type of firestopping/smoke seal and assembly installed, including application instructions and specifications.

C. Shop Drawings

1. Submit manufacturer's product information for each type of firestopping/smoke seal and assembly installed, including application instructions and specifications.

D. Quality Control Submittals

1. Certificates

a. Furnish manufacturer's certification that materials meet or exceed specification requirements for each of the performance tests specified in Part 2.

b. Furnish applicator's certification that material has been completed as specified to meet fire resistance ratings, thickness requirements, and application requirements of the applicable assembly.

c. Furnish UL, BSA, MEA, or OTCR approval of material.

d. Furnish certificate stating each material is 100% asbestos free.

2. Contractor Qualifications

a. Provide proof of Manufacturer and Applicator qualifications specified under “Quality Assurance”.

E. Mock Up

1. Provide mock-up as indicated under Quality Assurance.

F. Guarantee

1. Contractor’s installation guarantee.

G. Low Emitting Materials Compliance Certifications

1. Provide documentation for each sealer to be used on site, indicating that the sealers comply with low V.O.C. requirements of The City of New York.

1.7 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Qualifications

1. Manufacturer: Company specializing in the manufacture of firestopping/smoke seal materials to be used in this Contract shall have a minimum of three years’ experience

2. Installer: All firestopping Work shall be performed by a Subcontractor who will be acceptable to the firestopping manufacturer in the application of its products and systems and have a minimum of three years’ experience.

C. Regulatory Requirements

1. Material and application shall meet the requirements for firestopping materials in accordance with the NYC Building Code.

2. Material must have UL or NYC BSA, MEA or OTCR approval for each assembly utilized. Comply with the following for firestopping that is required to be in compliance with Section BC 713 – Penetrations, of the NYC Building Code:

a. ASTM E84 - Surface Burning Characteristics of Building Materials.

b. ASTM E814 - Fire Tests of Through Penetration Firestops.

c. U.L. 1479 - Fire Tests of Through-penetration `Firestops.

d. U.L. - Fire Resistance Directory; Through-Penetration Firestop Systems (XHEZ), and Fill, Void or Cavity Materials (XHHW).

e. U.L. 723 - Standard Test Method for Surface Burning Characteristics of Building Materials

D. Manufacturer Certification

1. Manufacturer shall provide written certification stipulating that its products and systems used in this Project, if installed in accordance with the manufacturer's recommendations, shall provide the firestopping specified in this Section, as indicated by its UL rating for that specific installation

E. Mock-up

1. Install, on representative substrates (on site), one mock-up of each type of firestopping system to be used on Project, for each fire rating required and for each type of wall, floor, and ceiling. Acceptable mock-up installations may remain as part of the completed work.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened packages bearing name of manufacturer, product identification, and the proper UL labels for fire hazard and fire-resistance classification.

B. Reject damaged packages found unsuitable for use and remove from job site.

C. Store materials off ground, under cover, and away from damp surfaces.

D. Keep materials dry at all times. Wet material shall be discarded.

E. Rotate stock material and use prior to expiration date.

1.9 ENVIRONMENTAL REQUIREMENT

A. Maintain air and substrate temperature at a minimum temperature of 50oF for 24 hours before, during, and for 24 hours after application of the material or as required by the product literature, which ever is more stringent. Contractor shall provide enclosures with heat to maintain temperatures.

1.10 CONTRACTORS GUARANTEE

A. Submit a guarantee, executed by the Contractor, agreeing to repair/replace firestopping work performed under this Contract which has cracked, flaked, dusted excessively, peeled, or has separated or fallen from the substrate due to defective workmanship for a period of one (1) year from the date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The manufacturer of products for this sections shall be one of the following:
1. Hilti Construction Chemicals, Inc., Tulsa, OK.
2. The Carborundum Company, Niagara Falls, NY.
3. 3M Fire Protection Products, St. Paul, MN.
4. W. R. Grace & Co., Macungie, PA
5. Or approved equal.

2.2 MATERIALS

A. Grout and sealant systems, as well as integral firestopping sleeves and membranes, shall meet or exceed requirements as specified in Part 1 of this Section and shall be acceptable to The Commissioner.

B. Firestopping systems shall meet the requirements of ASTM E814, which include the following:
   1. Prevent flame pass-through.
   2. Restrict temperature to not exceed 325°F over ambient on side of assembly opposite flames.
   3. Provide a positive smoke seal.
   4. Withstand hose stream test with a minimum positive pressure differential of 0.01 inch (2.49 pa).
   5. Provide an F rating of not less than the required fire rating of the wall penetrated.
   6. Provide an F rating and a T rating for floor penetrations of not less than 1 hour, but not less than the required fire rating of the floor penetrated, except as follows:
      a. Floor penetrations contained and located within the cavity of a wall do not require a T-rating.
      b. Metallic piping or tubing penetrating a single fire rated floor, having a maximum 6" diameter can be firestopped with concrete, grout or mortar of thickness to maintain the fire rating of the floor penetrated. No limit to the number of floors penetrated if the area of the penetration does not exceed 144 square inches in any 100 square feet of floor area.

C. Firestopping materials shall be asbestos-free, emit no toxic or combustible fumes and be capable of maintaining an effective barrier against flame, smoke, gas, and water in compliance with requirements of this Section.

D. Firestopping materials/systems shall be flexible to allow for normal movement of building structure and penetrating items(s) without affecting the adhesion or integrity of the system.

E. Firestopping materials shall not require hazardous waste disposal of used containers/packages.

F. On insulated pipe, the fire-rating classification must not require the removal of the insulation.

G. Firestopping materials shall be free of solvents. Shrinkage while curing shall not exceed shrinkage experienced during specified testing. Firestopping shall remain in complete contact with adjacent construction when fully cured.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine and confirm the compatibility of surfaces to receive firestopping materials. Verify that surfaces are sound, clean and dry and are ready to receive the firestopping.

B. Verify that penetration elements are properly located and securely fixed, with the proper space between the penetration element and surfaces of the opening

3.3 PREPARATION

A. Protect adjacent surfaces and equipment from damage.

B. Clean surfaces of openings.

3.4 INSTALLATION

A. Install firestopping system in strict accordance with the manufacturer's instructions to obtain the fire-rating required at the specific location. The Commissioner shall be immediately notified of conditions that will not allow the proper installation of the material to achieve the required rating, such as the annular space between the penetration and sleeve not being wide enough to meet the requirements of the assembly.

B. Provide escutcheons for piping at each side of penetration.

3.5 FIELD QUALITY CONTROL

A. Special Inspection
   1. The City of New York will assign under the requirements of Section 1704.25 of the NYC Building Code a Special Inspector who will inspect the firestopping/smoke seal installation to meet both the Special and periodic Special Requirements of the NYC Building Code.
   2. The Special Inspector will make inspections and any testing deemed necessary.

B. Nonconforming Firestopping/Smoke Seal Installation

1. When inspection indicates firestopping does not comply with the required assembly, remove and replace firestopping.
2. Areas of restoration or replacement will be re-inspected for compliance to the approved assembly.

C. Contractors Responsibility for Quality Control
1. Inspect all installations to ensure that all work meets the requirements specified as the Work progresses.
2. Cooperate with the Special Inspector performing Special and Periodic Inspection. Provide all access, including scaffolding and ladders.
3. Do not cover firestopping work until it is accepted and approved by the Special Inspector.

3.6 CLEANING AND PROTECTION

A. Remove excess materials, droppings, and debris; remove excess materials from adjacent surfaces.

B. Protect firestopping installations from damage until completion of all Project Work.

END OF SECTION 07 27 00

SECTION 07 52 16 – SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide Styrene-butadiene-styrene (SBS) modified bituminous membrane, cold applied roofing system on steel deck, including but not limited to:

1. Polyisocyanurate insulation, Min. R Value of 30, mechanically fastened to deck.

2. 1/4” gypsum cover board, cold adhesive adhered.

3. Two trilaminate base ply membranes.

4. Granulated SBS modified bitumen white cap sheet ply adhered in cold process adhesive.

5. Base flashings

6. Metal flashing components and miscellaneous accessories as required.

1.3 DEFINITIONS

A. Refer to DDC General Conditions.

B. Roofing terminology and definition of terms related to roofing work in this section are as per ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual".

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing Membrane Load-Strain Properties

1. Provide a three-ply cold-applied roofing membrane identical to component systems that have been successfully tested by a qualified independent testing and inspecting agency to meet the following minimum load-strain properties at membrane failure when tested according to ASTM D 2523:

a. Tensile strain at failure, at 0 deg F: 740 lbf/machine direction, minimum; 4.00 percent elongation at break.

b. Tensile strain at failure, at 0 deg F: 780 lbf/cross-machine direction, minimum; 4.20 percent elongation at break.

D. Flashings and Fastening: Comply with requirements of 'Section 07 60 00 – Flashing and Sheet Metal'. Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:

1. FMG 1-49: Loss Prevention Data Sheet for Perimeter Flashings.

2. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.

3. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.

4. The metal edge securement, except gutter, shall be installed as tested in accordance with the most current version of the ANSI\SPRI ES-1, American National Standard for Edge Systems Used with Low-Slope Roofing Systems.

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Shop Drawings:

1. Roof Survey locating high and low points of existing roof deck, pitch and locations of roof penetrations. Roof survey after new roofing installation to demonstrate compliance with required new pitch and general layout.

2. Tapered insulation layout, including slopes. The proposed tapered insulation layout shall be coordinated with the high points, low points and slopes of existing roof deck as identified in the roof survey performed as per item 1.5 B.1.

3. Crickets, saddles, and tapered edge strips, including slopes.

C. Samples for Verification: For the following products:

1. 8-by-10-inch sample of base plies.

2. 8-by-10-inch of sample granulated cap sheet.

3. 8-by-10-inch sample of flashing sheet and backer sheet.

4. 4-by-4-inch of roof insulation and cover board.

5. Six insulation fasteners of each type, length, and finish.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Qualification Data: For manufacturer's technical representative.

F. Warranties: Sample of warranties as specified in this Section.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Manufacturer Qualifications:

1. Manufacturer of roofing system shall demonstrate a minimum five (5) year track record of successful production and application of cold process roofing systems similar to the one specified for this project.

2. The manufacturer shall have current ISO-9001 Certification.

C. Installer Qualifications:

1. Installer performing Work of this Section sall have minimum 3 years experience in installing cold process roofing systems on projects of comparable size and scope.

2. Installer shall be approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product and shall be eligible to receive and issue the standard roofing manufacturer's warranty.

D. Installer's supervisor/foreman qualification:

1. Installer must maintain full-time supervisor/foreman on job-site during times that roofing work is in progress. Supervisor must have a minimum 3 years of experience in roofing.

E. Manufacturer's Technical Representative

1. Contractor shall employ a full time technical representative of manufacturer experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspections specified in Field Quality Control Article.

2. Manufacturer's representative shall be authorized by the manufacturer to issue warranty certification.

3. Manufacturer's Technical Representative must inspect roof installation every other day and report progress to the Commissioner. Provide progress photos for application of each operation of roofing system. In addition to regular inspections, Manufacturer's Technical (non-sales) Representative shall be present for roof work starts at each section.

4. It will be the contractor's responsibility to coordinate with the manufacturer to employ the manufacturer's representative or the roof observer to ensure receipt of the specified manufacturer warranty for the installed roofing.

F. Source Limitation: Obtain all roofing system components and accessories from the selected roofing manufacturer or approved in writing by the selected roofing system manufacturer.

G. Pre-installation Roofing Conference: Conduct conference at Project site.

1. Meet with Commissioner, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

7. Review NYC Building Code regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.

9. Review roof observation and restoration procedures after roofing installation.

H. Random Sampling:

1. Roofing material:

a. During course of work, the commissioner may secure samples according to ASMT D140-93 of materials being used from containers at job site and submit them to an independent laboratory for comparison to specified material.

b. Should test results prove that a material is not functionally equal to specified material:

1) Contractor shall be responsible for the expenses of the testing.

2) Roofing installed and found not to comply with the specifications shall be removed and replaced by contractor at no additional expense to the City of New York.

I. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to the NYC Department of Buildings. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F.

E. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

F. Contractor is responsible for the safekeeping of materials stored onsite.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Prevent dust, vapors, gases, and odors from entering into the building during roof installation. When shutting down or blocking air intakes, provide makeup air or additional intake air from sources away from the work area. Coordinate these procedures with Commissioner.

1.9 WARRANTY

A. Manufacturer’s Roofing Warranty: Submit a written warranty, signed by the roofing system manufacturer agreeing to promptly restore any leaks in the roof membrane system resulting from defects in materials or workmanship including roof plies and adhesive, base flashings, roof

insulations and adhesives, wood components, fasteners, and all roof system metal components for the indicated warranty period.

1. Manufacturer's 20-Year Systems Warranty.

2. Indicate a wind speed warranty of 74 M.P.H., as reported by the certified weather reporting station nearest to the site for the New York, N.Y. region. Provide a sample copy of standard roofing manufacturer's warranty, stating obligations, remedies, limitations, and exclusions of warranty.

3. Warranty shall run for a continuous 20 years from date of substantial completion.

4. Warranty containing any requirement(s) for commissioner to renew the warranty at any time during the 20 year period will not be accepted that

5. In year(s) number 2, 5, 10 and 15 of this warranty, manufacturer shall provide roof inspections, and limited housekeeping services, at no additional charge.

6. Upon successful completion of the work, the manufacturer's warranty as stated above shall be issued to the commissioner.

B. Applicator/Roofing Contractor Guarantee: Submit roofing installer's written warranty, signed by the installer, covering work of this section, including but not limited to, roof plies and adhesive, insulation layers, base flashings, roof insulations, wood components, fasteners, and all roof system metal components for two years from the date of substantial completion. The warranty shall guarantee material and workmanship for watertightness, weathertightness, and against all leaks. During the two-year period, upon notification to manufacturer to uphold warranty, the contractor shall respond and fix all reported leaks within 24 hours from time of notification, and fix all leaks without any expense to the City of New York.

1. Warranty Period: Two years from date of Substantial Completion.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Provide products which meet all VOC requirements of New York State Department of Environmental Conservation for applications outlined herein

1. Roof Coatings: Max VOC content of 250 gms/liter
2. Bituminous Roof Coatings: Max VOC content of 300 gms/ liter
3. Bituminous Roof Primers: Max VOC content of 350 gms/liter
4. Thermoplastic Rubber Coatings/Mastics: Max VOC content of 550 gms/liter

B. Modified Bitumen Granulated Cap Sheet and Reflective Elastomeric Coating shall be “Energy Star” rated.

1.11 SUSTAINABILITY REQUIREMENTS

A. Provide products complying with the following requirements:

1. Polyisocyanurate insulation shall have 9% of recycled content.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with meeting or exceeding specified performance requirements, provide the roofing system manufactured by one the following:

1. Tremco, Inc., Beechwood, OH. Phone: (908) 616 6437

2. Johns Manville Corporation, Denver, CO. Phone (914) 359-0110

3. The Garland Company, Cleveland, OH Ph.: (516) 717-5051

4. Or approved equal

2.2 MATERIALS

A. The roofing system shall be a fully adhered, three-ply preformed roofing system, including the components and accessories specified in this section.

B. Mineral Granular Roof System

1. SBS Modified Bitumen Granulated Cap Sheet, Color: White.

a. ‘POWERPLY 300 FR’ by Tremco Inc.

b. ‘DynaGlas FR CR’ by Johns Manville

c. ‘StressPLY E FR Mineral’ by The Garland Company

d. Or approved equal

2. Base and Intermediate Plys:

a. ‘BURmastic Composite Ply HT’ by Tremco Inc.

b. ‘Dyna Base base and intermediate ply’ by Johns Manville

c. ‘StressBase 80’ by The Garland Company

d. Or approved equal

C. Fluid Applied Flashing System

1. Flashing assembly shall consist of a white fluid applied membrane, with a reinforcing fabric/mat, for a finished dry film thickness of 70 mils, as manufactured by:

a. ‘Alphaguard’ by Tremco

b. ‘MBR Flashing Cement’ coated with‘CR Seam Coating’ by Johns Manville

c. ‘TuffFlash’ by The Garland Company

d. Or approved equal.

2. Flashing system shall be the type provided by the roof system manufacturer, and shall be compatible with the roofing.

D. Cold applied Interply Adhesive:

1. ‘Powerply Standard Cold’ by Tremco Inc.

2. ‘MBR Cold Application Adhesive’ by Johns Manville

3. ‘Weatherking’ by The Garland Company

4. Or approved equal

E. Cold applied Insulation and Coverboard adhesive:

1. Insulation and coverboard attachment shall be with a cold applied, modified urethane adhesive by the roof manufacturer:

a. ‘Low Rise Foam Insulation’ adhesive by Tremco Inc.

b. Johns Manville Two-part Insulation Adhesive

c. ‘Insul-Lock II’ by The Garland Company

d. Or approved equal

F. Roof Insulation

1. General:

a. Roof insulation shall consist of substrate board (where shown on the Contract Drawings or where required), foam insulation, and cover board as required for compliance with the requirements of this Section. Tapered and fill insulation is applied over the primary insulation to provide the required slope and pitch to roof drains. All insulation shall be sufficiently rigid to span the fluted openings of the metal deck, if applicable.

b. Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses required to create a minimum R-Value of 30.

c. Provide minimum 1/2" thick cover board, over polyisocyanurate insulation, over minimum 1/2 inch thick substrate board, unless indicated otherwise in drawings.

d. Slope insulation to drain. Taper insulation as tapered insulation layout submitted for review and approved by commissioner.

e. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where required for sloping to drain.

2. Polyisocyanurate Board Insulation: :

a. Rigid, closed-cell cellular polyisocyanurate thermal insulation with integrally laminated to heavy non-asphaltic fiber-reinforced felt facers core formed by using HCFCs as blowing agents to comply with ASTM C 1289 Type II, Class 1, Grade 2; with minimum compressive strength of 20 psi, nominal 2.0 pcf density

b. Facer Type shall be Felt or Glass-fiber mat.

c. Insulation shall be manufactured by or approved for use with the roof system, by the roof system manufacturer. Provide Insulation manufactured by:

1) 'AC Foam-II' by Atlas Energy Products, Atlanta, GA

2) ISO 1 and ISO 1 Tapered by Johns Manville

3) ISO95+ GL by Firestone Building Products Co., Carmel, IN

4) Multi-Max FA by R-Max Inc, Dallas, TX

5) Or approved equal.

G. Insulation Accessories
1. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
2. Fasteners: Factory-coated steel fasteners and plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
3. Wood Nailers and Cants: Comply with recommendations in FMG Loss Prevention Data Sheet 1-49, including requirements for wood nailers and cants. Fibrous cants are not permitted.
4. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

H. Cover Board
1. General: ASTM C 1278/C 1278M, cellulosic-fiber-reinforced, water-resistant gypsum substrate, minimum 1/2 inch thick.
2. Provide one of the following manufacturers/products:
   a. "Dens-Deck Prime Roof Guard," manufactured by Georgia-Pacific Corporation ; ASTM C 1177, glass-mat, water-resistant gypsum substrate, 1/2 inch thick with factory-primed face.
   b. “Securock Gypsum-Fiber,” as manufactured by United States Gypsum Company, Chicago, IL; ASTM C 1278, compressive strength minimum 1,800 psi, ½ inch thick.
   c. “JM DensDeck” by Johns Manville
   d. Or approved equal

I. Auxillary Roofing Membrane Materials
1. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
2. Water-Based Asphalt Primer: Water-based, asbestos-free, polymer modified, asphalt primer.
3. Asphalt Roofing Mastic: ASTM D 4586, Type II, Class 1, one-part, asbestos-free, cold-applied mastic specially formulated for compatibility and use with specified roofing membranes and flashings.
4. Elastomeric Stripping Mastic: One-part, asbestos-free, trowel-grade, elastomeric roof mastic specially formulated for compatibility and use with specified roofing membranes and flashings, with the following properties:
5. Elongation at 77 deg. F, minimum, ASTM D 412: 1000 percent.
6. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
7. Lead Flashings: Plumbing stacks and Drain Bowls: 4 lb. sheets ASTM B29-79

8. Termination Bar: .060" thick aluminum bar x 2" wide x 10' lengths. Fastener spacing 8" o.c.
9. Gasket Sealant: Two sided, butyl adhesive, 1" x 1/8 compression tape for termination bars.
10. Pitch Pocket mastic: Pourable Sealer.
11. Reflective Elastomeric Coating: Energy Star rated, white elastomeric coating with compatible primers, as recommended by the roofing manufacturer.
12. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing membrane cap sheet.
13. Glass-Fiber Fabric for Stripping: Vinyl coated glass-fiber mesh cloth.
14. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

J. Roof Pavers

1. Provide concrete Roof Ballast Pavers as indicated on drawings from one of the following manufacturers:
   a. 'Skyscape Ballast Pavers' by 'Firestone Building Products'
   b. 'Westile Ballast Paver' by Westile
   c. 'Wausau Ballast Pavers' by 'Wausau Tile'
   d. Or approved equal
2. The weight of the Roof Pavers shall be a minimum of 7 psf and a maximum of 12 psf.
3. Provide 'Ballast Paver Mats' as bearing between the pavers and roofing membrane and coordinate with roofing manufacturer for any implications of roofing pavers to maintenance of roofing warranty.
4. Do not store Pavers on the roof prior to installation.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.

2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.

4. Verify that substrate is visibly dry and free of moisture.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Complete abatement of asbestos containing materials, if any, following all prescribed legal requirements.

B. All roof top curbs, units, projections and wall flashings must be raised to allow finish roof system flashing height of 8" minimum.

C. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

D. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

E. Upon award of contract and before any roofing work is started, roofing contractor shall check the roof drains for any damage. Roofing contractor shall clean out the roof leaders with "snakes" to ensure drains are open and free-flowing. Use hoses to flush out and ensure there is a constant flow of water from drains. Commissioner to be present for testing.

3.4 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's recommendations.

B. Comply with recommendations in FMG Loss Prevention Data Sheet 1-49, including requirements for wood nailers and cants.

C. Begin the built up roof membrane system installation in the presence of roofing manufacturer technical (non-sales) personnel.

D. Coordinate installation of roofing system components so insulation and roofing plies are not exposed to moisture or remain exposed at the end of the workday or when rain is forecast.

E. Provide water cutoffs at the end of each day's work to cover exposed ply sheets and insulation with a course of coated felt with joints and edges sealed.

F. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of the roofing system.

G. Roofing system and building shall be water-tight at the end of each working day.

H. Remove and discard temporary seals before beginning work on adjoining.

I. Shingling Plies: Install base sheet and roofing plies with ply sheets shingled uniformly to achieve required number of membrane plies throughout. Shingle in direction to shed water.

J. Cooperate with inspecting and testing agencies engaged or required to perform services for installing modified bitumen membrane roofing system.

K. Asphalt Primer Application: Prime all surfaces and substrates to which cold adhesive or asphalt mastic or membrane will come in contact. Apply at the rate of 200 square feet per gallon. Coat all metal flashings and fascia with primer that will come in contact with membrane materials.

L. Contractor shall erect all required roof barriers and safety lines as required by OSHA and comply with OSHA regulations for safety.

3.5 ROOF DRAINS

A. General:

1. Inspect roof drains at time of existing roof tear-off to ascertain requirements for restoration and/or replacement of broken or missing parts.

2. Provide temporary means of protecting roof drains from clogging of foreign material during construction. (E.g. inclement weather, weekends, holidays, etc.)

B. Preparation:

1. For all existing roof drain locations, remove all foreign material from body of drain, tailpiece, connecting piping, and roof leader.

2. Flush through roof leaders to building drainage system to remove sediment and to test drain capacity.

3. Verify that all roof drains are clear and free flowing, and attain Commisioner approval prior to commencement of work.

4. Clean drain body of all bitumen and other contaminants.

5. Fasteners: Coat all bolt threads with manufacturer’s recommended permanent type lubricant to prevent freeze-up.

6. Set membrane under new clamping ring in full bead of water stop mastic.

7. Use bronze, brass or stainless steel machine bolts.

8. Do not seal the dome strainer to the drain body or clamping ring. It must be removable for future cleaning of the drain bowl or roof leader. Install only cast iron drain strainers. PVC or plastic-type drain strainers are not permitted.

3.6 INSULATION INSTALLATION

A. Comply with built-up roofing manufacturer's written instructions for installing roof insulation.

B. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

C. Install insulation under area of roofing to achieve required thickness to achieve specified Continuous R-Value of 30 and minimum slope of 1/8.

D. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring and does not restrict flow of water.

G. Wood Cants: Install and secure preformed 45-degree wood cants at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.

H. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

I. Taper insulation to provide a 48” square sump at drains.

J. Mechanically Fastened Insulation: Install each layer of polyisocyanurate insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation at a rate of one fastener/plate for every two square feet of board surface.

a. Increase fastener rate at perimeter and corners to meet specified wind uplift requirement.

3.7 COVER BOARD INSTALLATION

A. Install cover boards over existing insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together.

1. Set cover board in ribbons of foamed cold-applied insulation adhesive at a rate of 12 O.C. with enhancements of 50% at edges and 75% in corners, firmly pressing and maintaining insulation in place.

B. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

3.8 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing".

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cooperate with inspecting agencies engaged or required to perform services for installing roofing system.

D. Coordinate installation of roofing so insulation and other components of built-up roofing not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed built-up roofing sheets and insulation with a course of coated felt set in roofing cement with joints and edges sealed.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.

3. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Cold Process Asphalt Heating

1. An in-line heat exchange unit may be used to facilitate application

a. Do not exceed maximum adhesive temperature of 100° F.

b. Heat exchange unit: Use heat transfer oil approved by heating equipment manufacturer.

c. Follow operation procedures recommended by heating equipment manufacturer.

F. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging built-up roofing components or adjacent building construction.

3.9 BASE-PLY SHEETS INSTALLATION

A. Install two roofing membrane trilaminate ply sheets according to roofing system manufacturer's written instructions starting at low point of roofing system. Align ply sheets without stretching. Extend sheets over and terminate beyond cants.

1. Shingle side laps of ply sheets uniformly to ensure that required number of ply sheets covers substrate at any point. Shingle in direction to shed water.

2. Embed each ply sheet in cold-applied membrane adhesive applied at rate of 2 gallons per 100 square feet, or as required by roofing manufacturer, to form a uniform membrane without ply sheets touching.

3. Avoid walking on plies until adhesive has set.

3.10 SBS-MODIFIED BITUMINOUS CAP SHEET INSTALLATION

A. Install SBS-modified bituminous roofing membrane cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.

2. Embed each ply sheet in cold-applied membrane adhesive applied at rate of 2.0 gallons per 100 square feet.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Install roofing membrane sheets so side and end laps shed water. Completely bond and seal laps, leaving no voids.

1. Restore tears and voids in laps and lapped seams not completely sealed.

2. Cast granules into adhesive lap bleed out, while adhesive is still fluid, to ensure a uniform granulated roofing surface.

C. Install modified bituminous membranes with side laps shingled with slope of roof deck. Nail off all roof plies into wood cants with 1" nails fastened 12" on center.

D. On reflective white cap sheets, apply coating to all areas where bituminous material has bled out or the reflective material has cracked or separated, to provide a uniformly white roof surface. For roof membrane and base flashings that are not manufactured to be reflective white, apply coating to all exposed surfaces. Prepare substrate and provide base coat of primers as recommended by roofing manufacturer.

3.11 FLASHING AND STRIPPING INSTALLATION

A. Install one ply base flashing system over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

1. Adhere one ply base flashing ply in a continuous layer of flashing adhesive, applied at the rate required by the roofing system manufacturer.

2. Adhere SBS-modified granulated flashing cap sheet over backer sheet in manufacturer's specified cold-applied flashing adhesive at a rate of 1.0 gallon per 10 square feet, per ply.

B. Extend base flashings up a minimum of 8-inches above roof membrane and 6-inches onto field of roof membrane. Lap ends 6-inches minimum, and stagger end laps 18-inches minimum.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. Seal top termination of base flashing with a metal termination bar.

2. Set butyl tape behind base flashing.

3. Fasten through termination bar, flashing membrane, and butyl tape 8 inches on center.

4. Install metal counterflashing to cover flashing termination.

D. Seal base flashing to roofing membrane with a three course application of elastomeric stripping mastic and mesh.

E. Install two-ply stripping where metal flanges and edgings are set on membrane roofing. Extend plies minimum of 4" beyond edge of metal flange or beyond edge of previous installed ply and embed each ply in a full bed of asphalt mastic. Lap ends 6-inches minimum, and stagger end laps 18-inches minimum. Set all metal flanges on roof in full bed of mastic and prime flanges before stripping.

F. Roof Drains: Install four pound lead flange in bed of asphalt roofing cement on completed modified bitumen membrane roofing. Prime lead flashing and cover with stripping plies extending a minimum of 6 inches beyond edge of metal flashing onto field of roof membrane. Clamp roof membrane, metal flashing, and stripping into roof-drain clamping rings if required by roofing manufacturer.

1. Install stripping according to roofing system manufacturer's written instructions.

G. Complete all flashing details in accordance with attached drawings. Complete details to meet FM 1-49 approval requirements utilizing wood nailers and cant strips

3.12 FIELD QUALITY CONTROL

A. Manufacturer’s Technical Representative must inspect roof installation every other day and report progress to Commissioner.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to the Commissioner

1. Notify commissioner 48 hours in advance of date and time of inspection.

2. Results will be made available to commissioner in written form. Any defects or entrapped moisture found within the new roofing system installation will be removed and replaced at no additional expense to the City of New York.

C. Restore or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at no additional expense to the City of New York, will be performed to determine compliance of replaced or additional work with specified requirements.

3.13 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to the Commissioner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, restore substrates, and restore or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Sequence operations to avoid excessive or concentrated foot traffic and storage over roof areas while they cure.

D. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 52 16

SECTION 07 60 00 – FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide all flashing, trim and sheet metal Work as indicated on the Drawings, as required for the completed Work, and as specified herein. The Work shall include, but shall not be limited to, the following:

1. Roof flashings, counterflashing, drip edge/fascia and reglets

2. Insulated rooftop duct Curbs (prefabricated)

3. Miscellaneous flashings and other sheet metal work as indicated in the drawings.

1.3 REFERENCE DOCUMENTS

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

D. American Society for Testing and Materials (ASTM).

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Shop Drawings

1. Provide shop drawings for each sheet metal item to indicate shape, dimensions, material and gauge, finish. Show the manner of forming, jointing, and securing the metal flashings, trim, and other specified sheet metal items. Include expansion joint connections, and the method of forming waterproof connections to adjoining construction.

C. Samples

1. Materials for Flashing and Counter Flashing: One 6" sq piece, for each material specified.

D. Certificates of qualifications as specified under Article titled “Quality Assurance”.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Except as otherwise shown or specified, comply with applicable recommendations, details, and standards of SMACNA.

C. The installer shall have a minimum of three (3) years’ experience in the fabrication and installation of flashing systems, sheet metal components and other items utilizing the materials indicated in the specifications and drawings.

D. All metal Work shall be ink-stamped at intervals, identifying Manufacturer, type metal, and gage or thickness.

E. Materials containing asbestos are prohibited.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle products of this Section in such manner to protect them from damage.

1.7 PROJECT CONDITIONS

A. Make the roof and all uncompleted flashings watertight at the end of each work day.

1.8 CONTRACTORS GUARANTEE

A. The Contractor shall provide a two (2) year written guarantee, covering the flashing and sheet metal materials and workmanship. Should any defects occur during the stated period, they shall be corrected immediately, and all damage caused by such defects shall be corrected; all corrective Work shall be at the Contractor's expense.

PART 2 - PRODUCTS

2.1 MATERIALS FOR FABRICATION

A. Zinc-coated Copper sheet- match to existing

B. Stainless steel Sheet: Match to existing stainless gauge

C. For duct roof curbs, use min 16GA galvanized steel sheet

2.2 FASTENERS

A. Screws, Bolts, and other Fastening Accessories: Stainless steel

B. Anchors: Provide one of the following types:
   1. Hammer driven anchors, consisting of a stainless steel drive pin and a corrosion resistant metal expansion shield inserted thru a stainless steel disc with an EPDM sealing washer.
   2. Self-tapping, corrosion resistant, concrete and masonry screw inserted thru a stainless steel disc with an EPDM sealing washer

2.3 MISCELLANEOUS MATERIAL

A. Solder
   1. Composition of block tin/pig lead of proportion recommended by the metal manufacturer, stamped either 50/50 or 60/40 "Warranted".

B. Flux
   1. Paste or acid type as recommended by the metal manufacturer

C. Flashing Sealants, Cements, Mastics, and Adhesives

D. Provide products recommended in writing by the flashing manufacturer. Materials containing asbestos are prohibited.

   1. Where low modulus silicone sealant is indicated provide ASTM C 920, single-component, neutral-curing silicone; Class 100/50, Grade NS, Use NT, Use O

2.4 FABRICATION

A. General: Where practicable, form and fabricate sheet metal Work in the factory or shop. Produce bends and profiles accurately to the indicated shapes. Where not indicated or specified, follow the applicable requirements of the reference standards listed in PART 1. All corners to be factory prefabricated. Hem exposed sheet metal to eliminate all sharp edges and corners.

B. Stainless Steel and Copper Flashing and Counterflashing: Fabricated to be spring-tight against wall/roofing flashing when required. All corners shall be factory prefabricated: mitered and lapped approximately 1" at corner, and fully soldered or welded.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Coordinate the work of this Section with other Work for the correct sequencing of items which make up the entire system of weatherproofing or waterproofing.

3.3 PREPARATION

A. Do not install the Work of this Section unless all necessary nailers, blocking and other supporting components have been provided.

B. Do not install the Work of this Section unless all substrates are clean and dry. Do not cover air barrier membrane until the completion of a curing period if recommended by the membrane manufacturer.

3.4 INSTALLATION

A. Isolation: Separate dissimilar metals from each other with a dielectric coating to prevent galvanic action. Coating shall be bituminous or synthetic material as required for compatibility with adjacent materials. Provide escutcheons for piping at each side of penetration.

B. Tinning and Soldering:
   1. Use soldering irons (heavy coppers) as Industry Standard. Torch soldering is not acceptable.
   2. Clean, flux and tin all surfaces to be soldered.
   3. Sweat solder thoroughly into seams, completely filling the seam for the full width.
   4. Upon completion of soldering, remove all traces of flux residue, and if required, apply a neutralizing wash followed by a clean water wash.

END OF SECTION 07 60 00

SECTION 07 72 00 – ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide all roof accessories as indicated on the drawings and as specified herein, including but not limited to

1. Insulated Roof Hatches

1.3 REFERENCE DOCUMENTS

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

B. Underwriters Laboratories, Inc. (UL).

C. New York City Board of Standards and Appeals (BSA, or New York City Materials Equipment Acceptance (MEA).

D. Occupational Safety and Health Administration (OSHA).

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures”.

B. Shop Drawings

1. Provide shop drawings showing relationship with adjoining Work and anchorage methods. Include plans, sections, and details.

C. Product Data

1. Manufacturer's catalog sheets, specifications, and installation instructions for roof hatches.
2. Manufacturer's Operations And Maintenance Manual

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. The manufacturers shall have a minimum of three (3) years' experience in the fabrication of type of specified roof hatches.

C. The installer shall have a minimum of three (3) years' experience in installation of type of specified roof hatches

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle products of this Section as recommended by the manufacturers and in such manner to protect them from damage.

1.7 PROJECT CONDITIONS

A. Coordinate sequence of hatch installation with roofing and flashing in such a manner as to maintain the warranty of all products.

1.8 WARRANTY

A. All roof hatches shall be furnished with manufacturer's standard 5 year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Bilco Co., New Haven, CT

B. Babcock-Davis Hatchways, Inc., Arlington, MA

C. Karp Associates Inc., Melville, NY

D. Or approved Equal

2.2 ROOF HATCHES

A. Type
1. Aluminum units consisting of an insulated and weather stripped hinged cover on an insulated curb fitted with integral cap flashing and safety railing.
2. Cover shall be 11 gage, mill finish aluminum with 3" beaded or hemmed flange, 1" thick fiberglass insulation covered by a 18 gage aluminum liner, and neoprene or closed cell rubber gasket seal around perimeter. Cover shall open to 90 degrees.
3. Curb for Roof Hatch shall be 11 gage minimum, mill finish aluminum with 3½ " flange at bottom with holes for securing to roof deck, 11 gage aluminum cap flashing at top, and 1" thick rigid fiberboard insulation on exterior of curb.
4. Curb Height shall be as required to provide a dimension of at least 6” from top of roof surfacing (gravel, pavers, etc.) to bottom of integral cap flashing.

B. Fabrication
1. Continuously weld metal joints.

C. Hardware
1. Zinc or cadmium plated steel; heavy pintel hinges, enclosed spring operators, positive snap latch with turn handles inside and outside, padlock hasp inside, and automatic hold-open operating arm with one hand grip release handle.

D. Safety Railing
1. Conform to OSHA Standard CFR 29 1910.23 Fall Protection in General Industry. Hatch manufacturer’s railing system, with chain or gate on access side. Rail system shall be supported from hatch assembly without penetrating roofing. Provide weatherproof label: “NO HOISTING”. Provide corrosion resistant materials throughout.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Coordinate the work of this Section with other Work for the correct sequencing of items which make up the entire system of weatherproofing or waterproofing.

3.3 INSTALLATION

A. Install roof accessories in accordance with the manufacturer's instructions, unless shown otherwise on the Drawings. Securely anchor units in place to the substrate by bolting, screwing or welding.

B. Where mounting flanges are set directly in the roofing, embed the flanges in roofing cement or other waterproof mastic or adhesive as recommended by the manufacturer of the roofing. On sloping surfaces, integrate mounting flanges with roofing elements to properly shed water.

END OF SECTION 07 72 00

SECTION 07 90 00 – JOINT SEALERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide all joint sealer Work as indicated on the Drawings, as required for the completed Work, and as specified herein. Sealant installation locations include the following locations:

1. Coping transverse joints and masonry joints.

2. Around Door Openings

3. Miscellaneous locations indicated in drawings

1.3 REFERENCE DOCUMENTS

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society for Testing and Materials (ASTM).

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Catalog sheets, specifications, and installation instructions for each product specified

C. Samples for initial selection

1. Provide Manufacturer’s color charts consisting of strips of cured sealants showing the full range of Manufacturer’s standard colors available for each product exposed to view.

D. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in ½ inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

E. Quality Control Submittals

1. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

2. Test Results

a. Sealant manufacturer's test reports certifying compatibility with all contiguous materials.

b. Sealant manufacturer's test reports certifying that the sealant will not stain contiguous materials.

c. Results of field adhesion testing

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".

B. Installers Qualification

1. The persons installing the sealants and their supervisor shall have a minimum of three (3) years' experience in the installation of sealants.

C. Container Labels: Include manufacturer's name, trade name of product, kind of material, federal specification number (if applicable), expiration date (if applicable), and packaging date or batch number.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle joint sealers as recommended by the manufacturer, to protect from damage.

1.7 PROJECT CONDITIONS

A. Environmental Requirements

1. Temperature: Unless otherwise approved or recommended in writing by the sealant manufacturer, do not install sealants at temperatures below 40 degrees F or above 85 degrees F.

2. Humidity and Moisture: Do not install the Work of this Section under conditions that are detrimental to the application, curing, and performance of the materials.

3. Ventilation: Provide sufficient ventilation wherever sealants, primers, and other similar materials are installed in enclosed spaces. Follow manufacturer's recommendations.

4. Do not proceed with installation of Joint Sealers under following conditions:

   a. When joint substrates are wet

   b. When joint widths are less than allowed by manufacturer for the application.

   c. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

   d. Substrates are frozen or superheated by the sun.

B. Protection

1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining

2. Protect all other surfaces in the Work area with tarps, plastic sheets, or other approved covering to prevent defacement from droppings.

3. Protect any painted surfaces which are not included in the Work from impact or damage.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Type 1 Sealant; for general purpose use

1. One part low-medium modulus silicone sealant (plus or minus 50% movement); ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G, and A; The product shall be:

   a. General Electric Silpruf Dow Corning’s 791

   b. Pecora’s 864

   c. Tremco Spectrem 2

d. Sika Sikasil C-955

e. Or approved equal.

2. Silicones shall meet following requirements:

a. ASTM C719- Low-Medium Modulus (+ or - 50%). Sealants shall not exhibit any cracking or surface degradation after 5000 hours exposure in the Atlas Twin Arc Weatherometer.

b. ASTM C661- Shall not incur a durometer increase greater than 10 points.

c. Sealants shall contain zero parts of toxic isocyanurate ingredients.

3. Provide custom colors if directed by commissioner

4. Thoroughly clean surfaces on which sealant is to be applied and prime surfaces as recommended by manufacturer before applying sealant.

2.2 JOINT FILLERS

A. Expanded Polyethylene Joint Filler:
1. Flexible, compressible, closed cell polyethylene of not less than 10 psi compression deflection (25 percent)

2.3 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealer manufacturer where required for adhesion to substrates indicated.

B. Cleaners for nonporous surfaces: Chemical cleaners acceptable to manufacturer of sealants and backing materials, free of oily residues or other ingredients capable of staining or harming joint substrates or adjacent material.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and adjacent surfaces.

D. Backing Material: Non-staining material compatible with joint substratesm sealants, primers and joint fillers, that are approved for applications indicated by the sealant manufacturer.

E. Bond Breaker tape: Polyethylene or other plastic tape as recommended by sealant manufacturer; nonbonding to sealant and self adhesive where applicable.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine all joint surfaces for conditions that may be detrimental to the performance of the completed Work. Do not proceed until satisfactory corrections have been made.

3.3 PREPARATION

A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.
   1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section.
   2. Remove lacquers, protective coatings and similar materials from joint faces with manufacturer's recommended solvents
   3. Use methods such as grinding, acid etching or other approved and manufacturer's recommended means, if required, to clean the joint surfaces, assuring that the sealant materials will obtain positive and permanent adhesion.

3.4 JOINT BACKING INSTALLATION

A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.

B. Install backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

3.5 SEALANT INSTALLATION

A. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.

B. Install sealants with ratchet hand gun or other approved mechanical gun. Where gun application is impracticable, install sealant by knife or by pouring, as applicable.

C. Finishing

1. Tool all vertical, non-sag sealants so as to compress the sealant, eliminating all air voids and providing a neat smoothly finished joint. Provide slightly concave joint surface, unless otherwise indicated or recommended by the manufacturer.
2. Use tool wetting agents as recommended by manufacturer.

3.6 FIELD QUALITY CONTROL

A. Field Adhesion Testing of Sealants - Test completed elastomeric joints as follows:
   1. Extent of Testing: Test completed elastomeric sealant joints at one test for each 500 feet of joint length.
   2. Test Method: Test joints by hand pull method described below:
      a. Make knife cuts from one side of joint to other, followed by two cuts 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross cut end of 2 inch piece.
      b. Use fingers to grasp 2 inch piece of sealant between cross-cut end and 1" mark, pull firmly at a 90 degree angle or more in direction of side cuts while holding a ruler along sides of sealant. Pull sealant out of joint to the distance recommended by the sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension, hold this position for 10 seconds.
      c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side.
   3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
   4. Inspect tested joints and report on the following:
      a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
      b. Whether sealants filled joint cavities and are free of voids.
      c. Whether sealant dimensions and configurations comply with specified requirements
   5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
   6. Restore sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
   7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.7 CLEANING

A. Immediately remove misapplied sealant and droppings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.

B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up remaining defacement caused by the Work.

END OF SECTION 07 90 00

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SECTION 07 92 00 - JOINT SEALANTS FOR CONCRETE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SECTION INCLUDED

A. Silicone joint sealants.

B. Preformed silicone joint sealants and molded silicone cruciforms.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than [eight] pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by the Commissioner.
2. Conduct field tests for each application indicated below:

    a. Each kind of sealant and joint substrate indicated.

3. Notify Commissioner seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer Retain first paragraph below for product certificates from manufacturers.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion Test Reports: For each sealant application tested.

G. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm with minimum three years of experience installation of specified products in successful use on similar projects, including a full-time on-site supervisor with a minimum of [three] years of experience installing similar work.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.
1. Test for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

E. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY/GUARANTEE

A. Manufacturer's standard guarantee form in which the contractor agrees to restore/retouch or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified guarantee period.

1. Guarantee Period: Two years from date of Substantial Completion.

B. Manufacturer's standard warranty form in which joint-sealant manufacturer agrees to furnish joint sealants to restore/retouch or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 – Standard Specification for Elastomeric Joint Sealants, and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 – Standard Specification for Elastomeric Joint Sealants, classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant General Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, Use NT, M, G, A, and O; SWRI validation.

1. Hardness, ASTM C 661: 15 durometer Shore A, minimum.
2. Volatile Organic Compound (VOC) Content: 1 g/L maximum.
3. Volatile Organic Emissions (VOE): Not greater than NYC Building Code emissions levels.
4. Staining, ASTM C 1248: None on concrete, marble, granite, limestone, and brick.
5. Color: Provide color chart and/or samples to the Commissioner.

B. Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant General Sealant: ASTM C920, Type S, Grade NS, Class __, Use NT; ASTM C 1184.

1. Tensile Strength, ASTM D 412: 350 psi (2.4 MPa), at 100 percent elongation.
2. Tear Strength, ASTM D 624: 67 pli (11.7 kN/m).
3. Peel Strength, ASTM C 794: 60 pli (10.5 kN/m).
4. Hardness, ASTM C 661: 40 durometer Shore A, minimum.
5. Volatile Organic Compound (VOC) Content: 14 g/L maximum.
6. Volatile Organic Emissions (VOE): Not greater than NYC Building Code emissions levels.
7. Staining, ASTM C 1248: None on concrete, marble, granite, limestone, and brick.
8. Color: Black.

2.3 PREFORMED JOINT SEALANTS

A. Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

B. Preformed Silicone Joint Seals PS#1: Manufacturer's standard seal consisting of precured low-modulus silicone extrusion, in sizes to fit applications indicated on Drawings, combined with a neutral-curing liquid silicone sealant for bonding seals to substrates.

1. Shore A hardness ASTM D2240: 29-32
2. Tensile strength ASTM D412: 218 psi
3. Elongation at break ASTM D412: 554%
4. Movement classification ASTM C1523: Class 200%
5. Tear propagation classification ASTM C1523: PT (partial tear)

C. Preformed Silicone Joint Seals PS#2: Manufacturer's standard seal consisting of precured low-modulus silicone extrusion, in sizes to fit applications indicated on Drawings, combined with a neutral-curing liquid silicone sealant for bonding seals to substrates.

1. Ozone Resistance, 100 mPa 100 hr @ 104 °F (40 °C) 20% Elongation ASTM D1149: No cracks
2. Brittleness Temperature at 40°F (-40°C): Pass
3. Four products characterized by hardness (durometer)

    a. Shore "A" hardness ASTM D2240: 40 durometer
        1) Compression set ASTM D395, 22 hour @ 212°F, Ozone resistance, 100mPa ASTM D395: 13.8%
        2) Tensile strength ASTM D412: 1060 psi (7.3 MPa)
        3) Elongation at rupture ASTM D412: 323%
        4) Tear strength ASTM D624: 120 lb/in (21 kN/m)
    b. Shore "A" hardness ASTM D2240: 60 durometer
        1) Compression set ASTM D395, 22 hour @ 212°F, Ozone resistance, 100mPa ASTM D395: 12.5%
        2) Tensile strength ASTM D412: 1139 psi (7.8 MPa)
        3) Elongation at rupture ASTM D412: 235%
        4) Tear strength ASTM D624: 107 lb/in (18.7 kN/m)
    c. Shore "A" hardness ASTM D2240: 70 durometer
        1) Compression set ASTM D395, 22 hour @ 212°F, Ozone resistance, 100mPa ASTM D395: 11%
        2) Tensile strength ASTM D412: 1075 psi (7.4 MPa)
        3) Elongation at rupture ASTM D412: 167%
        4) Tear strength ASTM D624: 121 lb/in (21.2 kN/m)
    d. Shore "A" hardness ASTM D2240: 80 durometer
        1) Compression set ASTM D395, 22 hour @ 212°F, Ozone resistance, 100mPa ASTM D395: 12.9%
        2) Tensile strength ASTM D412: 1095 psi (7.6 MPa)
        3) Elongation at rupture ASTM D412: 113%
        4) Tear strength ASTM D624: 92 lb/in (16.1 kN/m)

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

D. Pre-Compressed Impregnated Foam Tape:

1. Preformed Foam Joint Seals PS#3: Manufacturer's standard preformed, pre-compressed, open-cell foam seal manufactured from urethane foam with minimum density of 10 lb/cu. ft. (160 kg/cu. m), impregnated with water-repellent agent. Provide factory-produced pre-compressed sizes selected to fit joint widths; coated on one side with a pressure-sensitive adhesive.

    a. Thermal conductivity ASTM C 518: .28-0.30 BTU-in/hr-°F-ft^2
    b. Thermal resistance ASTM C 518: 3.3-3.6 hr-°F-ft^2/BTU
    c. Frame spread ASTM E84: 0
    d. Smoke development ASTM E84: 5
    e. Volatile Organic Compound (VOC) Content: 0 g/L maximum.
    f. Volatile Organic Emissions (VOE): Not greater than NYC Building Code emissions levels.
    g. Color: Black or Grey.

2. Preformed Foam Joint Seals PS#2: Manufacturer's standard preformed, precompressed, open-cell foam seal manufactured from urethane foam impregnated with water-repellent agent. Provide factory-produced precompressed sizes selected to fit joint; coated on one side with a pressure-sensitive adhesive.

    a. Resistance to driving rain ASTM E331: 2.86 psf (137 Pa)
    b. Overall heat transfer R Value ASTM C518-10: minimum R value 3.1 in^{-1}
    c. Flame spread ASTM E84: 0
    d. Smoke development ASTM E84: 5

3. Preformed Foam Joint Seals PS#2: Manufacturer's standard preformed, precompressed, open-cell foam seal manufactured from urethane foam impregnated with water-repellent agent. This foam sealant has an extra layer of impregnation that acts as a vapor retarder. Provide factory-produced precompressed sizes selected to fit joint; coated on one side with a pressure-sensitive adhesive.

    a. Flammability class: B2 (normal flammability)
    b. Overall heat transfer R Value ASTM C518-10: minimum R value 3.1 in^{-1}
    c. Coefficient of diffusional resistance EN 150 12572: $\mu < 100$
    d. Water vapor permeability ASTM E96: 28 perms at 70°F (21°C) and 50% RH
    e. Windload cycling (before ASTM E2357) ASTM E283: 0.0014 cfm/ft^2 at 75 Pa
    f. Windload cycling (after ASTM E2357) ASTM E283: 0.0017 cfm/ft^2 at 75 Pa
    g. Flame spread ASTM E84: 5
    h. Smoke development ASTM E84: 150

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Remove laitance and form-release agents from concrete.
3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 – Standard Guide for Use of Joint Sealants for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

    a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193-Standard Guide for Use of Joint Sealants, or Method A, Tail Procedure, in ASTM C 1521 – Standard Practice for Evaluating Adhesion of Installed Waterproofing Sealant Joints.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Restore/retouch sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without

deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with restore/retouched areas are indistinguishable from original work.

3.7 JOINT SEALANT SCHEDULE

A. Glazing-Sealant Application: Exterior joints in glazing systems JS-#1.

1. Joint Locations:
   a. Aluminum to aluminum joints.
   b. Concrete to aluminum joints.
   c. Other joints as indicated.

2. Silicone Glazing Sealant: Single component, nonsag, neutral curing, Class 100/50
3. Joint-Sealant Color: As selected by the Commissioner from manufacturer's full range of colors.

B. Glazing-Sealant Application: Exterior joints in glazing systems JS-#2.

1. Joint Locations:

   a. Glazing cap and weather beads
   b. Other joints as indicated.

2. Silicone Glazing Sealant: Single component, nonsag, neutral curing, Class 50.
3. Joint-Sealant Color: As selected by the Commissioner from manufacturer's full range of colors.

C. Glazing-Sealant Application: Exterior joints in glazing systems JS-#3.

1. Joint Locations:
   a. Joints between aluminum.
   b. Other joints as indicated.

2. Silicone Glazing Sealant: Preformed silicone seal.
3. Joint-Sealant Color: As selected by the Commissioner from manufacturer's full range of colors.

END OF SECTION 07 92 00

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SECTION 08 11 00 – STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide galvannealed steel doors and frames as indicated on Drawings and specified herein.

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. Underwriter's Laboratory, Inc. (UL)
2. American Society for Testing and Materials (ASTM)
3. National Fire Protection Association (NFPA)
4. Steel Door Institute (SDI)
5. Hollow Metal Manufacturers Association (HMMA)
6. Warnock Hersey Inc.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Submit manufacturer's catalog sheets, specifications and installation instructions.

C. Shop Drawings

1. All shop drawing shall be Site specific for the Project. Show details of each frame type, elevation, construction and installation for each door type, conditions at openings, location for each door type, location and installation requirements for finish hardware (including cutouts and reinforcements), details of connections, and anchorage and accessory items.Include dimensional drawings coordinated with existing openings and conditions verified in field and coordinated with new work.

2. Include a schedule of doors and frames using the same reference numbers for details and openings as those on the Contract Drawings.

D. Samples

1. Frames: Corner sample of each type, 18" x 18" with mortises and reinforcements, shop painted.

2. Doors: Corner sample of each type showing construction, 18" x 18", with mortises and reinforcements, shop painted.

E. Certificates

1. Include approval data and acceptance by a New York City Building Department approved testing agency for all fire-rated assemblies.

2. Provide certification for oversized assemblies as described in Quality Assurance.

3. Provide certification for watertight door assemblies and certified test/calculation data.

4. Provide certification for maximum U Value for exterior doors as specified in item ‘1.10A Environmental Requirements’.

1.5 QUALITY ASSURANCE

A. Provide doors and frames complying with ANSI/SDI A250.8 and as specified herein.

B. Fire rated assemblies:

1. Wherever fire resistance classification is shown or scheduled for steel doors and frames, provide fire rated units that have been tested as fire door assemblies and comply with National Fire Protection Association (NFPA) Standard No. 80, are tested in accordance with NFPA 252 or UL 10B/UL 10C and UL 1784 as required by the NYC Building Code and comply with these Specifications. Identify each door and frame with metal UL, or

Warnock Hersey Inc. labels indicating applicable fire class of the unit. Rivet or weld labels on the hinge edge of door and jamb rabbet of frame.

2. Whenever fire rated assemblies are larger than size limitations established by NFPA, provide manufacturer's certification that they have been constructed with materials and methods equivalent to requirements for labeled construction.

3. See Door Schedule in the Drawings for Label Requirements (Class) for respective openings.

C. Regulatory Requirements

1. Not withstanding the requirements for fire-rated assemblies noted above, all fire-rated doors and frames shall be approved for use in New York City.

2. Provide evidence of acceptance by an approved testing agency. Provide permanent labels on doors and frames as required by the New York City Building Code. Labels shall be applied at the factory or where fabrication and assembly are performed.

1.6 WARRANTY

A. Submit warranty signed by manufacturer, agreeing to replace assemblies which fail in materials, performance or workmanship within the specified warranty period.

1. Warranty Period: 1 year from date of Substantial Completion.

B. Contractor’s guarantee: 1 year from date of substantial completion.

1.7 DELIVERY, STORAGE AND HANDLING

A. Store doors and frames on raised platforms in vertical position with blocking between units to allow air circulation.

B. During delivery, storage and handling, protect doors and frames from water damage.

C. Provide delivery, storage and handling in such manner to prevent damage to products.

1.8 GAGE STANDARDS

A. Gages specified are based on U.S Standard Gauge for hot rolled and cold rolled steel sheets.

B. The allowable tolerances for steel sheet thicknesses shall be in accordance with HMMA Standards for ‘Tolerances and Clearances for Commercial Hollow Metal Doors and Frames’

1.9 ENVIRONMENTAL REQUIREMENTS

A. Opaque Exterior Doors in this project shall comply with the NYC Energy Conservation Code requirements. The maximum U Value shall be U-0.61.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the requirements of this Section, furnish and install products of one of the following manufacturers:

1. General Fireproof Door Corp., Bronx, NY 10474

2. Acme & Dorf Door Co., New City, NY 10956

3. Ceco Door Products Div., Brentwood, TN 37027

4. Acme Steel Door Co., Brooklyn, NY 11222

5. Curries Company, Mason City, IA 50401

6. Metallines Fire Door Co., Bronx, NY 10457

7. Long Island Fireproof Door, Port Washington, NY 11050

8. Or approved equal

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip

1. Commercial quality carbon steel, pickled and oiled, complying with ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength and ASTM A568 - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements

B. Cold-Rolled Steel Sheets

1. Commercial Quality carbon steel complying with ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-

Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable and ASTM A568 - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements.

C. Galvannealed Steel Sheets

1. Carbon steel sheets of commercial quality complying with ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, Doors and frames shall have **A**60 zinc-iron coating, mill phosphatized, complying with ASTM A653

D. Anchors and Supports

1. Fabricate of gages indicated on and of not less than 16 gage sheet steel, unless otherwise indicated, on the drawings.

a. Galvanized Units: Galvanized anchors and supports used with galvanized frames, complying with ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, Class B.

b. Stainless Steel Units: Stainless steel used with stainless steel frames complying with ASTM A167.

E. Anchorage Devices, Bolts, and other Fasteners

1. Manufacturer's standard units unless otherwise indicated on the Drawings.

a. Galvanized or Galvannealed Units: Galvanized items used with galvanized frames complying with ASTM A153, Class C or D as applicable.

2.3 FABRICATION

A. Fabricate hollow metal work accurately and assemble neatly to ensure work smooth and free from dents, tool marks, visible waves, warp, buckles and conspicuous joints.

B. Align lines straight and true with arises and angles as sharp as practicable. Miter corners in true alignment and join similar abutting profiles accurately.

C. Assemble all joints to form imperceptible intersections when finished.

D. Form each member, such as jamb and head, from a single piece of metal, unless otherwise shown or approved

E. Fasten all members together to provide rigid construction in assembled work. Weld all connections except those for removable members such as glazing beads.

F. Weld, dress smooth and flush joints on exposed faces.

G. Clearances: Comply with NFPA 80.

H. Work showing defects or blemishes will be rejected, and rejected work shall be replaced with satisfactory work.

2.4 DOORS

A. General

1. Provide steel doors of types and styles indicated on drawings or schedules. Comply with ANSI/SDI A250.8 requirements unless more restrictive requirements are specified herein. Also doors shall have been pretested by the manufacturer to conform to ASTM F476, Door Impact Test, Grade 40, Table X5.1.

2. Design and Thickness: Flush design doors, seamless vertical edges, hollow construction, 1-3/4" thick unless specifically noted otherwise.

3. Reinforce inside of doors with continuous formed steel sections not less than 20 gage, spaced 6 inches on center. Spot weld at not more than 5 inches on center to both face sheets.

4. Sound Deadening (ASTM E90): Minimum Sound Transmission Class (STC) of 30.

5. Door Edges: Meeting stiles of pairs of single acting doors shall be "V" beveled or rounded as detailed on the Drawings or as required to meet NFPA 80 – Standard for Fire Doors and Other Opening Protectives.

B. Doors

1. Fabricate doors with two (2) outer stretcher-leveled, galvannealed steel sheets or stainless steel sheets of 14 gauge unless indicated otherwise on the Drawings. Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces and stile edges.

2. On mortise face of door, vertical joints shall be continuously welded and ground smooth and steel doors shall be coated with zinc-rich primer.

3. Provide reinforcement for surface sheet, edge, hardware, stops, and other provisions, of size and gage as specified or detailed on Drawings.

4. Provide 14 GA bottom channel and top channel and closure, as detailed on Drawings.

2.5 FRAMES

A. General

1. Provide steel frames for doors and other openings where shown, of size and profile as indicated on Drawings.

2. Construction: Full-welded unit construction, with corners mitered and continuously welded full depth and width of frame, unless otherwise indicated. Knock-down type frames will not be accepted.

a. Fixed Stops: Integral 5/8" stop unless otherwise indicated. Construct jambs and heads from one piece of metal each; rabbeted and flanged as required for the various types of openings, and neatly mitered or interlocked and welded together. Provide channel, angle and bent plate reinforcing as indicated on approved Shop Drawings or otherwise required. Provide reinforcing in the heads of frames where shown or required.

3. Frame Material shall be 12 gage Galvannealed steel sheet, unless indicated otherwise on Drawings.

4. Provide frames for masonry openings with adjustable Underwriter's type masonry anchors to suit conditions of installation, using not less than three (3) at each jamb, in addition to floor anchors.

5. Provide frames with calking stops, filler pieces and trim where indicated on Drawings or required; integrally formed as part of the frame wherever possible. Applied calking stops, filler pieces, and other members as indicated, shall be neatly attached by spot welding. All welds at galvannealed frames shall be painted with zinc-rich primer.

6. At Butts, cut back jamb the thickness of one leaf of butt.

7. Drill and tap reinforcement to template

8. Provide reinforcement for hardware as indicated on Drawings and as required for proper hardware installation. Refer to Section 08 71 00 - Finish Hardware.

2.6 SHOP PAINTING

A. All doors shall shall be delivered to the site with a full shop coat. Doors not fully shop coated shall not be accepted. Galvanized or galvannealed steel doors shall be painted with following paint system or approved equal:

1. Primer shall be 4 DFT, Epoxy primer, by one of the following:
   a. 'Carboguard 888' by Carcoline
   b. 'Amercoat 385' by PPG PMC
   c. 'Macropxy 646' by Sherwin Williams
   d. Or approved equal
2. Top Coat shall be 4 DFT, Aliphatic Polyurethane Gloss, by one of the following:
   a. 'Carbothane 134HG' by Carboline
   b. 'Amercoat 450 H' by PPG PMC
   c. 'Acrolon 218 HS B65-600' by Sherwin Williams
   d. Or approved equal
3. Provide primer and top coat by same manufacturer.

B. Units shall pass the following tests:
   1. Salt Spray Test complying with ASTM B117 for 120 continuous hours
   2. Water fog Test complying with ASTM D1735 for 240 continuous hours.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Verification of Conditions
   1. Examine substrate and conditions, under which the frames are to be installed, for defects which will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.3 INSTALLATION

A. Install steel doors, frames, and accessories in accordance with the Drawing Details, approved Shop Drawings, and the manufacturer's printed instructions, except as otherwise indicated.

B. Frame Installations
   1. Place frames accurately in position; plumb, align, and brace securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreader bars, leaving surfaces smooth and undamaged.
   2. Place fire rated frames in accordance with NFPA Standard No. 80 – Standard for Fire Doors and Other Opening Protectives..

3. Provide necessary field splices in frames as detailed on approved Shop Drawings, welded and finished to match factory fabrication.
4. Extend jambs to structural floor slab and securely anchor in place.

C. Door Installation
1. Install doors accurately in their respective frames within the clearance specified in Part 2.
2. Place fire rated doors with clearances as specified in NFPA standard No. 80.

D. Drill and tap doors and frames to receive surface applied hardware.

3.4 ADJUSTING

A. Coat touch up: If damaged during installation, apply touch up of original painting system.

B. Final Adjustments: Check and adjust operating finish hardware items prior to final inspection. Leave work in complete and proper operating condition

3.5 CLEANING

A. Clean doors, frames, and accessories, leaving free of dirt and other foreign material after completion of installation.

END OF SECTION 08 11 00

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SECTION 08 71 00 – FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide finish hardware as indicated on Drawings, as specified herein and as needed for complete hardware requirements

1.3 REFERENCES

A. Reference to DDC General Conditions.

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. Underwriter's Laboratory, Inc. (UL)

2. American National Standards Institute (ANSI)

3. National Fire Protection Association (NFPA)

4. Door and Hardware Institute (DHI)

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Submit Manufacturer's Technical Product Data for each hardware item type, including cuts, specifications and characteristics, instructions for installation, operation, and maintenance.

C. Hardware Schedule

1. Provide Schedule for entire Project in one submittal, unless otherwise directed. Submit Hardware Schedule in book form (8½" x 11" pages), indicating the following for each item. No continuous computer printout permitted:

   a. Locations of hardware, with cross-reference to schedules and other indications on Drawings.

   b. Name, manufacturer, type, style, size, function, and finish.

   c. Information for fastenings.

   d. Mounting Locations

   e. Materials and Sizes of doors and frames

   f. Explanation of abbreviations and symbols

2. At time of submittal of Hardware schedule, furnish hardware templates to fabricators of other factory- prepared work necessary for installation of hardware.

D. Key Schedule

1. Consult with the NYC Department of Sanitation prior to preparing a keying schedule in order to confirm the required keying scheme.

2. Submit Hardware Key Schedule, prepared by hardware supplier, within forty-five (45) days after starting date of Contract.

3. Stamp top face of each key with letter and number using keyset symbols as set forth in the BHMA handbook. Tag each series of keys.

4. Stamp face of each cylinder with the same corresponding keyset symbols.

5. Locks shall be made up on combinations as specified.

1.5 QUALITY ASSURANCE

A. Hardware Supplier

1. Finish hardware shall be furnished by those having a minimum 3 years of builders hardware experience and shall have in their employ at least one Architectural Hardware Consultants (AHC) to correctly interpret the plans, detailed drawings and specifications.

B. Manufacturer
   1. Manufacturer shall have minimum of three (3) years successful experience manufacturing types and sizes of Hardware specified herein
   2. Obtain each hardware type from a single manufacturer.

C. Minimum Quality Requirements
   1. The manufacturer shall certify that the Hardware items to be furnished shall be of quality specified herein, and meet the requirements of the applicable ANSI A156 Grade 1 standard for each item

D. Fire Rated Openings
   1. Provide hardware in compliance with NFPA Standard No. 80 and NYC Building Code requirements, tested and listed by UL for types and sizes of doors, and in compliance with requirements of door frame and door labels.

1.6 SHIPPING, STORAGE AND HANDLING

A. Package and ship hardware to prevent damage. Properly identify and tag each item. Sort, package and mark hardware with set numbers.

B. Inventory hardware immediately upon delivery.

C. Provide secure (locked) storage area for hardware until installed.

1.7 PROJECT CONDITIONS

A. Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated and as necessary for proper installation and functions. Deliver packaged hardware items to the proper locations for installation.

B. Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware.

1.8 WARRANTIES

A. The hardware manufacturers shall provide full replacement warranty as listed below. Replacement warranty shall include material and labor cost.

1. Locksets, etc. 1 year.
2. Hinges 2 years.
3. Balance of hardware 1 year.
4. Closers 2 years

B. Closers shall be warranted to properly operate door, free from mechanical defects for ten years from date of substantial completion of the Work. Closers which fail to meet specified requirements shall be replaced or repaired and made to operate properly by Contractor without additional expense to the City of New York.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Butts
1. Stanley
2. McKinney
3. Hagar
4. Bommer
5. Lawrence
6. Or approved equal

B. Locksets, Passage Sets (Lever Type)
1. Yale SL 8800 FL Series with mortise lock, satin stainless steel finish (US32D)
2. Sargent 8200 Series mortise in satin stainless steel finish (US32D)
3. Schlage L9000 Series mortise lock in satin stainless steel finish (US32D)
4. Or approved equal

C. Rim Latch
1. Yale
2. Segal
3. Hagar
4. Or approved equal

D. Cylinders
   1. Sargent
   2. Corbin Russwin
   3. Schlage
   4. Yale
   5. Or approved equal

E. Door Closers
   1. LCN
   2. Norton
   3. Sargent
   4. Yale
   5. Or approved equal

F. Stop and Holder
   1. Glynn Johnson
   2. Architectural Builder Hardware
   3. Rixzon
   4. Or approved equal

G. Surface Bolts
   1. Ives
   2. Rockwood
   3. Securitech
   4. Or approved equal

H. Smoke Seals
   1. Pemko
   2. McKinney
   3. National Guard Products
   4. Or approved equal

2.2 MATERIALS AND FABRICATION

A. General

1. Commercial Hardware: Heavy duty cast or forged (.080 min.) bronze with satin chromium finish U.S. 26D, except as otherwise specified.

2. Interior Door Holders: Steel, satin chromium U.S. 26D finish.

3. Door closers: As specified herein.

4. Interior butts and horizontal releases: As hereinafter specified with chrome finish.

5. Surfaces of castings shall be true, smooth and free from burrs. Lock mechanism and accessory components in contact with or bear upon other parts shall be dressed to a true, smooth surface.

6. Items of cast iron shall be annealed.

7. Whenever weight is specified, it shall mean actual weight of casting without screws, washers and accessories.

8. Do not use products with manufacturer's name in an exposed location, except name on rim of lock cylinders.

9. Backset: 2-3/4" for locksets and latchsets unless indicated otherwise.

B. Screws

1. Secure hardware with suitable screws and bolts of same material and finish as hardware items unless otherwise specified. Screws for strike and face plates, hinges, overhead door holders, and door checks and brackets for these items shall be flat-headed counter-sunk screws. Screws for other exposed hardware shall be oval-headed. Screws shall be countersunk unless expressly specified otherwise. Provide Phillips head screws unless otherwise indicated.

2. Hardware for metal frames and doors shall be secured with suitable machine screws, mill screws and bolts.

3. Manufacturer of each hardware item shall provide the fastenings required for the installation of that item.

4. Self-tapping or TEK screws are not permitted.

5. Wood screws for securing door butts shall be at least two inches long to secure butts through jamb and into wood stud behind jamb and blocking.

2.3 GENERAL HARDWARE REQUIREMENTS

A. Hardware Schedule is intended to guide Contractor in preparing the Schedule for Work of this Section. It shall not relieve Contractor from the necessity of examining Specifications, Drawings and Details, and providing everything necessary to properly complete hardware installation. Align lines straight and true with arises and angles as sharp as practicable. Miter corners in true alignment and join similar abutting profiles accurately.

B. Hardware used on hollow metal doors, sash or jambs, shall be made to templates and packed with machine screws or other fastenings recommended by the manufacturer for the particular application scheduled.Form each member, such as jamb and head, from a single piece of metal, unless otherwise shown or approved

C. Hardware items not described shall be equal in grade, workmanship, and other particulars to similar items of hardware described.Weld, dress smooth and flush joints on exposed faces.

2.4 FINISHES

A. All Hardware finishes shall be US32D- Satin Stainless Steel (U.S. Bureau of Standards), unless otherwise specified.

2.5 HARDWARE TYPE REQUIREMENTS

A. Locks and Latches

1. General Cylinder Lockset: Unless otherwise indicated:

a. Type: mortise, easy spring cylinder lock with latch bolt and guard bolt.

b. Case: 5-5/8" high, 4" wide, 3/4" thick. Steel, with zinc dichromate finish.

c. Backset: 2-3/4"

d. Hub: sintered steel, copper infiltrated.

e. Front: 8" high x 1-1/4" wide stainless steel, adjustable, protected, attached to case by machine screws.

f. Levers: solid stainless steel, secured to 5/16" square, hardened steel spindles.

g. Full Escutcheon: stainless steel, each side, 2-1/2" x 8".

h. Operation: From inside by lever. Outside lever operated by key or made stationary, as desired. Guard bolt, working on closed strike plate, automatically locks latch bolt to prevent it from being forced back when closed.

i. Secure locksets to doors with Phillips Head screws unless otherwise indicated.

2. Cylinders

a. Cylinders of locks shall be of proper length to fit doors for which they are intended. Cylinders shall be solid brass with common standard diameter rotating plug. The keyway shall be paracentric type of single section with seven pins or multiple (four or more) sections with six pins capable of being masterkeyed and grand masterkeyed as specified without duplications or interchanges.

b. Provide cylinders with removable cores.

c. Removable Cores: Core insert, removable by use of a special key; for use only with core manufacturer's cylinder.

3. Strikes

a. Strikes for latches shall project sufficiently to properly protect trim. Slots in strike plates shall not be more than 1/4" longer than bolts. Metal between slots for latch and bolt shall not be less than 1/4".

b. Strikes used with hollow metal jambs shall be of box type with closed back.

4. Latch Bolts

a. Latch bolts shall be constructed so that they will not work loose. Where washer is riveted to latch spindle, rivet head shall be full and machine upset. Latch and lock bolts not otherwise specified shall be cast bronze.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Provide complete installation of finish hardware items as indicated on Drawings and as specified herein.

B. Mount hardware as recommended by respective manufacturer.

C. Mount door (room) hardware items at heights and locations on doors and frames in accordance with "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by Door and Hardware Institute, except where specifically indicated otherwise.

D. Set hardware items plumb and level and secure with proper fasteners..

3.3 APPLYING HARDWARE

A. Hardware specified in this Section shall be fitted, installed and adjusted.

B. Use screws and/or bolts furnished by the manufacturer of the hardware item and install in accordance with the manufacturer's instructions and templates and as required. Install full complement of screws and/or bolts.

C. At completion of Project, leave hardware in perfect condition, free from stains, varnish, scratches and mars. Half-surface butts shall be bolted on doors with nuts on hinge side of doors.

D. No surface hardware, except butts and pivots, shall be installed before final coat of paint or varnish has been applied.

3.4 CLEANING

A. Clean hardware items thoroughly and adjust for proper operation.

3.5 KEY OPERATION AND INSPECTION

A. Upon completion of the building and after locks have been secured in proper positions, keys belonging thereto shall be fitted and made to work freely in respective locks in the presence of the Commissioner. The required number of keys for each lock, properly marked, shall be delivered to the Commissioner, who will give a receipt of such delivery.

3.6 FINISH HARDWARE SCHEDULE

A. Provide hardware for each door, each pair of doors, and each set of doors, in compliance with "Hardware Set Numbers" indicated in Door Schedule on Drawings, and as specified herein.

B. Manufacturer's names and product designations for hardware types are listed for the purpose of establishing minimum requirements. Provide the product specified or comparable product of other manufacturers listed in Art. 2.1 for each hardware type.

C. All door frames located in smoke partitions and fire-rated partitions shall be provided with continuous smoke seals at jambs and head, whether or not listed in Hardware Sets below.

3.7 HARDWARE SETS (FOR MANUFACTURERS REFER TO SECTION 2.1)

A. Hardware Set 1 (Door 01)

1.	Butts	3 each	McKinney TA314
2.	Lockset	1 each	Sargent 8204 LW1B
3.	Cylinder	1 each	Corbin
4.	Door Closer	1 each	LCN 411 EDA
5.	Silencers	3 each	Glynn Johnson 64
6.	Smoke Seal	1 each	Pemko S44D

B. Hardware Set 2 (Door 02)

1.	Butts	3 each	McKinney TA314
2.	Exit Device	1 each	Von Duprin 33A-L
3.	Cylinder	1 each	Corbin
4.	Door Closer	1 each	LCN 411 EDA
5.	Silencers	3 each	Glynn Johnson 64
6.	Smoke Seal	1 each	Pemko S44D

C. Hardware Set 3 (Door 03, Pair of Doors)

1	Butts	6 each	McKinney TA314
2	Exit Device	1 each	Von Duprin 9847NL
3	Exit Device	1 each	Von Duprin 9847EO
3	Cylinder	1 each	Corbin
4	Door Closer	1 each	LCN 411 EDA

5	Silencers	6 each	Glynn Johnson 64
6	Smoke Seal	1 each	Pemko S44D

D. Hardware Set 4 (Door 04, Pair of Doors)

1.	Butts	6 each	McKinney TA314
2.	Exit Device	1 each	Von Duprin 9847NL
3.	Exit Device	1 each	Von Duprin 9847EO
4.	Cylinder	1 each	Corbin
5.	Door Closer	1 each	LCN 411 EDA
6.	Silencers	6 each	Glynn Johnson 64
7.	Rain Drip	2 each	NGP 16A
8.	Weather Strips	2 each	NGP 152V
9.	Sweeps	2 each	NGP 97V

3.8 KEYING

A. Coordinate all keying requirements with the Commissioner and DSNY.

END OF SECTION 08 71 00

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SECTION 09 26 00 – GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide all materials, labor and equipment to properly install the following Work:
   1. Abuse and impact resistant gypsum board
   2. Non-load-bearing steel framing
   3. All accessory components

1.3 REFERENCES

A. Refer to DDC General Conditions

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications or mandated by the NYC Building code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

   1. American Society of Testing and Materials (ASTM) standards, latest editions.
      a. A641 Zinc-Coated (Galvanized) Carbon Steel Wire.
      b. A653 General Requirements for Steel Sheet, Zinc A653M Coated (Galvanized) by the Hot-Dip Process
      c. C11 Standard Terminology Related to Gypsum and Related Building Materials and Systems
      d. C473 Standard Test Methods for Physical Testing of Gypsum Panel Products
      e. C475 Joint Treatment Materials for Gypsum Wallboard Construction
      f. C630 Water Resistant Gypsum Backing Boards
      g. C645 Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board

h. C754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board or Water Resistant Backing Board

i. C834 Standard Specification for Latex Sealants

j. C840 Specification for Application and Finishing of Gypsum Board

k. C1002 Steel Drill Screws for the Application of Gypsum Board

l. C1047 Standard Specification for accessories for Gypsum Wallboard and Gypsum Veneer Base

m. C1396 Standard Specification for Gypsum Board

n. E84 Surface Burning Characteristics of Building Materials

o. E119 Fire Tests of Building Construction and Materials

2. Gypsum Association

a. GA-600 Fire Resistance Design Manual

b. GA-214 Levels of Finishes

c. GA-216 Recommended Specifications for the Application and Finishing of Gypsum Board

d. GA-505 Gypsum Board Products - Glossary of Terminology

3. Underwriters Laboratories Inc. (UL)

a. Fire Resistance Directory

4. International Code Council, ICC-ES (Evaluation Service)

a. AC86 - Acceptance Criteria for Cold-Formed Steel Framing Members – Interior Non load-bearing Wall Assemblies.

5. American Iron and Steel Institute (AISI)

a. AISI S905 Test Methods for Mechanically Fastened Cold-Formed Steel Connections

b. AISI Standard for Cold-Formed Steel Framing – General Provisions

c. AISI NASPEC

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Submit manufacturers' product information, specifications, and installation instructions for the following products: abuse and impact resistant gypsum board, joint compounds, acoustical sealants, insulation, fasteners, trim, joint reinforcing, metal furring members, metal studs, tracks, runners, and all related accessories.

C. Samples

1. Submit samples of the following materials:

a. Wallboard, each type: 12" square.

b. Metal studs and track: 12"

c. Accessories: 12", outside corner bead

D. Materials Certificates and Acceptance

1. Submit certificates from the manufacturers of the specified materials stating compliance with the applicable requirements set forth for all materials specified in this Section.

2. Submit certification and listing in accordance with NYC Dept. of Buildings rules, indicating that the materials and assemblies as regulated by the NYC Building Code are acceptable for the intended use. When test methods are stipulated in the NYC Building Code, the tests utilized shall be stated in the certification. Prior MEA and BSA approvals are acceptable for materials conforming to NYC Building Code requirements.

3. Submit written acceptances from the wallboard manufacturer and metal stud manufacturer accepting the type of metal studs, tracks, and fasteners to be used for each type of wallboard.

E. Quality Assurance Submittal

1. Submit affidavit certifying qualification requirement listed in Article 1.5 B.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions

B. Qualifications

1. Installer is to be a firm with not less than three (3) years of successful experience in the installation of specified materials.

C. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the N.Y.C. Building Code.

2. New York City Board of Standards and Appeals (BSA), and New York City Materials Equipment Acceptance (MEA) approvals are acceptable for materials and assemblies conforming to NYC Building Code requirements.

3. Fire- Resistance Ratings

   a. Comply with fire-resistance ratings as indicated and as required by NYC Building Code. Provide certification and listing in accordance with NYC Dept. of Buildings rules, indicating that the materials and assemblies as regulated by the NYC Building Code are acceptable for the intended use.

   b. Provide materials, accessories and application procedures which have been listed by UL or tested in accordance with ASTM E119 for the type of construction shown. Provide materials and construct assemblies which qualify for required fire resistance classifications in accordance with the Gypsum Association "Fire Resistance Design Manual" as referenced in the Building Code of the City of New York, or in accordance with the acceptance requirements of the New York City MEA or BSA.

D. Industry Standards

1. Comply with applicable requirements of ASTM C840, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer

2. Acoustical Ratings: Comply with acoustical ratings as required and based on type of construction indicated on the Drawings. Provide materials, accessories, including fasteners, seals, sealants and application procedures which have been listed by manufacturer or tested in accordance with ASTM E90 for the type of construction shown.

E. Single Source Responsibility

1. Obtain all steel studs and other metal framing components and accessories from a single manufacturer.

1.6 PROGRESS INSPECTIONS

A. The City of New York will employ a special inspection agency to perform all special inspections related to the work, under a separate contract.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer.

B. Store all materials inside, under cover, in a manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards to prevent sagging. Do not store at temperature exceeding 125°F.

C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal framing members, corner beads, and trim from being bent or damaged.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products which vary slightly from specified criteria will be considered for acceptance upon submission of a written explanation and complete technical data to the Commissioner. Written authorization from the Commissioner is required prior to installation of such materials whether or not the manufacturers are listed herein.

B. Abuse and Impact Resistant gypsum board and related products
1. SHEETROCK brand Mold Tough VHI (Very High Impact) FIRECODE Core Gypsum Panels, USG Corporation
2. Fire-Shield Hi-Impact brand XP Wallboard Panels – National Gypsum Company
3. Protecta HIR 300 Type X With Mold Defense panels, Lafarge / Continental Building Products LLC.
4. Or approved equal

C. Metal Support Material
1. Marino Ware, South Plainfield, NJ
2. ClarkDietrich Building Systems, West Chester, OH
3. Super Stud Building Products Inc., Edison, NJ
4. United States Gypsum Co., Chicago, IL
5. Or approved equal

2.2 MATERIALS

A. Metal Framing

1. Steel Studs

a. In compliance with ASTM C645, provide galvanized steel, C-shaped members as specified and as shown on the drawings.

b. Stud thickness: 0.0296 inch minimum thickness of base metal or 20 gage min., for all wall framing members unless otherwise indicated

c. Pull-out strength for #6 screws in 20 ga. equivalent studs shall be at least 45 lbs. in accordance with AISI S905 test method.

d. Conform to all requirements indicated on the Drawings and specified herein, including fire resistance ratings of assemblies.

e. Stud thickness: 0.0428 inch min. thickness of base metal or 18 gage min., unless otherwise indicated, for use at all framed openings, with double studs at each door jamb.

2. Runners

a. In compliance with ASTM C645, provide galvanized steel runners to match applicable assembly specified, to match wall framing members, unless indicated otherwise.

3. Horizontal Bracing

a. Provide 3/4 inch galvanized cold rolled steel channels, or steel studs, fastened to webs in a horizontal position. Angle or channel shaped galvanized horizontal bracing that is fixed in place without fasteners may be used subject to written acceptance of the steel stud manufacturer and meeting all required partition ratings and performance criteria; 0.0296" minimum base metal thickness, 7/8" x 7/8" minimum size angle or equivalent channel shape. Comply with ASTM C645, ASTM C754.

4. Protective coating of framing shall conform to ASTM A653/A653M - G40 minimum, or shall be a protective coating with equal or better corrosion resistance.

5. Fasteners for Metal Framing

a. Provide fasteners of type, size, style, grade, holding power, class, and other properties required for secure installation of framing and furring. Galvanize all fasteners and accessories. Powder actuated fasteners shall not be used in occupied areas of a building

b. All devices, other than bolts, used to interconnect ceiling members are required to be certified and listed by an Approved Agency in accordance with NYC

Department of Buildings rules. Prior MEA and BSA approvals are acceptable for materials conforming to NYC Building Code requirements.

B. Abuse and Impact Resistant Gypsum Board

1. Provide reinforced abuse and impact resistant gypsum board, consisting of gypsum, or gypsum and cellulose fiber, with fiberglass mesh reinforcement. Weight of 5/8" thick panel approximately 2.8 psf. Surfaces shall be true, free from imperfections, and suitable for use with or without decoration. Provide in 48" widths and in such lengths as will result in the minimum number of joints. Provide 5/8" thick panels generally, unless indicated otherwise on the Drawings. Panels shall not contain asbestos. Panels shall be mold resistant, meeting a minimum average panel score of "10" in accordance with ASTM D3273.

2. Reinforcement: Fiberglass mesh embedded in the back of full panel.

3. Meet or exceed criteria when tested in accordance with ASTM C473, or ASTM C1396

C. Trim Accessories

1. Comply with ASTM C1047, standard accessories as recommended by gypsum board manufacturer. Where exposed to view provide accessories recommended for level-5 finish. Metal trim shall be formed of galvanized or zinc-coated steel. Provide paper faced metal trim where recommended by board manufacturer. Designed for concealment of paper or metal flanges in joint compound. Provide corner beads, L-type edge trim beads, V-type edge trim beads, and control joint beads.

2. Corner Reinforcement: Provide paper faced metal outside corner, tape-on bead at all outside corners.

D. Joint Treatment Materials

1. Jointing System - typical: Comply with ASTM C475. Type recommended by the manufacturer for the application indicated, to prevent cracking, and to meet fire resistance requirements where applicable. Reinforcing tape and compound shall be designed as a system to be used together.

2. Provide setting type or ready-mixed drying type joint compound as recommended by the board manufacturer for each type of board, for joints, fastener heads and cut edges of board.

3. Skim coat: For final coat of Level 5 finish, use type recommended by manufacturer.

4. Jointing compound shall be asbestos free.

E. Miscellaneous Materials

1. Provide required materials for gypsum board work of the type and grade recommended by the gypsum board manufacturer.

2. Gypsum board Screws:

a. Comply with recommendations of the wallboard and metal framing manufacturers and ASTM C1002.

b. For fastening the gypsum board in place, specially designed for use with power-driven tools, of length recommended for application in board manufacturers printed instructions, but not less than 1¼" long, with self-tapping threads and self-drilling points. Screws shall be steel with rust inhibitive coating.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION AND PREPARATION

A. Inspection

1. Prior to installation of the Work of this Section, carefully inspect the installed Work of all other trades and verify that all such Work is complete to the point where this installation may properly commence.

2. Installation shall comply with manufacturer's recommendations as a minimum standard.

B. Coordination of Work

1. Coordinate Work of this Section with the Work of other Divisions which have items installed in, on or contiguous to gypsum board assemblies.

C. Verification of Conditions

1. Start of Work constitutes acceptance of existing conditions, Contractor shall bring any discrepancies to the attention of the Commissioner prior to start of Work.

D. Construction Tolerances

1. Do not exceed 1/8" in 8 feet variation from plumb or level in any exposed line or surface except at joints between boards. Do not exceed 1/16" variation between planes or abutting edges or ends. Shim as required to comply with specified tolerances. Variations shall not be visible in finished surfaces.

3.3 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of all referenced application standards and manufacturers recommendations for environmental conditions before, during and after gypsum board application.

B. Maintain continuous uniform building temperatures of not less than 55ºF and not more than 90ºF for a minimum of 48 hours prior to, during and following application of gypsum board and joint treatment materials and until joint and finishing compounds have dried. Conform to more restrictive environmental conditions where required by the manufacturer.

C. Do not install gypsum board in any location where it may be exposed to moisture during the Construction Phase of the Project.

D. Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry hot weather to prevent too rapid drying.

E. Provide adequate drying time between coats of joint compound.

3.4 INSTALLATION – STEEL FRAMING

A. Comply with ASTM C754 and manufacturers installation instructions for all non-load bearing steel stud installations.

B. Extend all partitions to underside of roof and floor construction unless indicated otherwise. Brace laterally to building structure as required for stability.

C. Where fire-rated work is indicated on Drawings, construct assemblies in accordance with the Article herein titled Quality Assurance, Paragraph titled Regulatory Requirements.

D. Accurately align top and bottom tracks. Secure runner tracks as recommended by the framing manufacturer for the upper and lower construction involved, except, do not exceed 24" on center spacing for power driven fasteners. Provide fasteners approximately 2" from corners and ends of tracks.

E. Position studs vertically and engage both floor and top tracks. Install studs at 16" on center maximum spacing unless closer spacing is indicated on the Drawings, or is required for height

of partition or transverse loading in order to meet deflection requirements. Fasten studs to track flanges with screws, or as otherwise required to meet fire resistance ratings and NYC Building Code requirements.

F. Use full length studs between tracks wherever possible. If necessary, splice studs with a minimum 8" nested lap and fasten with 2 screws per stud flange.

G. Provide additional studs to support inside corners at partition intersections, and to support outside corners and terminations of partitions (and both sides of control joints).

H. Provide two 18 gauge studs at each door jamb unless heavier gauge studs are required by Drawings. Comply with stud manufacturers recommendations for the types of frames and weights of doors used in the project. Provide 14 gauge studs surrounding openings to receive interior window guards. Studs shall extend to underside of roof or floor construction above.

I. Running Channel Installation: Floor and top running channels or stud tracks shall be galvanized cold rolled steel with 1½" extended leg on top runner to allow movement (legs longer as recommended by manufacturer or as required to prevent transfer of structural loads or movements to partitions). Match gauge of studs indicated for assembly. Securely fasten to floor, slab above or vertical structural elements with fasteners approved by manufacturer, spaced not more than 24" on center. Provide slip or cushion type joint between channel and structural elements as indicated in paragraph titled Steel Stud Installation, above. Maintain lateral bracing of partitions to building structure.

J. Horizontal Bracing or Stiffener Installation: Install metal stud bracing fastened to each partition stud with webs in a horizontal position, or horizontal bracing fixed to each stud in accordance with manufacturer's instructions. Provide continuous horizontal rows of bracing, spaced vertically 4'-0" on center maximum, unless otherwise indicated. The uppermost row shall be located 12 inches from the top of stud, or as otherwise recommended by the stud manufacturer. Provide additional bracing as recommended by stud manufacturer.

K. Tolerances: Do not exceed 1/8" in 8 feet variation from plumb or level in any exposed line or surface, except at joints between planes or abutting edges or ends. Shim as required to comply with specified tolerances. Variations shall not be visible in finished wall surfaces

3.5 INSTALLATION - PANELS

A. Applying and Finishing Panels, General: Comply with manufacturer's printed installation instructions and recommendations based upon Project conditions, ASTM C840, GA-216, and these Specifications, for all gypsum board application and finishing.

1. Provide wallboard panels of type, thicknesses, and number of layers indicated on the Drawings. Provide multi-layer assemblies using abuse and impact resistant gypsum board panels in conjunction with other types of panels where indicated on the Drawings.

2. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

3. Firestopping required for fire-rated work shall be covered under Section 07 27 00 - Firestopping/Smoke Seals.

4. Where fire-rated work is indicated on Drawings construct assemblies in accordance with the Article herein titled Quality Assurance, Paragraph titled Regulatory Requirements.

5. Install the gypsum board with separate boards in moderate contact but not forced into place. At internal and external corners, conceal the cut edges of the board by overlapping covered edges of the abutting boards. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.

6. Extend all partitions to underside of slab above and floor construction, unless indicated otherwise.

7. All interior partitions, unless otherwise indicated, shall have mineral fiber sound attenuating blankets, ASTM C665 Type 1, density 2.5 lbs./cubic foot minimum. Sound attenuating blankets shall be installed friction fitted between studs, completely filling solid the partitions for the full height of the partitions.

8. Fasten the gypsum board with drywall screws as recommended by the gypsum board manufacturer. Drive the required screws with clutch-controlled power screwdrivers. Provide fasteners in gypsum panels according to referenced gypsum board application and finishing standard, manufacturer's written recommendations, and as required for fire-resistance-rated assembly. Maximum spacing shall be as follows:

    a. Maximum fastener spacing for abuse resistant gypsum board: 8” o.c., except where 12 inches o.c. is recommended by panel manufacturer.

    b. Maximum fastener spacing for other panels: 8 inches o.c.

B. Panel Application

1. Single layer application on walls/partitions: install the gypsum board to studs at right angles to the furring or framing members, unless otherwise required for fire-resistance-rated assembly, minimizing end joints. Stagger abutting end joints not less than one framing member in alternate courses of board.

2. Multilayer application on partitions/walls: Apply board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. Make end and edge joints, where required, over furring or framing members. Position boards so that like edges abut, with tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

4. Cover both faces of steel stud partition framing with wallboard as indicated on the Drawings (including above ceilings).

5. Multilayer Fastening Methods: fasten base layers and face layers separately to supports with screws unless otherwise indicated or required by fire-resistance-rated assembly

C. Finishing and Joint Treatment

1. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

2. Prefill open joints and damaged surface areas.

3. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

4. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C840 and as indicated, for locations as follows:

   a. Exposed locations: ASTM C840 - Level 5, with finished surfaces completely flat and uniform, with no visible irregularities or imperfections: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface at panel and trim surfaces that will be exposed to view.

5. Outside Corners

   a. Install corner bead fitting neatly over the corner and apply compound to both sides of corner.

   b. Treat the corner with joint compound as recommended by accessory manufacturer, allowing compound to dry between coats. Final coat shall completely cover corner.

6. Inside Corners: Treat as specified for joints, except that the reinforcing tape shall be folded lengthwise through the middle and fitted neatly into corner.

7. Properly prepare surfaces to receive paint.

D. Other Trim: The Drawings do not purport to show all locations and all requirements for trim in connection with the Work of this Section. Carefully study the Drawings and the installation; provide in place all trim normally recommended by the manufacturer of the gypsum board used.

3.6 CLEAN UP AND PROTECTION

A. In addition to the requirements of these Specifications, use all necessary care during execution of this portion of the Work to prevent scattering of gypsum board scraps and dust and to prevent tracking of joint and finishing compound onto floor surfaces. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scraps, debris and surplus material of this Section.

END OF SECTION 09 26 00

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SECTION 09 51 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Provide acoustical ceiling Work as indicated on Drawings and as specified herein, including the following:

1. Acoustical Mineral Fiber Tile and Panel Ceilings

    a. Lay-in panel installation - exposed grid

1.3 REFERENCES

A. Refer to DDC General Conditions

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society of Testing and Materials (ASTM) standards, latest editions.

    a. C423 Test Method for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method.

    b. C635 Metal Suspension System for Acoustical Tile and Lay-In Panel Ceilings.

    c. E84 Surface Burning Characteristics of Building Materials.

    d. E90 Standard Test Method for Laboratory Sound Transmission Class

    e. E119 Method for Fire Tests of Building Construction and Materials.

f. E413 Determination of Sound Transmission Class

g. E1264 Standard Classification for Acoustical Ceiling Products.

2. AMA -1-II Ceiling Sound Transmission Test By Two-Room Method

3. Acoustical and Insulation Materials Association, "Job Conditions".

4. New York City Board of Standards and Appeals (BSA) approvals; New York City Materials Equipment Acceptance (MEA).

5. New York City Building Code.

1.4 DEFINITIONS

A. Refer to DDC General Conditions.

B. Direct Suspension System: Directly fastened to floor or roof construction above.

C. Indirect Suspension System: Installed as part of the Work of this Section, as furnished by ceiling system manufacturer to be attached to direct suspension system.

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Submit manufacturer's product specifications and installation instructions for ceiling materials, indicating compliance with applicable requirements. Include information pertaining to fire performance, flame spread, and smoke development.

C. Shop Drawings

1. Submit shop drawing details indicating the relationship to mechanical and electrical Work and other items penetrating or connected to the ceiling. Indicate framing and support details for the ceiling Work.

D. Samples

1. Submit samples of the following materials, prior to installation:

a. Lay-in mineral fiber acoustical panel with field cut tegular edge on one edge, painted to match factory tegular edges. The other three edges shall have manufactured tegular profile: 12” x 24” sample.

b. Exposed runners: 8" long samples of each color and system type required.

c. Concealed suspension members: 1 set of each assembly specified.

E. Quality Assurance Submittals

1. Affidavit certifying experience of installation company.

2. Certification and listing by an Approved Agency in accordance with NYC Dept. of Buildings rules, indicating that the materials and assemblies regulated by the NYC Building Code are acceptable for the intended use. When test methods are stipulated in the NYC Building Code, the tests utilized shall be stated in the Certification. Prior MEA and BSA approvals are acceptable for materials conforming to code requirements.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions

B. Qualifications

1. Installer is to be a firm with not less than three (3) years of successful experience in the installation of specified materials.

C. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYC. Building Code.

2. Certification and listing by an Approved Agency in accordance with NYC Dept. of Buildings rules. Prior MEA and BSA approvals are acceptable for materials conforming to code requirements.

D. Fire Performance Characterestics

1. Provide ceiling components that are identical to those tested for the following fire performance characteristics, according to ASTM test method, by UL. Identify ceiling components with appropriate marking of applicable testing and inspecting agency.

2. Surface Burning Characteristics: Tested per ASTM E84. Tested surfaces shall be the surfaces facing the occupied space.

a. Flame Spread: 25 or less

b. Smoke Deceloped: 25 or less

E. Coordination of Work

1. Coordinate layout and installation of ceiling units and suspension system components with other work above, supported by, or penetrating through ceilings, including light fixtures, HVAC equipment, fire-suppression systems and partitions. Resolve all discrepancies and conflicts prior to start of Work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery

1. Deliver all acoustical units in manufacturer's original, unopened packages fully identified with type, finish, performance data and compliance labeling

B. Storage

1. Store materials where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

2. Store tile containers in space where they will be installed for at least 24 hours prior to installation to stabilize moisture content and temperature.

C. Handling

1. Handle ceiling units carefully to avoid chipping edges or damaging units in any way.

1.8 PROJECT CONDITIONS

A. Space Enclosure

1. Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet work in space is completed and dry, work above ceilings is completed, and until air temperature and humidity are maintained at values of final occupancy.

1.9 GUARANTEE

A. Work showing defects in workmanship or materials within the one year guarantee period specified in the Contract shall be corrected as directed by the Commissioner. Defects include:

1. Tiles or suspension system loose or improperly secured.

2. Tiles or suspension members showing discoloration or cracking.

3. Tiles or suspension members warping, sagging, or deforming.

1.10 REQUIRED MATERIALS

A. Deliver required materials to Commissioner. Furnish required materials, described below, matching products installed, packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish 80 square feet of full size units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acoustical Panels:

1. Mineral Composition Panels (24" x 48" x 3/4")
   a. 'Mars / 88785' by USG Interiors inc
   b. 'Ultima /1914' by Armstrong Worl Industries
   c. 'Symphony-m/1220BB-I0F-1' by Certain Teed Corporation
   d. Or approved equal

2. Indirect Metal Suspension Systems
   a. Chicago Metallic Corporation
   b. Donn Corporation/ USG Interiors Inc.
   c. Armstrong World Industries
   d. Or approved equal

2.2 MATERIALS – ACOUSTIC TILES AND PANELS

A. Mineral Fiber Tile and Panels

1. Provide units per ASTM E1264; of designation, style, finish, color, acoustical range, edge detail and size as indicated below:

a. Suspended (Exposed grid, lay-in) Installation

1)	Style	Fine Texture
2)	Size	24”x48”x3/4” or 24”x24”x3/4” as indicated
3)	Edge Profile	Reveal beveled tegular, or as indicated
4)	Weight	0.95-1.05 lbs/sft
5)	NRC	Min. 70
6)	CAC	Min. 35
7)	Light Reflectance	Min 85 Average
8)	Color	White
9)	Finish	Factory finish

2.3 MATERIALS – METAL SUSPENSION SYSTEMS- INDIRECT HUNG

A. Exposed Grid Suspension System

1. Manufacturer's standard system, with design and finish as selected by the Commissioner

   a. Structural Classification: Heavy-duty system in accordance with ASTM C 635.

2. Face width: 15/16".

3. Main Runners: Connect to direct suspension system. Conform to ASTM C 635 for heavy-duty classification.

4. Provide runners suitable for attachment of hold-down clips and impact clips as applicable.

2.4 MISCELLANEOUS MATERIALS

A. Drop Clips

1. 18 gage galv steel with key hole slot, or other configuration approved by NYC DOB for connection of ceiling suspension members to carrying channels.

2. Drop clips shall be of length required for indicated ceiling heights and to provide clearances of lighting fixtures, mechanical equipment and other items above ceilings.

3. Where necessary because of limited clearance, provide clips that connect runners tight to bottom of carrying channels.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine the building before beginning Work to determine that it is properly enclosed and the structure is in proper condition to receive acoustical materials and suspension system. Area shall be broom cleaned and uninterrupted for free movement of rolling scaffold. Do not proceed until satisfactory conditions prevail.

B. Verify that direct suspension system has been installed properly, that main runners are spaced evenly and have been leveled to a tolerance of 1/8" in 12' measured both lengthwise on each runner and transversely between parallel runners so that indirect suspension system installation may proceed accurately.

C. Start of Work constitutes acceptance of existing conditions, therefore, contractor is advised to bring any discrepancies to the attention of the Commissioner prior to start of Work.

3.3 PREPARATION

A. Coordination
   1. Provide and coordinate the locations of inserts, clips, or other supports for support of acoustical ceilings.
   2. Determine the length of drop clips required to maintain indicated ceiling height and to provide necessary clearance for electrical, mechanical and other equipment. Where necessary for clearance, clips that connect runners tight to the bottom of carrying channels shall be used.

B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans.

3.4 INSTALLATION – GENERAL

A. Install materials in accordance with manufacturer's printed instructions and in compliance with ASTM C636, fire resistance rating requirements, as indicated.
   1. Coordinate requirements for Work of other trades to be built into ceiling system. Provide supplementary framing as required.

B. Cut as required for installation of electric fixtures, air diffusers, grilles, sprinkler heads, security devices, access doors, etc., provided under other contracts. Verify sizes and locations with other trades.

C. On completion, the ceilings shall present a uniform horizontal plane surface, unless otherwise indicated, free from blemishes and imperfections. Exposed grid cross runners shall fit tightly against adjacent main runners, with no visible gaps.

D. Install panels in coordination with suspension system with suspension members concealed by support of tile units.

E. Neatly scribe and cut panels to fit accurately at borders, interruptions, and penetrations. The cut edges of reveal tegular lay-in mineral fiber panels shall be field cut to match profile of factory edges, in accordance with manufacturer's printed instructions. Paint the cut edges to match factory finish where exposed to view, using paint supplied by panel manufacturer.

3.5 ADJUSTING AND CLEANING

A. Clean exposed surfaces of ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage.

B. Remove and replace Work which cannot be successfully cleaned and restored to permanently eliminate evidence of damage

C. Remove and replace Work that is damaged or soiled by other trades as directed by Commissioner

END OF SECTION 09 51 00

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes, but is not limited to, surface preparation, shop and field painting of the following:

1. Existing and new exterior steel items including: structural steel dunnage at roof.

2. Interior painting including new first floor electrical service room.

1.3 REFERENCES

A. Refer to DDC General Conditions

B. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications or mandated by the NYC Building Code, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. Occupational Safety and Health Administraion (OSHA)
2. Steel Structures Painting Council (SSPC)
3. American Society of Testing and Materials (ASTM)

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data

1. Provide manufacturers' product literature for all materials specified and material manufacturer's printed directions and recommendations for environmental conditions,

surface preparation, priming, mixing, reduction, spreading rate, application, storage and VOC content, as applicable for each of the materials specified

C. Samples for selection

1. Submit entire color chart from manufacturer for each type and location to be painted.

D. Quality Assurance Submittals

1. Certification that materials comply with regulations for Volatile Organic Compounds (VOC).

E. Guarantee Submittal

1. Provide Guarantee per article 1.8

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions

B. General

1. All painting materials shall arrive at the job ready-mixed.

2. Remove all rejected materials from the premises immediately.

3. All thinning and tinting materials shall be as recommended by the manufacturer. Generally, all paints shall not require additional thinning.

4. Verify that the specified shop prime paint for each applicable item in this Project is compatible with the total coating system, prior to application.

5. Materials selected for each system type shall be products of a single manufacturer.

6. In existing building locations, restoration of existing base surface is to be approved prior to commencement of painting.

C. Qualifications

1. Work of this Section shall be performed by personnel with a minimum of three years experience in performing this type of Work.

2. The Contractor shall ensure that all employees meet the qualifications set forth in OSHA, 29 CFR 1926.62 - Lead in Construction Standard.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery

1. Deliver materials to the site in original, unopened containers bearing manufacturers name and label containing the following information:

a. Product name or title of material

b. Manufacturer stock number, batch number, VOC content in grams per liter and date of manufacture

c. Manufacturer's name

d. Contents by volume for major pigment and vehicle constitutions

e. Thinning instructions

f. Application instructions

g. Color name and number

B. Storage

1. The Commissioner will designate space on premises for storage of materials. Contractor shall restrict storage in this area to paint materials and related equipment, and provide the following:

a. Provide one (1) approved chemical dry fire extinguisher equal to 20 lb. CO_2 rating in all assigned rooms or locations where painting materials are stored. Fire extinguisher shall bear the label of the National Board of Fire Underwriters and tag of most recent inspection.

b. Provide three (3) standard size red fire pails with clean sand in above locations. At the completion of project, fire extinguishers and pails shall become property of Contractor.

2. Maintain storage area in clean condition, store materials not in use in tightly covered containers. Remove oily rags, waste and empty containers from site each night.

3. Provide the Commissioner with one key for each space if spaces are to be kept locked when not in use.

4. Protect all materials from freezing.

1.7 PROJECT CONDITIONS

A. Environmental Requirements

1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.

2. Do not apply finish in areas where dust is being generated or will be generated while the material is drying

3. Provide paint and coating products to comply with VOC requirements of New York State Department of Environmental Conservation.

4. The Contractor shall ensure that all requirements of OSHA 29 CFR 1926.62 – Lead in Construction Standard, are adhered to during the project. In addition, the Contractor shall ensure that proper work area protection and clean-up procedures (as described in this Section) are strictly adhered to during all phases on the project.

1.8 GUARANTEE

A. Adherence of workmanship and materials to Specifications requirements shall be maintained for the contractor's one year guarantee period. These requirements shall include the following:

1. There shall be no evidence of blistering, peeling, crazing, alligatoring, streaking, staining, or chalking.

2. Dirt shall be removed without blemishing the finish by washing with mild soap and water.

3. Colors of surfaces shall remain free from serious fading; the variation, if any, shall be uniform.

B. Correct all defects, appearing within the guarantee period, by removal of the defective work and replacement as directed.

C. All corrective measures shall be the Contractor's responsibility, and shall be made at no extra cost to the City of New York. The requirements set forth in Part 3 of these Specifications shall be strictly adhered to.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Benjamin Moore and Co.

B. Carboline

C. The Sherwin-Williams Co.

D. PPG

E. Or approved equal

2.2 MATERIALS

A. Provide products which meet all VOC requirements of New York State Department of Environmental Conservation for applications outlined herein.

1. Primers for Flat paints: Max VOC content of 100 gms/liter
2. Primers for Non- Flat paint: Max VOC content of 150 gms/liter
3. Non Flat Coatings: Max VOC content of 150 gms/liter
4. Rust Preventive/Anti corrosive paint: Max VOC content of 250 gms/liter
5. Stains: Max VOC content of 250 gms/liter

B. Provide products which meet all Federal regulations for amount of lead in paint (less than 0.06% lead in non-volatile ingredients).

C. Use only thinners approved by paint manufacturers for applications intended and use only within recommended limits.

D. Miscellaneous Standards and Requirements

1. Turpentine: ASTM D13.
2. Mineral Spirits (Petroleum Paint Thinner): FS TT-T-29
3. Cleaning Solvents: Low toxicity; flash point in excess of 100oF.
4. Polyester Filler: Polyester resin base autobody filler standard weight or finishing grade required by conditions; "White Lightning" and "Topcoat" by Marson's, "Dynatron Dynalite" by 3M, "Duraglass" by USG, or approved equal.
5. Color Pigments: Pure, non-fading, finely ground pigments, at least 99 percent passing a 325 mesh sieve. Color pigments that are to be used on masonry and concrete shall be lime proof - FS-TT-P-381.

2.3 INTERIOR PAINTING SYSTEM

A. Interior Gypsum board walls – new and existing

1. Semi Gloss finish
   a. 1st coat – Vinly Acrylic Latex Primer Sealer – 1.0 mils DFT
   b. 2nd & 3rd coats - Semi Gloss Vinyl Acrylic Latex Enamel- 1.3 Mils DFT each coat

2.4 EXTERIOR PAINTING SYSTEM

A. All metal and galvanized or zinc metallized steel items shall be coated with following paint system:

1. Primer: Epoxy primer, 4.0 Mils DFT
   a. 'Carboguard 888' by Carboline
   b. 'Amercoat 385' by PPG PMC
   c. 'Macropoxy 646' by SW
   d. Or approved equal

2. Top coat shall be two coats of Polyurethane gloss, 4.0 mils DFT each
   a. 'Carbothane 134HG' by Carboline
   b. 'Amercoat 450 H' by PPG PMC
   c. 'Acrolon 218 HS B65-600' by SW
   d. Or approved equal

2.5 CONCRETE FLOOR SEALER

A. Concrete floor surface shall be coated with following system:

1. Provide two coats of epoxy finish ver unpainted concrete surfaces as follows:
   a. First coat – Waterborne Epoxy or Acrylic – 2.0 Mils DFT
   b. Second coat – Waterborne Epoxy or Acrylic – 2.0 Mils DFT

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Verification of Conditions

1. The application of painter's finish to any surface shall be taken to indicate that the contractor considers such surfaces suitable for a first-class finish.

2. Do not apply painter's finish in any locations until the Work of other Contractors that might damage the new finish is completed.

3. Notify the Commissioner in writing regarding Work by others that does not provide a suitable surface for the new finish.

4. In case of dispute regarding the suitability of any surface, the Commissioner's decision shall be final and conclusive upon all concerned.

5. Contractor shall check the compatibility of previously painted surface with the new coating by applying a test panel 4 foot wide x wall height. Allow test panel to dry thoroughly; verify proper adhesion before proceeding with painting Work.

3.3 PREPARATION AND APPLICATION

A. Protection

1. Cover or otherwise protect finished Work of other trades and surfaces not to be painted concurrently or not to be painted.

B. Surface Preparation

1. Perform preparation and cleaning procedures in accordance with the paint manufacturer's instructions and as specified.

a. Sand bare spots and abraded areas of shop primed and previously painted surfaces. Where paint is missing or removed, sand surrounding edges of sound paint film so edges of existing paint do not show through the finished system.

b. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to other cleaning procedures. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

2. Ferrous Metals

a. Remove dirt and grease with cleaning solvents that will not affect shop prime coat. Wipe off with clean cloths.

b. Remove rust, mill scale and defective paint down to bare metal, using scraper, sandpaper, or wire brush. Grind if necessary to remove shoulders at edge of sound paint to prevent flaws from photographing finish coats.

3. Galvanized Metal

a. Remove dust and oil with mineral spirits and wipe dry with clean cloth. Restore welded and abraded surfaces with a 2 mil (dry) minimum thick coating of cold galvanizing compound in conformance with ASTM A780; comply with manufacturer's application instructions.

4. Gypsum Board: Fill cracks and other blemishes with spackling or patching compound and sand smooth.

5. Concrete Masonry Unit: Prepare cementitious surfaces by removing efflorescence, chalk, dust, grease and oils. Mortar shall be cured as recommended by paint manufacturer.

C. Material Preparation

1. Mix and prepare painting materials in accordance with the manufacturer's directions.

2. Stir materials before and during application to produce and maintain a mixture of uniform density. Do not stir any film that may form on the surface of materials into the material; remove the film and strain the material before using.

3. Thinning: Use only thinners recommended by the paint manufacturer and use only within the recommended or specified limits.

3.4 APPLICATION

A. Apply paint materials to produce smooth finished surfaces, free of brush or roller marks, drops, runs, or sags.

B. Paint materials shall be kept at a proper and uniform consistency.

C. Thin only when necessary to achieve best results.

D. Thinners shall be material recommended by manufacturer of paint, and in quantity as recommended.

E. Excessive use of thinner as indicated by variation in absorption, lack of "hide", thickness of dry film, mottled or streaky coat, shall be cause for rejection. Correct as directed.

F. Apply all coats with brush or roller (spraying will not be permitted) varying slightly the color of succeeding coats.

G. Brush out or roll on first or prime coat; work well into surface.

H. Each coat shall be inspected, approved and dry before proceeding with additional coats.

I. The surfaces of metals shall be sanded or rubbed between coats to assure smooth finish and proper adhesion of subsequent coats.

3.5 CLEANING

A. Contractor shall clean-up behind each paint crew such that painting and clean-up will be a continuous uninterrupted operation. The practice of one general clean-up after completion of all painting will be strictly prohibited. This clean-up will include the following:

1. Remove spots or defacement resulting from Work of this Section.

2. Retouch all damaged surfaces to leave Work in perfect finished condition.

3. If spots or defacement cannot be satisfactorily removed and retouched, re-finish the surfaces as directed.

4. Remove from premises all surplus paint materials, debris and any other rubbish resulting from the Work.

5. Leave storage space clean and in condition required for equivalent spaces in project.

3.6 PROTECTION

A. Provide caution tape and/or locked entryways during paint removal activities in existing buildings to prevent access to the work area from unauthorized personnel.

B. Provide "Wet Paint" signs to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their Work after completion of painting operations.

C. At the completion of Work of other trades, touch-up and restore all damaged or defaced painted surfaces as directed by the Commissioner.

END OF SECTION 09 91 00

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SECTION 21 05 00 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Mechanical sleeve seals.
3. Sleeves.
4. Escutcheons.
5. Grout.
6. Fire-suppression equipment and piping demolition.
7. Equipment installation requirements common to equipment sections.
8. Painting and finishing.
9. Concrete bases.
10. Supports and anchorages.

1.3 DEFINITIONS

A. Refer to DDC general conditions.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

C. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

F. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

G. The following are industry abbreviations for plastic materials:

1. CPVC: Chlorinated polyvinyl chloride plastic.

H. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For the following:

1. Mechanical sleeve seals.
2. Escutcheons.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1 2015, "Structural Welding Code—Steel"

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Fire-Suppression Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for fire-suppression items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Section 081100 "Steel Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 21 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 21 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements for Joining CPVC Plastic Piping: ASTM F 493.

2.4 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Or approved equal

2. Sealing Elements: EPDMinterlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.].

E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.

F. One-Piece, Floor-Plate Type: Cast-iron floor plate.

G. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 21 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

   a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
   b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
   c. Insulated Piping: One-piece, stamped-steel type with spring clips.
   d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
   e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
   f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece or split-casting, cast-brass type with polished chrome-plated finish.
   g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
   h. Bare Piping in Equipment Rooms: One-piece, cast-brass type.

i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Sleeves are not required for core-drilled holes.

N. Permanent sleeves are not required for holes formed by removable PE sleeves.

O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Specification 076000 "Flashing and Sheet Metal" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Specification 079000 "Joint Sealers" for materials and installation.

Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Specification 072700 "Firestopping and Smoke Seals" for materials.

R. Verify final equipment locations for roughing-in.

S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and 211313 Wet-Pipe Sprinkler Systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 – Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings, or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1 – Pipe Threads, General Purpose. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12 – Guide for Welding Mild Steel Pipe, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 – Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings, for safe-handling practice of cleaners, primers, and solvent cements.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M – Standard Specification for Chlorinated Polyvinyl Chloride Plastic Hot- and Cold-Water Distribution Systems, Appendix.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139 – Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

3.4 PAINTING

A. Painting of fire-suppression systems, equipment, and components is specified in Section 099100 Painting.

B. Damage and Touchup: Restore marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Section 051210 Structural Steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire-suppression materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.6 GROUTING

A. Mix and install grout for fire-suppression equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 210500

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SECTION 21 05 18 - ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Escutcheons.
2. Floor plates.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With rough-brass finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

D. Split-Casting Brass Type: With rough-brass finish and with concealed hinge and setscrew.

E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

2.2 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
c. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
d. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge**.**
e. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge**.**

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.
2. Existing Piping: Split-casting, floor-plate type.

3.3 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 210518

SECTION 21 05 53 - IDENTIFICATION FOR FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Equipment identification.
2. Identification signs, nameplates and labels.
3. Pipe labels.
4. Fire department connection nameplates & signs.
5. Valve tags.
6. Warning signs.
7. Cabinet equipment identification.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated.

C. Samples: For color, letter style, and graphic representation required for each identification material and device.

D. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label. Contractor shall provide a labeling matrix for Commissioner review and approval.

E. Equipment labeling shall include: Equipment Name Designation, Equipment description, Equipment Functionality, Equipment information, Equipment location, Label Color and Label Location.

F. Valve numbering scheme.

G. Valve Schedules: For each piping system shall be included in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Comply with NYC Building Code.

C. Comply with ANSI A13.1 “Scheme for Identification of Piping Systems”.

1.5 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT SIGNS

A. Metal Labels for Equipment:

1. Material and Thickness: Stainless steel, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering

for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data. Provide equipment label schedule for Commissioner's review and approval.

2.2 IDENTIFICATION SIGNS, NAMEPLATES AND LABELS

A. Identification on signs for outside sprinkler alarm devices shall be located above or next to the device and shall be worded "SPRINKLER FIRE ALARM – WHEN BELL RINGS NOTIFY FIRE DEPARTMENT OR POLICE."

B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

C. Letter Color: Red

D. Background Color: White.

E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

H. Fasteners: Stainless-steel rivets or self-tapping screws.

I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

J. Label Content: Include caution and warning information, plus emergency notification instructions.

K. Provide sign on the entrance door of sprinkler valve. The sign shall read "Sprinkler control valves".

2.3 WARNING SIGNS

A. Warning Signs: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches (75 by 133 mm) minimum, Approximately 4 by 7 inches (100 by 178 mm).
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Red background with white lettering.

B. Label Content: Include caution and warning information, plus emergency notification instructions.

2.4 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

1. Factory fabricated, snap-on type pipe markers every 10 feet indicating system and direction of flow. The pipe markers shall be the weather-proof plastic type and shall not be used where surface temperature exceeds 180 deg F.
2. The pipe markers shall be:

a. Smaller than 6 inch: completely encircling pipe.
b. 6 inch and larger: stainless steel spring fasteners.
c. Adhesive type markers will not be permitted.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.5 PIPE MARKERS

A. Provide factory fabricated, snap-on type pipe markers with service legend and flow arrows. The pipe markers shall be the weather-proof plastic type and shall not be used where surface temperature exceeds 180EF.

B. The pipe markers shall be in accordance with the following types:
1. Smaller than six inches: completely encircling pipe.

2. Six inches and larger: stainless steel spring fasteners.

C. Adhesive type markers will not be permitted.

2.6 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: 2 inch square Stainless steel, 0.025-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Mount charts on walnut grained wood plaque with clear plastic laminations covering diagrams and/or lists.
2. Mount charts, diagrams, and/or lists, in aluminum frame and glass.
3. Letter and number equipment, valves and controls to correspond with designations on metal tags and/or nameplates.
4. Fasten permanently in locations, as directed, with four brass screws.
5. Valve-tag schedule shall be included in operation and maintenance data.

2.7 CHARTS

A. Provide valve tag chart indicating valve number, system, type, size, location and function for all valves.

B. Mount charts on walnut grained wood plaque with clear plastic laminations covering diagrams.

C. Mount in aluminum frame and glass.

D. Letter and number valves and controls to correspond with designations on metal tags.

E. Fasten charts permanently in locations, as directed, with four brass screws.

F. Supplement numbering and lettering of valve tags and charts of existing building.

G. Valve Chart: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Mount charts, diagrams, and/or lists, in aluminum frame.

2. Letter and number equipment, valves and controls to correspond with designations on metal tags and/or nameplates.
3. Fasten permanently in locations, as directed, with four brass screws.
4. Valve-tag schedule shall be included in operation and maintenance data.

2.8 WARNING SIGNS

A. Warning Signs: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches.
2. Fasteners: Brass grommet and wire
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

2.9 NAMEPLATES

A. Provide engraved black Lamicoid sheet with white lettering nameplates with inscriptions, subject to review, indicating equipment and voltage, and fasten with epoxy cement and chrome plated screws.

B. Provide nameplates for gauges, meters, valve boxes, instruments, control devices, pilot lamps, transmitters, motor controllers and panel-mounted equipment.

2.10 CABINET EQUIPMENT IDENTIFICATION

A. Material and thickness same as equipment labels.

B. Minimum label size: Approximately 4 inches high by 7 inches in length.

C. Minimum letter size: 2 inches by 5 inches high (50 mm).

D. Unless code exception applies.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.3 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment, and for gauges, meters, valve boxes, instruments, control devices, pilot lamps, transmitters, motor controllers, and panel-mounted equipment.

B. Label each 1½ inch hose racks with operating instructions.

C. Provide metal sign for each riser control valve.

D. Locate equipment labels where accessible and visible.

3.4 IDENTIFICATION SIGNS, NAMEPLATES AND LABELS

A. All interior fire standpipe signage shall have a red background with a minimum one inch high background with minimum one inch high red letters.

C. Each remotely controlled R.C.V. valve shall have a metal sign indicating if it is normally closed or open.

D. Each riser control valve shall have metal sign hanging from the valve stating that it is a riser control valve.

3.5 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Section 099100 Painting

B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels complying with ASME A13.1 on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.

2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 10 feet along each run.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
8. Where removable ceiling tiles are provided, install buttons, tabs, or markers to identify location of concealed work and/or valves. Submit for review.

D. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and following client's color coding requirements.

1. Item Description	Color Designation
a. Fire Service	Red
b. Sprinkler piping – all type	Red

3.6 VALVE-TAG INSTALLATION

A. Install tags on all valves and control devices in piping systems, except check valves; valves within factory-fabricated fire pumping equipment units. List tagged valves in a valve schedule.

B. Valve-Tag Application: Securely attach tags to each valve. Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

   a. Fire Standpipe (FSP): 2 inches, round.
   b. Sprinkler (SPK): 2 inches square
   c. Combined FSP and SPK: 2 inches square

2. Valve-Tag Color:

   a. Natural

3. Letter Color:

   a. Black

3.7 PAINTING APPLICATION

A. All valve handles, risers and cross connections, run outs to auxiliary hose valve handles, and control cabinets must be painted, including concealed piping.

B. In addition to exposed risers, cross connections and control valve handles, all concealed control valve handles, risers and cross connections that are exposed during the course of the alteration whether to remain exposed or to be concealed again shall be painted.

C. Required Paint Color:

1. Red for all risers (sprinkler, standpipe or combined) and cross connections and standpipe control valve handles.
2. Green for sprinkler valve handles.
3. Yellow for combined standpipe/sprinkler riser valve handles.

3.8 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 210553

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SECTION 21 13 13 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Piping materials.
2. Pipe joining materials.
3. Cover system for sprinkler piping.
4. Listed fire-protection valves.
5. Trim and drain valves.
6. Specialty valves:
   a. Sprinkler specialty pipe fittings.
7. Sprinklers.
8. Alarm devices.
9. Escutcheons.
10. Sleeves.
11. Sleeve seals.
12. Grout.

1.3 DEFINITIONS

A. Refer to DDC general conditions.

B. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

C. NFPA 13 – Standard for the Installation of Sprinkler Systems

1.4 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.5 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig (1200-kPa) minimum working pressure.

B. Engineering Services: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer licensed in the State of New York, using performance requirements and design criteria indicated.

1. Available pressure and gpm:
   a. See Building Riser diagram for elevations and design information
   b. Provide hydrant flow test for obtaining most recent street flow and pressure for the hydraulic calculations.

2. Available fire-hydrant flow test records indicate the following conditions:

C. Sprinkler system design shall be approved by New York City Department of Buildings and Fire Department of New York.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.

2. Sprinkler Occupancy Hazard Classifications:

   a. Building Service Areas: Ordinary Hazard, Group 1.
   b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
   c. General Storage Areas: Ordinary Hazard, Group 1.
   d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
   e. Office and Public Areas: Light Hazard.

3. Minimum Density for Automatic-Sprinkler Piping Design:

   a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
   b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
   c. Special Occupancy Hazard: As determined by the City of New York

4. Maximum Protection Area per Sprinkler:

   a. Office Spaces: 225 sq. ft.
   b. Storage Areas: 130 sq. ft.
   c. Mechanical Equipment Rooms: 130 sq. ft.
   d. Electrical Equipment Rooms: 130 sq. ft.
   e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:

   a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
   b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.

D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13.

1.6 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

C. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

D. Engineering Services Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.

E. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Domestic water piping.
2. HVAC piping and ducts.
3. Items penetrating finished ceiling include the following:

a. Lighting fixtures.
b. Air outlets and inlets.

F. Qualification Data: For qualified Installer.

G. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by New York City Department of Buildings and Fire Department of New York, including hydraulic calculations if applicable.

H. Welding certificates.

I. Fire-hydrant flow test report.

J. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

K. Field quality-control reports.

L. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

M. Submittals shall indicate M.E.A. approval with a Calendar Number.

1.7 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Installer Qualifications:

1. Installer's responsibilities include fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer licensed in the State of New York.

C. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."
3. NFPA 72E.
4. Americans with Disabilities Act.

F. Provide products with BS & A approval as required.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify The Commissioner no fewer than two days in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without The Commissioner’s written permission.

1.9 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.10 REQUIRED MATERIALS

A. Furnish required materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

B. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
1. Wheatland.
2. Cerro.
3. Allied.
4. Or Approved Equal.

2.2 STEEL PIPE AND FITTINGS

A. Schedule 40, Black Steel Pipe: ASTM A 53/A 53M (Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless), Type E, Grade B. Pipe ends may be factory or field formed to match joining method.

B. Schedule 10, Black-Steel Pipe: ASTM A 135 (Standard Specification for Electric Resistance-Welded Steel Pipe) or ASTM A 795/A 795M (Standard Specification for Black and Hot-Dipped Zinc-Coated Welded and Seamless Steel Pipe for Fire Protection Use), Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10, plain end.

C. Black Steel Pipe Nipples: ASTM A 733 (Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples), made of ASTM A 53/A 53M (Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless), standard-weight, seamless steel pipe with threaded ends.

D. Uncoated, Steel Couplings: ASTM A 865 (Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated Welded or Seamless, for Use in Steel Pipe Joints), threaded.

E. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4 (Cast Iron Threaded Fittings), Class 125, standard pattern.

F. Malleable- or Ductile-Iron Unions: UL 860.

G. Cast-Iron Flanges: ASME 16.1 (Cast Iron Pipe Flanges and Flanged Fittings), Class 125.

H. Steel Flanges and Flanged Fittings: ASME B16.5 (Pipe Flanges and Flanged Fittings), Class 150.

I. Steel Welding Fittings: ASTM A 234/A 234M (Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Services) and ASME B16.9 (Factory-Made Wrought Steel Butt-welding Fittings).

J. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

   a. Anvil International, Inc.
   b. Corcoran Piping System Co.
   c. National Fittings, Inc.
   d. Shurjoint Piping Products.
   e. Tyco Fire & Building Products LP.
   f. Victaulic Company
   g. Or approved equal

2. Pressure Rating: 175 psig minimum.
3. Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free.

1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:

1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.

B. Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

   a. Anvil International, Inc.
   b. Victaulic Company
   c. Trion
   d. Or Approved Equal.

2. Standard: UL 1091 except with ball instead of disc.
3. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
4. Valves NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
5. Valves NPS 3: Ductile-iron body with grooved ends.
6. Grooved end shut-off valve shall be ball type, two-piece bronze body ASTM A584 with threaded or grooved end connections. Chrome-plated brass ball, 316 stainless steel stem, TFE seat, die-cast brass gearbox, pre-wired supervisory switches.

C. Bronze Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide Valve product by one of the following:

   a. Milwaukee Company
   b. Fivalco Inc.
   c. Global Safety Products, Inc.
   d. Or Approved Equal.

2. Standard: UL 1091.
3. Pressure Rating: 175 psig (1200 kPa).
4. Body Material: Bronze.
5. End Connections: Threaded.
6. Operation: Slow closing with position indicator with tamper switch.

D. Iron Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

   a. Anvil International, Inc.
   b. Fivalco Inc.
   c. Global Safety Products, Inc.

d. Kennedy Valve; a division of McWane, Inc.
e. Milwaukee Valve Company.
f. NIBCO Inc.
g. Shurjoint Piping Products.
h. Tyco Fire & Building Products LP.
i. Or Approved Equal.

2. Standard: UL 1091.
3. Pressure Rating: 175 psig (1200 kPa).
4. Body Material: Cast or ductile iron.
5. Style: Lug or wafer.
6. End Connections: Grooved.

E. Check Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
   a. Anvil International, Inc.
   b. Clow Valve Company; a division of McWane, Inc.
   c. Crane Co.; Crane Valve Group; Crane Valves.
   d. Crane Co.; Crane Valve Group; Stockham Division.
   e. Fire-End & Croker Corporation.
   f. Fivalco Inc.
   g. Globe Fire Sprinkler Corporation.
   h. Kennedy Valve; a division of McWane, Inc.
   i. Milwaukee Valve Company.
   j. Mueller Co.; Water Products Division.
   k. NIBCO Inc.
   l. Potter Roemer.
   m. Reliable Automatic Sprinkler Co., Inc.
   n. Shurjoint Piping Products.
   o. Tyco Fire & Building Products LP.
   p. Viking Corporation.
   q. Or Approved Equal.

2. Standard: UL 312.
3. Pressure Rating: 250 psig minimum.
4. Type: Swing check.
5. Body Material: Cast iron.
6. End Connections: Flanged or grooved.
7. Two inch and smaller valves, except as noted, shall be threaded bronze, 175 psig wwp. 2-1/2 inch and larger, except as noted shall be flanged IBBM, 175 psig wwp.
8. Wafer type check valves or grooved end spring-assisted check valves 250# WWP UL, FMG, MEA approved may be used.
9. Threaded bronze, swing type check valves, 175 psig wwp with composition or leather disc for air lines.

F. Bronze OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Crane Co.; Crane Valve Group; Stockham Division.
    c. NIBCO Inc.
    d. Tyco Fire & Building Products LP.
    e. Or Approved Equal.

2. Standard: UL 262.
3. Pressure Rating: 175 psig .
4. Body Material: Bronze.
5. End Connections: Threaded.
6. Equal to Kennedy Fig. 66.

G. Iron OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
    a. Clow Valve Company; a division of McWane, Inc.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Stockham Division.
    d. Hammond Valve.
    e. Mueller Co.; Water Products Division.
    f. NIBCO Inc.
    g. Shurjoint Piping Products.
    h. Tyco Fire & Building Products LP.
    i. Or Approved Equal.

2. Standard: UL 262.
3. Pressure Rating: 250 psig (1725 kPa) minimum
4. Body Material: Cast or ductile iron.
5. End Connections: Flanged or grooved.
6. 2-1/2 inch and larger, shall be flanged IBBM, OS&Y gate type.
7. Seal valves in proper position and provide approved type metal signs indicating purpose of valve.

H. Indicating-Type Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

    a. Anvil International, Inc.
    b. Fivalco Inc.
    c. Global Safety Products, Inc.
    d. Kennedy Valve; a division of McWane, Inc.
    e. Milwaukee Valve Company.
    f. NIBCO Inc.
    g. Shurjoint Piping Products.

h. Tyco Fire & Building Products LP.
i. Or Approved Equal.

2. Standard: UL 1091.
3. Pressure Rating: 175 psig minimum.
4. Valves NPS 2 and Smaller:

a. Valve Type: Ball or butterfly.
b. Body Material: Bronze.
c. End Connections: Threaded.

5. Valves NPS 2-1/2 and Larger:

a. Valve Type: Butterfly.
b. Body Material: Cast or ductile iron.
c. End Connections: Flanged, grooved, or wafer.

6. Valve Operation: Integral electrical, 115-V ac, prewired, single-circuit, supervisory switch indicating device.

2.5 TRIM AND DRAIN VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.

B. Angle Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

a. Fire Protection Products, Inc.
b. United Brass Works, Inc.
c. Or Approved Equal.

C. Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
a. Milwaukee Valve Company
b. Anvil International, Inc.
c. Conbraco Industries, Inc.; Apollo Valves.
d. Fire-End & Croker Corporation.
e. Kennedy Valve; a division of McWane, Inc.
f. NIBCO Inc.
g. Potter Roemer.

h. Tyco Fire & Building Products LP.
i. Victaulic Company.
j. Watts Water Technologies, Inc.
k. Or Approved Equal.

2. Grooved end shut-off valve shall be ball type, two-piece bronze body ASTM A584 with threaded or grooved end connections. Chrome-plated brass ball, 316 stainless steel stem, TFE seat, die-cast brass gearbox, pre-wired supervisory switches.

D. Globe Valves:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

a. Milwaukee Valve Company No. 502
b. Fire Protection Products, Inc.
c. United Brass Works, Inc.
d. Or Approved Equal.

2.6 SPRINKLER SPECIALTY PIPE FITTINGS

A. Branch Outlet Fittings:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

a. Victaulic Company
b. Anvil International, Inc.
c. Shurjoint Piping Products.
d. Tyco Fire & Building Products LP.
e. Or Approved Equal.

2. Standard: UL 213.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
5. Type: Mechanical-T and -cross fittings.
6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
a. Reliable Automatic Sprinkler Co., Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.
d. Or Approved Equal.

2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

C. Sprinkler Inspector's Test Fittings:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
   a. Tyco Fire & Building Products LP.
   b. Victaulic Company.
   c. Viking Corporation.
   d. Or Approved Equal.

2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig (1200 kPa) minimum.
4. Body Material: Cast- or ductile-iron housing with sight glass.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.
7. Where required, test pipe with sight glass, and calibrated orifice
8. Where applicable, use a grooved end 90 degree elbow at fire department connection

D. Adjustable Drop Nipples:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

   a. Merit Manufacturing; a division of Anvil International, Inc. CECA, LLC.
   b. Aegis Technologies Inc.
   c. Corcoran Piping System Co.
   d. Or Approved Equal.

2. Standard: UL 2443.
3. Pressure Rating: 250 psig (1725 kPa) minimum.
4. Body Material: Steel pipe with EPDM-rubber O-ring seals.
5. Size: Same as connected piping.
6. Length: Adjustable.
7. Inlet and Outlet: Threaded.

E. Flexible, Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

   a. Fivalco Inc.
   b. FlexHead Industries, Inc.

c. Gateway Tubing, Inc.
d. Or Approved Equal.

2. Standard: UL 2443.
3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
4. Pressure Rating: 175 psig (1200 kPa) minimum.
5. Size: Same as connected piping, for sprinkler.

2.7 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
1. Globe Fire Sprinkler Corporation.
2. Tyco Fire & Building Products LP.
3. Victaulic Company.
4. Viking Corporation.
5. Or Approved Equal.

B. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig (1200 kPa) minimum.

C. Sprinkler Finishes:

1. Chrome plated.
2. Bronze.
3. Painted.

D. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Concealed, flushed and recessed.
2. Sidewall Mounting: Concealed and recessed.

E. Sprinkler Guards:

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

a. Globe Fire Sprinkler Corp.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.
d. Viking Corporation.
e. Or Approved Equal.

2. Standard: UL 199.
3. Type: Wire cage with fastening device for attaching to sprinkler.

F. Quick Response Sprinklers (5.6 K-Factor Only):
1. Sprinklers shall be provided where noted and installed in accordance with their listing.
   a. Upright:
      1) Reliable Model GFR (fusible link UL Listing only)
      2) Reliable Model F1FR (frangible bulb UL & FM listed)
      3) Victaulic Model V2704 (frangible bulb UL and FM listed)
      4) Or approved equal
   b. Pendent:
      1) Reliable Model GFR (fusible link UL listing only)
      2) Reliable Model F1FR (frangible bulb UL & FM listed)
      3) Victaulic Model V2708 (frangible bulb UL and FM listed)
      4) Or approved equal
   c. Sidewall:
      1) Reliable Model GFR (fusible link UL listing only)
      2) Reliable Model F1FR (frangible bulb UL & FM listed)
      3) Victaulic Model V2710 (frangible bulb UL and FM listed)
      4) Or approved equal
   d. Concealed:
      1) Reliable Model G4A (fusible link UL listing only)
      2) Victaulic Model V3802 (frangible bulb UL listing only)
      3) Or approved equal
2.

2.8 ESCUTCHEONS

A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.

B. One-Piece, Cast-Brass Escutcheons: rough-brass finish with set-screws.

2.9 SLEEVES

A. Cast-Iron Wall Pipe Sleeves: Cast or fabricated of cast iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, standard weight, zinc coated, plain ends.

C. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

   1. Underdeck Clamp: Clamping ring with set-screws.

D. Except where framed openings are provided in General Construction Work, provide No. 22 USSG galvanized sheet metal sleeves though interior floors, ceilings, walls, and partitions.

1. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

E. Projecting flashing type sleeves though interior membrane waterproofed floors, except as noted. Sleeves shall be cast iron with integral flashing flange for built up membrane, with clamping ring. For liquid membrane, furnish sleeves with integral or brazed 4 inch wide flange.

F. Flush flashing type sleeves though membrane waterproofed walls, slabs with earth fill above and slabs on ground. Sleeves shall be cast iron with integral flashing flange and clamping ring for built up membrane. For liquid membrane sleeves shall be with integral or brazed 4 inch wide flange. Sleeves shall be modified for wall or slab thickness.

G. Through elastomeric type waterproofing, galvanized cast iron sleeves with integral bottom flange.

1. Exposed sleeves after packing shall be covered by close-fitting metal escutcheons on both sides of construction.

H. Generally, sleeves though foundations are by others. Provide additional sleeves required and cutting and patching to install same or to relocate existing sleeves.

2.10 SLEEVE SEALS

A. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex, Inc.
4. Pipeline Seal and Insulator, Inc.
5. Or Approved Equal.

B. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Sealing Elements: EPDM-rubber or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements.

2.11 GROUT

A. Standard: ASTM C 1107, Grade B, posthardening and volume adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink, and recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.3 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from New York City Department of Buildings and Fire Department of New York. File written approval with the Commissioner before deviating from approved working plans.

B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.

C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.

D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

E. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.

F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

1. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes. Drain pipes or test pipes shall spill

through building wall, over ejector pit, over sump pit, over mop sink, over anti-splash standpipe drain, on roof or as noted.

I. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.

J. Install alarm devices in piping systems.

K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.

L. Pressurize and check preaction sprinkler system piping and air-pressure maintenance devices.

M. Fill sprinkler system piping with water.

3.4 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.

C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.

D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

H. Welded Joints: Construct joints according to AWS D10.12M/D10.12 (Guide for Welding Mild Steel Pipe), using qualified processes and welding operators according to "Quality Assurance" Article.

1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.

I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606 (Standard for Grooved and Shouldered Joints). Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 (Standard for Grooved and Shouldered Joints) for steel-pipe joints.

J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606 (Standard for Grooved and Shouldered Joints). Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 (Standard for Grooved and Shouldered Joints) for steel-pipe grooved joints.

K. Specialty Valves:

1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
2. Alarm Valves: Include bypass check valve and retarding chamber drain-line connection.

3.5 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.

B. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

3.6 ESCUTCHEON INSTALLATION

A. Install escutcheons for penetrations of walls, ceilings, and floors.

B. Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish.
5. Bare Piping in Equipment Rooms: One piece, cast brass.
6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

3.7 SLEEVE INSTALLATION

A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.

B. Sleeves are not required for core-drilled holes.

C. Permanent sleeves are not required for holes formed by removable PE sleeves.

D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.

E. Install sleeves in new partitions, slabs, and walls as they are built.

F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements for joint sealants in Section 07 92 00 "Joint Sealants."

G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements for joint sealants in Section 07 92 00 "Joint Sealants."

H. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals.

I. Provide sleeves of cast iron or steel pipe through exterior walls, beams, interior machine room floors and interior sprinklered area floors, except as noted. Extend sleeves 3 inches to 6 inches above finished floor. Provide continuously welded center flange for sleeves though exterior walls, and floors of machine rooms and sprinklered areas.

J. Seal space outside of sleeves in concrete slabs and walls with grout.

K. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.

L. Install sleeve materials according to the following applications:

1. Sleeves for Piping Passing through Gypsum-Board Partitions:

    a. Galvanized-steel-pipe sleeves for pipes smaller than NPS 6 (DN 150).
    b. Galvanized-steel-sheet sleeves for pipes NPS 6 (DN 150) and larger.
    c. Exception: Sleeves are not required for water-supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.

2. Sleeves for Piping Passing through Interior Concrete Walls:

    a. Galvanized-steel-pipe sleeves for pipes smaller than NPS 6 (DN 150).
    b. Galvanized-steel-sheet sleeves for pipes NPS 6 (DN 150) and larger.

M. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestop materials and installations in Section 07 27 00 " Firestopping/Smokeseals."

3.8 SLEEVE SEAL INSTALLATION

A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.

B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.9 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.10 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Restore leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Start and run excess-pressure pumps.
6. Coordinate with fire-alarm tests. Operate as required.
7. Coordinate with fire-pump tests. Operate as required.
8. Verify that equipment hose threads are same as local fire-department equipment.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Submit a copy of Department of Buildings/Plumbing Division On Site Inspection Report.

3.11 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

3.12 PIPING APPLICATION

A. Standard-pressure, wet-pipe sprinkler system, NPS 2 (DN 50) and smaller, shall be one of the following:

1. Standard-weight, Schedule 40, threaded, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight, black-steel pipe with roll grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

B. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 to NPS 4, shall be one of the following:

1. Schedule 30, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Schedule 30, black-steel pipe with grooved-end-pipe couplings for steel piping; and grooved joints.
3. Schedule 30, black-steel pipe with plain ends; steel welding fittings; and welded joints.
4. Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
5. Schedule 10, black-steel pipe with plain ends; welding fittings; and welded joints.

3.13 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Concealed sprinklers.
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Pendent, dry sprinklers.

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
3. Upright Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION 211313

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SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Pipe, tube and fittings
2. Dielectric fittings
3. Mechanical sleeve seals
4. Sleeves
5. Escutcheons
6. Grout

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

C. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

F. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.

2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For the following:

1. Pipe, tube and fittings
2. Dielectric fittings
3. Mechanical sleeve seals
4. Sleeves
5. Escutcheons
6. Grout

C. Welding certificates.

D. Coordinated Drawings.

E. As-built Record Drawings.

F. Record Files.

G. Layout (Shop) Drawings:

1. Prepare layout shop drawings for all areas.

H. From the layout drawings, prepare and submit Coordinated Drawings as herein specified below.

I. Coordinated Drawings:
1. This Contractor shall prepare coordinated drawings which shall show work of all trades including:
   a. Items noted in the Addendum to the General Conditions.
   b. Mechanical Equipment.

J. As-built (Record) Drawings:
1. Provide after installation is complete. Final signoff and acceptance will not occur prior to submission of As-built drawings to Commissioner.
2. Indicate as-built conditions and all revisions that occurred subsequent to "Coordinated Drawings" submittal, fully illustrating all revisions made by all trades in the course of work.
3. Dimension physical locations of piping with reference elevations and distances above finished roof, below beams, and from wall (parapet) faces, and from column lines.
4. Indicate all equipment sizes and capacities and tag numbers.
5. Provide drawing on reproducible CADD mylar.
6. These drawings shall be for as-built record purposes for the Commissioner's use and are not considered shop drawings.

K. Record Files:

1. Provide 5 (five) electronic file copies of the As-built CADD drawings in the media of Commissioner's choice.
2. Include hard copy and electronic copy of file naming convention, layering standards, drawing index and file descriptions.
3. Electronic files shall be modifiable and shall include all associated referenced background files.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, 2015, "Structural Welding Code--Steel."

C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

1. Manufacturers:

a. Capitol Manufacturing Co.
b. Central Plastics Company.
c. Eclipse, Inc.
d. Epco Sales, Inc.
e. Hart Industries, International, Inc.
f. Watts Industries, Inc.; Water Products Div.
g. Zurn Industries, Inc.; Wilkins Div.
h. Or approved equal

2.3 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.
e. Or approved equal

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.4 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

2.5 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.

C. Split-Plate, Stamped-Steel Type: With exposed-rivet hinge, set screw or spring clips, and chrome-plated finish.

D. One-Piece, Floor-Plate Type: Cast-iron floor plate.

2.6 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PLUMBING DEMOLITION

A. Refer to DDC General Conditions and Section 02 41 13 " Selective Removals & Demolitions" for general demolition requirements and procedures.

B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Insulated Piping: One-piece, stamped-steel type with spring clips.
c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
d. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
f. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

2. Existing Piping: Use the following:
a. Insulated Piping: Split-plate, stamped-steel type with concealed or exposed-rivet hinge and spring clips.
b. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
c. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.

B. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

C. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Section 07 60 00 "Flashing and Sheet Metal" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Section 07 92 00 "Joint Sealants" for materials and installation.

D. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

3.4 PAINTING

A. Painting of plumbing systems, equipment, and components is specified in Section 09 91 00 Painting.

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

B. Field Welding: Comply with AWS D1.1.

3.6 GROUTING

A. Clean surfaces that will come into contact with grout.

B. Provide forms as required for placement of grout.

C. Avoid air entrapment during placement of grout.

D. Place grout around anchors.

E. Cure placed grout.

END OF SECTION 220500

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SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following hangers and supports for plumbing system piping and equipment:

1. Steel pipe hangers and supports.
2. Fastener systems.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

C. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For the following:

1. Steel pipe hangers and supports.

C. Shop Drawings: Signed and sealed by a qualified professional engineer licensed in the State of New York. Show fabrication and installation details and include calculations for the following:

1. Pipe hangers. Include Product Data for components.

D. Welding certificates.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

C. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.4, "Structural Welding Code--Reinforcing Steel."

PART 2 - PRODUCTS

2.1 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:

1. AAA Technology & Specialties Co., Inc.
2. Anvil International.
3. Bergen-Power Pipe Supports.
4. B-Line Systems, Inc.; a division of Cooper Industries.
5. Carpenter & Paterson, Inc.
6. Empire Industries, Inc.
7. ERICO/Michigan Hanger Co.
8. Globe Pipe Hanger Products, Inc.
9. Grinnell Corp.
10. GS Metals Corp.
11. National Pipe Hanger Corporation.
12. PHD Manufacturing, Inc.
13. PHS Industries, Inc.
14. Piping Technology & Products, Inc.
15. PSI Corp.
16. Tolco Inc.
17. Or approved equal

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.2 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 (Pipe Hangers and Supports – Selection and Application) for pipe hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use padded hangers for piping that is subject to scratching.

F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.

H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.

    a. Inserts shall be steel, slotted type and factory-painted.

        1) Multi-rod shall include end caps and closure strips.
        2) Clip form nails flush with inserts.
        3) Maximum loading including pipe, contents and covering shall not exceed 75% of rated insert capability.

2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

J. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

3.3 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 (Pipe Hangers and Supports – Selection and Application) and MSS SP-89 (Pipe Hangers and Supports – Fabrication and Installation Practices). Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

C. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

D. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

F. Install lateral bracing with pipe hangers and supports to prevent swaying.

G. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

H. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.

J. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

2. Shield Dimensions for Pipe: Not less than the following:
   a. NPS 4: 12 inches long and 0.06 inch thick.
   b. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

3. Insert Material: Length at least as long as protective shield.
4. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

K. Suspended Horizontal Piping:

1. Support piping independently from structure using heavy iron-hinged type hangers.
2. Provide electroplated solid-band hangers equal to Auto-Grip, for 2-inch and smaller pipe.
3. Provide wall brackets for wall-supported piping, and furnish pipe saddles for floor-mounted piping.
4. Suspend piping from inserts or expansion anchors, using beam clips, steel fish plates, cantilever brackets or other accepted means.
5. Suspend piping by rods with double nuts.

3.4 EQUIPMENT SUPPORTS

A. Provide corrosion resistant mounting systems when exposed to the elements and other corrosive environments. Provide hot dip galvanized metal parts of mountings (except springs and hardware). Provide cadmium-plated and neoprene-coated springs and cadmium-plated nuts and bolts.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 09 91 00 “Painting”.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-restore paint to comply with ASTM A 780 (Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings).

D. Dip in epoxy primer, uncoated hangers, supports, rods, and inserts.

END OF SECTION 220529

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SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:
1. Pipe labels.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated.

C. Samples: For color, letter style, and graphic representation required for each identification material and device.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

1.5 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. Manufacturers Subject to compliance with requirements, provide product by one of the following.
   1. Seton Nameplate Corp.
   2. Compliance Signs.
   3. Brady.
   4. Or approved equal

B. Description:
   1. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
   2. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
      a. Factory fabricated, snap-on type pipe markers every 10 feet indicating system and direction of flow. The pipe markers shall be the weather-proof plastic type and shall not be used where surface temperature exceeds 160 deg F.
      b. Pipe markers shall be equal to the following types:
         1) Smaller than 6 inch: completely encircling pipe.
         2) 6 inch and larger: stainless steel spring fasteners.
         3) Adhesive type markers will not be permitted.
   3. Pipe Label Contents: Include identification of piping service using same designations as stated herein, pipe size, and an arrow indicating flow direction.
      a. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
      b. Lettering Size: At least 1-1/2 inches high.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PREPARATION

A. Clean piping surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
   1. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
   2. At access doors, access hatches, and similar access points that permit view of concealed piping.
   3. Spaced at maximum intervals of 20 feet. Pipe identification text shall be repeated at maximum intervals of 25 feet (7620 mm) and at each point where the piping passes through a wall, floor or roof.
   4. Where removable ceiling tiles are provided, install buttons, tabs, or markers to identify location of concealed work and/or valves. Submit for review.
   5. Identification shall include the contents of the piping system and an arrow indicating the direction of flow.
   6. The size of the background color field and lettering shall be as follows:

Pipe Diameter	Length Background Color Field (Inches)	Size of Letters (Inches)
2½ to 6	12	1.25
8 to 10	24	25

B. Pipe Label Designations & Color Coding:

DESIGNATION	BACKGROUND	TEXT
Storm Water	Black	White
Natural Gas	Yellow	Black

END OF SECTION 220553

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SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Insulation Materials:
   a. Cellular glass.
   b. Mineral fiber.
2. Adhesives.
3. Sealants.
4. Tapes.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

C. Shop Drawings:

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at pipe expansion joints for each type of insulation.
3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
4. Detail removable insulation at piping specialties, equipment connections, and access panels.
5. Detail application of field-applied jackets.

D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:

1. Sample Sizes:

a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
b. Sheet Form Insulation Materials: 12 inches square.
c. Jacket Materials for Pipe: 12 inches long by NPS 2.
d. Sheet Jacket Materials: 12 inches square.
e. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

E. Qualification Data: For qualified Installer.

F. Material Test Reports: From a qualified testing agency acceptable to City of New York indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

G. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to City of New York. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Commissioner. Use materials indicated for the completed Work.

1. Piping Mockups:

a. One 10-foot section of NPS 2 straight pipe.

2. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
3. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.
4. Obtain Commissioner's approval of mockups before starting insulation application.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Commissioner specifically approves such deviations in writing.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

7. Demolish and remove mockups when directed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Cell-U-Foam Corporation; Ultra-CUF.
   b. Pittsburgh Corning Corporation; Foamglas Super K.
   c. SPI
   d. Or approved equal

2. Block Insulation: ASTM C 552, Type I.
3. Special-Shaped Insulation: ASTM C 552, Type III.
4. Board Insulation: ASTM C 552, Type IV.
5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
6. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Fibrex Insulations Inc.; Coreplus 1200.
   b. Johns Manville; Micro-Lok.
   c. Knauf Insulation; 1000(Pipe Insulation.
   d. Manson Insulation Inc.; Alley-K.
   e. Owens Corning; Fiberglas Pipe Insulation.
   f. Or approved equal

2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass, Phenolic, and Polyisocyanurate Products: Subject to compliance with requirements, provide one of the following:

   a. Childers Products, Division of ITW; CP-76.
   b. Foster Products Corporation, H. B. Fuller Company; 30-45.
   c. Marathon Industries, Inc.; 405.
   d. Mon-Eco Industries, Inc.; 44-05.

e. Pittsburgh Corning Corporation; Pittseal 444.
f. Vimasco Corporation; 750.
g. Or approved equal

B. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Products, Division of ITW; CP-76.
b. MM Systems Corp.
c. Marathon Industries, Inc.
d. Mon-Eco Industries, Inc.
e. Vimasco Corporation
f. Or approved equal

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
b. Compac Corp.; 104 and 105.
c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
e. Or approved equal

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
b. Compac Corp.; 120.

c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
d. Venture Tape; 3520 CW.
e. Or approved equal

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.4 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Replace normal insulation inside hanger shields with incompressible insulating block. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below ambient services (i.e. cold water, chilled water, insulated storm water, and other frost protected services), apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Restore joint separations and cracking due to thermal movement.

O. Restore damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.5 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

C. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 07 27 00 "Firestopping/Smokeseals" firestopping and fire-resistive joint sealers.

3.6 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings:

1. Install insulation over fittings and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

3.7 CELLULAR-GLASS INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

3.8 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.

2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

3.9 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.10 FINISHES

A. Equipment and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 09 91 00 “Painting”.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color as selected by the Commissioner. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Inspect field-insulated equipment, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.
2. Inspect pipe and fittings, randomly selected by the Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe.

D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.12 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Soundproof piping in walls and ceilings of as noted for insulation on respective service, except with a minimum 2 inch thick fiberglass, or as recommended by an acoustical consultant retained by contractor.

3.13 INDOOR PIPING INSULATION SCHEDULE

A. Stormwater:

1. All Pipe Sizes: Insulation shall be one of the following:

a. Cellular Glass: 1-1/2 inches thick.
b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Roof Drain Bodies:

1. All Pipe Sizes: Insulation shall be one of the following:

    a. Cellular Glass: 1-1/2 inches thick.
    b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

END OF SECTION 220700

SECTION 22 08 00 - COMMISSIONING OF PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract]

1.2 SUMMARY

A. This section includes commissioning process requirements for Plumbing systems, assemblies, and equipment.

B. Related Sections:

1. DDC General Conditions Section 019113 General Commissioning Requirements for MEP Systems for general commissioning process requirements.

1.3 DESCRIPTION

A. Commissioning is a systematic process of confirming that all building systems perform interactively according to the City of New York's Project Requirements and continuing through construction, acceptance and the warranty period with actual verification of performance.

B. The Commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.

C. The CxA directs and coordinates the commissioning activities and reports to the Commissioner. All members in the construction process work together to fulfill their contracted responsibilities and meet the objectives of the City of New York's Project Requirement's as detailed in the Contract Documents.

1.4 DEFINITIONS

A. Refer to DDC General Conditions Section for definitions.

1.5 SUBMITTALS

A. The CxA will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the

Contractor, or Commissioner as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

B. The CxA will receive a copy of the final approved submittals.

C. In addition, the Contractor is to provide the following:

1. Certificate of readiness

2. Certificates of completion of installation, prestart, and startup activities.

3. O&M manuals

4. Test reports

D. Refer to DDC General Conditions Section 013300 Submittal Procedures and Section 019113 General Commissioning Requirements for MEP Systems for general commissioning submittal requirements.

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: The Contractor will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Commissioning Kick-Off Meeting – Construction Team: The Contractor will attend a meeting of the Commissioning Team, chaired by the CxA, to review the scope of commissioning process activities and the Commissioning Plan with discussions on milestones, activities, and assignments of responsibilities. The flow and type of documents and the amount of submittal data given to the CxA will be determined. Meeting minutes will then be distributed to all parties by the CxA.

B. Commissioning Meetings: The Contractor will attend coordination meetings with the Commissioning Team, chaired by the CxA, to review progress on the Commissioning Plan, construction deficiencies, scheduling conflicts, and to discuss strategies and processes for upcoming commissioning process activities.

C. Miscellaneous Construction Meetings: The CxA attends selected planning and job-site meetings in order to remain informed on construction progress and to update parties involved in the commissioning process. This will not include 100% meeting attendance, but the CxA shall be provided with the subsequent meeting minutes for review.

D. Pre-testing Meetings: The Contractor will attend pretest meetings with the Commissioning Team, chaired by the CxA, to review startup reports, pre-test inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

E. Testing: Contractor will coordinate with testing personnel and agencies for timing and access for CxA to witness test.

F. Manufacturers' Inspection and Startup Services: Contractor will coordinate services of manufacturers' inspection and startup services.

G. Testing, Adjusting and Balancing: Contractor will coordinate with plan and schedule for testing, adjusting and balancing for timing and access for CxA to witness process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. The Contractor will require the HVAC subcontractor to complete testing. For example, the Contractor shall ultimately be responsible for all standard testing equipment for the plumbing system in Division 22. A sufficient quantity of two-way radios shall be provided by the Contractor.

B. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York's personnel upon completion of the commissioning process.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems. These checklists shall be provided to the Contractor for completion. The CxA shall gather and review the completeness and accuracy of these checklists via site visits.

B. Red-lined Drawings (As-Builts): The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. Operation and Maintenance Data: The Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

D. Demonstration and Orientation: The Contractor will provide demonstration and orientation as required by the specifications. A complete orientation plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any orientation. An orientation agenda for each orientation session must be submitted to the CxA one (1) week prior the orientation session.

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Refer to DDC General Conditions Section 019113 General Commissioning Requirements for MEP Systems for general Contractor's responsibilities.

B. The Contractor shall ensure that the plumbing subcontractor attends construction phase controls coordination meetings.

C. The Contractor shall ensure that the plumbing subcontractor attends domestic water balancing review and coordination meetings.

D. The Contractor shall ensure that the plumbing subcontractor participates in plumbing systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Prepare preliminary schedule for Plumbing system orientations and inspections, operation and maintenance manual submissions, orientation sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for owner. Distribute preliminary schedule to commissioning team members. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

G. Provide detailed startup procedures.

H. Provide a written list of all user adjustable set-points and reset schedules with a brief discussion of the purpose of each and the range of reasonable adjustments with energy implications

I. Provide a written schedule frequency to review the various set-points and reset schedules to ensure they are current relevant and efficient values.

J. Respond to provided new deficiencies and/or responses within five (5) business days.

K. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the Contract Documents. Submit to CxA 45 days after submittal acceptance.

L. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

M. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

N. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
1. Natural Gas piping

O. The equipment supplier shall document the performance of their equipment.

P. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

Q. Test, Adjust and Balance subcontractor, under the direction of the Contractor
1. Attend initial commissioning coordination meeting scheduled by the CxA.
2. Submit the site-specific testing and balancing plan to the CxA and Commissioner for review and acceptance.
3. Attend the testing and balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in testing, adjusting, and balancing the HVAC&R system.
4. At the completion of the testing and balancing work, and the submittal of the final testing and balancing report, notify the HVAC&R subcontractor and the Contractor.
5. Participate in verification of the testing and balancing report, which will consist of repeating measurements contained in the testing and balancing reports. Assist in diagnostic purposes when directed.
6. Provided recommended setpoints as determined by testing, adjusting, and balancing such as static pressure and differential pressure setpoints.

R. Contractor responsibilities to be completed by Equipment Suppliers:
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the City of New York's personnel, to keep warranties in force.
2. Assist in equipment testing.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

3.3 CxA'S RESPONSIBILITIES

A. Roles and Responsibilities

1. Refer to DDC General Conditions Section 019113 General Commissioning Requirements for MEP Systems for general CxA responsibilities.

3.4 TESTING PREPARATION

A. Certify in writing to the CxA that Plumbing systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Plumbing instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 TESTING, ADJUSTING AND BALANCING VERIFICATION

A. Prior to performance of Testing, Adjusting, and Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least ten (10) days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.

1. The CxA will notify the Contractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
2. The Contractor will ensure that the testing and balancing subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.6 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Plumbing testing shall include entire Plumbing installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Contractor will ensure that the plumbing subcontractor, testing and balancing subcontractor, and plumbing Instrumentation and Control subcontractor shall prepare detailed testing plans, procedures, and checklists for plumbing systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Plumbing system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.7 PLUMBING SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 22 sections. Provide submittals, test data, inspector record, and certifications to the CxA.

B. Plumbing Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment: Test requirements are specified in Division 22 piping Sections. Plumbing Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.

4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. Plumbing Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, fuel gas, sanitary waste and vent piping, storm drainage piping, sprinkler and domestic water distribution systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

F. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. Commissioning shall be performed on equipment and systems including but not limited to the following:

1. Natural Gas piping

3.8 DEFICIENCIES/NON-CONFORMANCE, FAILURE DUE TO MANUFACTURER DEFECT

A. Deficiencies/Non-Conformance

1. The CxA will record the results of the functional test on the test form. All deficiencies or non-conformance items shall be noted and reported to the Commissioner and Contractor on a standardized form.
2. The Contractor shall respond to new deficiencies within five (5) business days. The response shall either indicate the issue will be corrected with anticipated date of completion indicated or the response should clearly indicate why the Contractor disputes the claim while referencing the Contract Documents in dispute or request further information to clarify the concern.
3. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA.
4. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
5. As tests progress and a deficiency is identified, the CxA discusses the issue with the Contractor.
6. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it, the CxA documents the deficiency and the Contractor's response and intentions or corrections. The CxA and Contractor then proceed to another test or sequence. Once the Contractor corrects the deficiency, the test is rescheduled and repeated in the anticipation of correct operation or function.
7. When there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible, the CxA documents the deficiency and the Contractor's response. The deficiency is then forwarded to parties assumed to be responsible for the deficiency. Resolutions are made at the lowest management level possible. Other parties are brought into the discussion as needed. Final interpretive authority is with the Commissioner. Final acceptance authority is with the Commissioner and CxA. The CxA will then document the resolution process. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency. The CxA then reschedules the test as stated in the section above.

8. Deficiencies that are not corrected at the time of documentation, shall be completed by the affected Contractor and photo evidence of the deficiency resolution shall be sent to both the Commissioner and the CxA.

B. Failure due to Manufacturer Defect

1. If 10% or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA and the Commissioner. In such case, the Contractor shall provide the Commissioner with the following:
   i. Within one week of notification from the Contractor the manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the Commissioner within two weeks of the original notice.
   ii. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
   iii. The Commissioner will determine whether a replacement of all identical units or a repair is acceptable.
   iv. Two examples of the proposed solution will be installed by the Contractor and the Contractor will be allowed to test the installations for up to one week, upon which the Commissioner will decide whether to accept the solution.
   v. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

3.9 APPROVAL

A. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA. The CxA recommends acceptance of each test to the Commissioner using a standard form.

3.10 SEASONAL TESTING

A. Seasonal Testing – During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the Contractor, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and record documents due to seasonal testing will be made by the Contractor.

3.11 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in the DDC General Conditions Section 017839 Contract Record Documents and Section 019113 General Commissioning Requirements for MEP Systems.

B. The specific content and format requirements for the standard O&M manuals are detailed in DDC General Conditions Section 017839 Contract Record Documents and Section 019113 General Commissioning Requirements for MEP Systems. Special requirements for the controls Contractor and TAB Contractor are found in Division 23.

CxA Review and Approval – Prior to substantial completion, the CxA shall review the O&M manuals, documentation and record documents for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the Contractor, or Commissioner, as requested. Upon a successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the Commissioner. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated.

3.12 INSTRUCTION OF CITY OF NEW YORK PERSONNEL

A. The Contractor shall be responsible for instruction coordination, scheduling, and ultimately for ensuring that instruction is completed.

B. The CxA shall oversee the instruction of the City of New York's personnel for commissioned equipment and systems.

1. The CxA shall interview the City of New York's personnel to determine the special needs and areas where instruction will be most valuable. The Commissioner and CxA shall decide how rigorous the instruction should be for each piece of commissioned equipment. The CxA shall communicate the results to the Contractor who will ensure that the subcontractors and vendors are also notified about the results.
2. In addition to these general requirements, the specific instruction requirements of the City of New York's personnel by the Contractor are specified in the individual sections listed in Section 1.2 – Summary & DDC's General Conditions Section 017900 Demonstration and Owners' Pre-Acceptance Orientation.
3. The Contractor shall ensure that each subcontractor and vendor responsible for instruction will submit a written instruction plan to the Contractor for review and approval prior to instruction. The Contractor will submit one comprehensive instruction plan to the CxA and the Commissioner.
4. The plan will be reviewed by the CxA and the Commissioner. Comments pertaining to its deficiencies will be forwarded to the Contractor. The instruction plan will be rewritten until approved by the CxA and the Commissioner. The final approved instruction plan will cover the following elements:
    a. Equipment (included in instruction)
    b. Intended audience
    c. Location of instruction
    d. Objectives
    e. Subjects covered (description, duration of discussion, special methods, etc.)
    f. Duration of instruction on each subject
    g. Qualified instructor for each subject
    h. Instructor qualifications
    i. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
5. For the primary plumbing equipment, the Contractor shall ensure that the controls subcontractor provide a discussion of the control of the equipment during the mechanical or electrical instruction conducted by each subcontractor or vendor.

6. Instruction documentation shall include the following items:
    a. Copy of the instruction plan, including schedule, syllabus, and agenda.
    b. Copy of the Owner's Project Requirements.
    c. Copy of the Basis of Design.
    d. Compiled operations manuals.
    e. Compiled maintenance manuals.
    f. Completed manufacturer instruction manuals.
    g. Red-lined drawings.
    h. Other pertinent documents.

7. The CxA develops criteria for determining that the instruction was satisfactorily completed, including attending the instruction, etc. The CxA recommends approval of the instruction to the Commissioner using a standard form. The Commissioner signs the approval form/letter template.

8. At one of the instruction sessions, the CxA presents a presentation discussing the use of the blank functional test forms for re-commissioning equipment.

9. Video recording of the instruction sessions may be provided by the CxA in electronic format, at the discretion of the Commissioner.

END OF SECTION 220800

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SECTION 22 13 16 - VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following for vent piping inside the building:

1. Pipe, tube, and fittings.
2. Special pipe fittings.

B. Related Sections include the following:

1. Division 22 Section 220529 "Hangers and Supports for Plumbing, Piping and Equipment."

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:

1. Vent Piping: 10-foot head of water

B. Seismic Performance: Vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to specification section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Shop Drawings – provide product data for each type of the following:
1. Piping
2. Fittings
3. Joints
4. Supports

C. Seismic-Design Submittal: Provide for natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.

1. Detail fabrication and assembly of seismic restraints.
2. Design Calculations: Calculate requirements for selecting seismic restraints.

D. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Refer to Section 220500 “Common Work Results for Plumbing”.

C. Reference Standards:

1. New York City Building Code.

D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service class.

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.3 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

2.4 SPECIAL PIPE FITTINGS

A. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

1. Manufacturers: Subject to compliance with requirements, provide product by one of the following:

a. SIGMA Corp.
b. EBBA Iron
c. Ford Meter Box Company, Inc.
d. Or approved equal

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, vent piping NPS 4 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; standard shielded, stainless-steel couplings; and hubless-coupling joints.
3. Dissimilar Pipe-Material Couplings: Flexible shielded nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

C. Aboveground, vent piping NPS 5 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; standard shielded, stainless-steel couplings; and hubless-coupling joints.
3. Dissimilar Pipe-Material Couplings: Flexible shielded nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

3.2 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Section 22 05 00 "Common Work Results for Plumbing."

B. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

C. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.

D. Make changes in direction for vent piping using appropriate branches, bends, and long-sweep bends. Straight tees, elbows, and crosses may be used on vent lines. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

E. Install vent piping at the following minimum slopes, unless otherwise indicated:

1. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

F. Install ABS vent piping according to ASTM D 2661 (Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings).

G. Install PVC vent piping according to ASTM D 2665 (Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings).

3.3 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Section 22 05 00 "Common Work Results for Plumbing."

B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Join hubless cast-iron soil piping according to CISPI 310 (Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications) and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

E. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

F. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

G. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665 (Standard Specification for Poly(Vinyl Chloride)(PVC) Plastic Drain, Waste, and Vent Pipe and Fittings).

3.4 HANGER AND SUPPORT INSTALLATION

A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

B. Pipe hangers and supports are specified in Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Install individual, straight, horizontal piping runs according to the following:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install supports according to Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6: 60 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.

G. Install supports for vertical cast-iron soil piping every 15 feet
1. NPS 6: 10 feet with 5/8-inch rod.

H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect vent piping to existing vent piping. Match existing piping material.

3.6 FIELD QUALITY CONTROL

A. During installation, notify New York City Department of Buildings at least 24 hours before inspection must be made. Perform tests specified below in presence of New York City Department of Buildings.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by New York City Department of Buildings to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If New York City Department of Buildings find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by New York City Department of Buildings.

D. Test vent piping according to procedures of New York City Department of Buildings or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.7 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221316

SECTION 22 14 13 - FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following storm drainage piping inside the building:

1. Pipe, tube, and fittings.
2. Roof Drains

B. Related Sections include the following:

1. Division 22 Section 220529 “Hangers and Supports for Plumbing, Piping and Equipment.”

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working-pressure, unless otherwise indicated:

1. Storm Drainage Piping: 10-foot head of water

B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to specification section 23 05 48 “Vibration and Seismic Controls for HVAC Piping and Equipment.”

1.4 SUBMITTALS

A. Refer to DDC General Conditions

B. Product Data: For pipe, tube, fittings, couplings, and roof drains

C. Shop Drawings – provide product data for each type of the following:
1. Piping
2. Fittings
3. Joints
4. Supports

D. Seismic-Design Submittal: Provide for natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.

1. Detail fabrication and assembly of seismic restraints.
2. Design Calculations: Calculate requirements for selecting seismic restraints.

E. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Refer to Section 220500 “Common Work Results for Plumbing”.

C. Reference Standards:

1. New York City Building Code.

D. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service class.

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.4 ROOF DRAINS

A. Metal Roof Drains:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Olympic Manufacturing Group.
b. Josam Company; Josam Div.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
d. Tyler Pipe; Wade Div.
e. Or approved equal.

2. Standard: ASME A112.21.2M.
3. Pattern: Roof drain.
4. Body Material: Cast Iron
5. Dimensions of Body:
6. Combination Flashing Ring and Gravel Stop: Required
7. Flow-Control Weirs: Not Required
8. Outlet: Bottom
9. Dome Material: Cast Iron
10. Underdeck Clamp: Required
Type Gravel Roofs: Sump type with gravel stop and cast-iron sediment cup dome strainer, cast aluminum mushroom dome strainer.
11. Type Gravel Roof: Combined clamping ring and gravel stop and cast aluminum mushroom dome strainer with a nonadjustable weir notch.
12. Type Deck Roof: Extension collar of required height with weep holes, square top and flat grate.
13. Type Deck Roof (Insulated Membrane): Square top and flat grate with perforated extension collar of required height.

EXECUTION

2.5 PIPING APPLICATIONS

A. Aboveground storm drainage piping NPS 6 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Dissimilar Pipe-Material Couplings: Flexible shielded nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

B. Aboveground, storm drainage piping NPS 8 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Dissimilar Pipe-Material Couplings: Flexible shielded nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

2.6 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Division 22 Section 220500 "Common Work Results for Plumbing."

B. Install seismic restraints on piping. Seismic requirements are specified in Division 23 Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section 220500 "Common Work Results for Plumbing."

D. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

E. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

F. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:

1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

G. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

H. Do not enclose, cover, or put piping into operation until it is inspected and approved by New York City Department of Buildings.

2.7 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Section 22 05 00 "Common Work Results for Plumbing."

B. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Hub-and-Spigot, Cast-Iron Soil Piping Calked Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

2.8 HANGER AND SUPPORT INSTALLATION

A. Seismic-restraint devices are specified in Division 23 Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

B. Pipe hangers and supports are specified in Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install supports according to Division 22 Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6: 60 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

2.9 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

2.10 FIELD QUALITY CONTROL

A. During installation, notify New York City Department of Buildings at least 24 hours before inspection must be made. Perform tests specified below in presence of New York City Department of Buildings.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
2. Final Inspection: Arrange for final inspection by New York City Department of Buildings to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If New York City Department of Buildings find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by New York City Department of Buildings.

D. Test storm drainage piping according to procedures of New York City Department of Buildings or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

2.11 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221413

SECTION 22 70 00 – NATURAL FUEL GAS SYSTEMS - PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:

1. The Contract Drawings
2. The Specifications
3. The general conditions,
4. The Addendum
5. The Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Valves.
5. Dielectric fittings.
6. Labeling and identification.
7. Concrete bases.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

C. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 125 psig minimum unless otherwise indicated.
2. Minimum Operating Pressure of Service Meter: 125 psig.

B. Natural-Gas System Pressure within Buildings: 4 inches WC to 3 psig.

1.5 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Shop Drawings Provide product data for each type of the following:

1. Piping
2. Fittings
3. Joints.
4. Piping specialties
5. Corrugated, stainless-steel tubing with associated components.
6. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
7. Supports

C. Seismic-Design Submittal: Provide for natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.

1. Detail fabrication and assembly of seismic restraints.
2. Design Calculations: Calculate requirements for selecting seismic restraints.

D. Coordination Drawings: Plans and details, drawn to 3/8 scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.

E. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.

F. Qualification Data: For qualified professional engineer licensed in the State of New York.

G. Welding certificates.

H. Field quality-control reports.

I. Operation and Maintenance Data: For gas valves pressure regulators and service meters to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Refer to Section 220500 “Common Work Results for Plumbing”.

C. Reference Standards:

1. New York City Building Code.
2. New York City Fuel Gas Code.
3. National Grid.
4. American Gas Association (AGA).
5. Compressed Gas Association (CGA).
6. Military Standard Spec. (MSS).
7. Underwriters Laboratory.
8. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
9. Pipe Welding Qualifications: Qualify procedures and operators according to ASME IX Boiler and Pressure Vessel Code 1980.
10. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of City of New York.

B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

1.8 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by the City of New York or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:

1. Notify Commissioner no fewer than 2 days in advance of proposed interruption of natural-gas service.
2. Do not proceed with interruption of natural-gas service without Commissioner's written permission.

1.9 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces.

C. Provide valved gas piping for heating, ventilating and air conditioning equipment to within ten (10) feet of equipment connections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Exterior wall sleeves:

1. Innerlinks.
2. Thunderline.
3. EJ Prescott
4. Or approved equal

B. Steel pipe and fittings:

1. Crane Co.
2. National Tube Co.
3. Republic Steel Co.
4. Allied Steel.
5. Or approved equal

C. Fittings:

1. Crane Co.
2. Tube Turn.
3. Walworth.
4. Allied Steel.
5. Or approved equal

D. Hangers and supports:

1. Anvil International.
2. Michigan Hanger (Erico).
3. PSI Corp.
4. B-Line.
5. Carpenter & Patterson, Inc.
6. Or approved equal

E. Paint:

1. Sherwin Williams.
2. Pittsburgh Plate Glass Co.
3. Pratt & Lambert.
4. Or approved equal

F. Valves:

1. Plug valves, (Gas Cocks):

a. Conbraco Industries.
b. A.Y. McDonald Mfg. Co.
c. Crane Co.
d. DeZurik Healy Co.
e. Nordstrom Valves, Inc.
f. Walworth Co.
g. Or approved equal.

2.2 PIPING

A. Steel piping:

1. For low pressure 0.5 PSIG or less use standard weight black steel pipe with 150 PSIG threaded malleable iron fittings for piping 4 in. and smaller.

B. In no case shall any gas pipe be less than ¾ inch.

2.3 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Corrugated stainless-steel tubing with polymer coating.
3. Operating-Pressure Rating: 0.5 psig.
4. End Fittings: Zinc-coated steel.
5. Threaded Ends: Comply with ASME B1.20.1.
6. Maximum Length: 72 inches.

B. 1¼ in. to 4 in. standard pipe threaded elbow with 12 x 12 mesh stainless steel screen.

2.4 PIPE AND TUBING JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural fuel gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.5 VALVES

A. Manual Shut-off Valves Inside Building

B. General Requirements for Metallic Valves, NPS 2and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves where required by Con. Ed.
5. Listing: Listed and labeled by an NRTL acceptable to City of New York for valves 1 inch and smaller.
6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
7. Threaded cast iron body, 125 PSIG wog

C. Provide 2 wrenches for each size used.

1. Attach wrench to each valve.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping according to NFPA 54 Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with NFPA 54 Fuel Gas Code requirements for prevention of accidental ignition.

3.4 INSTALLATION

A. Install piping free from traps and with drain pocket consisting of nipple and cap at low points for inside building and drip pot for underground piping.

B. Install shut-off valves at connection to each piece of equipment. Provide union or right and left nipple and coupling at equipment side of individual shut-off valve.

C. Threaded Joints:

D. Make-up joints with U.L. listed gas resistant Teflon tape or Teflon paste, suited for gas piping.

D. Provide a two elbow-swing on all branches taken from a riser.

E. Provide valve tags for piping systems indicating the operating system pressure.

F. Color code piping at different pressures within the gas meter room. Paint fifteen (15) to five (5) psi system brown and reduced pressure piping yellow.

G. Welders must be qualified in accordance with either API 1104 or A.S.M.E. IX Boiler and Pressure Vessel Code and as required by New York City Building code.

3.5 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 Fuel Gas Code for installation and purging of natural-gas piping.

B. Steel Piping with Protective Coating:

C. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.

D. Restore damage to PE coating on pipe as recommended in writing by protective coating manufacturer.

E. Replace pipe having damaged PE coating with new pipe.

F. Install fittings for changes in direction and branch connections.

3.6 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.

3.7 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1 (Pipe Threads, General Purpose).

    a. Cut threads full and clean using sharp dies.

    b. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.

c. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.

d. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M (Guide for Welding Mild Steel Pipe), using qualified processes and welding operators.

2. Bevel plain ends of steel pipe.

3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

G. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

1. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.8 HANGER AND SUPPORT INSTALLATION

A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 23 Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

B. Comply with requirements for pipe hangers and supports.

C. Maximum spans below are from NFPA 54 or MSS SP-69. Copper-tube sizes were adjusted to ASTM B 88 (ASTM B 88M).

D. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS ¾ and 1 – 8 ft on center

2. NPS 1-1/4 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.

3. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.

3.9 CONNECTIONS

A. Install natural-gas piping electrically continuous and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

B. Install piping adjacent to appliances to allow service and maintenance of appliances.

C. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

D. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.10 LABELING AND IDENTIFYING

A. Comply with requirements in "Identification for Plumbing Piping and Equipment" for piping and valve identification.

B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 PAINTING

A. Comply with requirements in Section 09 91 00 “Painting” for painting interior and exterior natural-gas piping.

B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Alkyd System: MPI EXT 5.1D.

2. Prime Coat: Alkyd anticorrosive metal primer.

3. Intermediate Coat: Exterior alkyd enamel matching topcoat.

4. Topcoat: Exterior alkyd enamel (semigloss).

5. Color: Yellow.

C. Paint exposed, interior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Latex Over Alkyd Primer System: MPI INT 5.1Q.

2. Prime Coat: Alkyd anticorrosive metal primer.

3. Intermediate Coat: Interior latex matching topcoat.

4. Topcoat: Interior latex (semigloss).

5. Color: Yellow.

   a. Alkyd System: MPI INT 5.1E.

6. Prime Coat: Alkyd anticorrosive metal primer.

7. Intermediate Coat: Interior alkyd matching topcoat.

8. Topcoat: Interior alkyd (semigloss).

9. Color: Yellow.

D. Damage and Touchup: Restore marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.12 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base.

1. Construct concrete bases of dimensions indicated, but not less than 6 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Use 3000-psig, 28-day, compressive-strength concrete and reinforcement as specified in Section 03 00 50 “Concrete Work.”

3.13 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Test, inspect, and purge natural gas according to New York City Gas Code and other applicable codes and standards of New York City Building Code.

C. Pressure Tests:

1. New York City Building Code.

2. Test low pressure systems up to 0.5 PSIG with air at 3 PSIG for a minimum of one hour.

D. Controlled Inspection:

1. Perform radiography test on all welds in gas service and at gas meter and piping where operating pressures exceed 3 PSIG and where required by Con Edison or code. Radiography shall be performed in accordance with API 1104 or A.S.M.E. Section IX Boiler and Pressure Vessel Code and as required by New York City Building Code.

E. Purge all piping after pressure test and all appliances after piping has been purged.

F. Natural-gas piping will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

3.14 INSTRUCTION

A. Engage a factory-authorized service representative to instruct the City of New York's operating personnel to adjust, operate, and maintain earthquake valves.

END OF SECTION 227000

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SECTION 23 01 30 - HVAC AIR DUCT CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes cleaning of the following existing duct systems:

1. Supply system.
2. Return system.
3. Exhaust system.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. ASCS: Air system cleaning specialist.

C. NADCA: National Air Duct Cleaners Association.

D. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Qualification Data: For ASCS.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. ASCS Qualifications: A certified member of NADCA or A member of a nationally recognized nonprofit industry organization dedicated to the cleaning of HVAC systems.

1. Certification: Employ a staff of ASCSs certified by a nationally recognized certification program.
2. Supervisor Qualifications: Certified as an ASCS by NADCA.
3. Experience: Submit records of experience in the field of HVAC systems cleaning.
4. Equipment, Materials, and Labor: Have equipment, materials, and labor required to perform specified services.

C. Comply with current published standards of NADCA.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

A. See Section 233300 "Air Duct Accessories" for sheet metal materials.

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.

2.3 DUCT-MOUNTING ACCESS DOORS

A. General Description: Fabricate doors airtight and suitable for duct pressure class.

B. See Section 233300 "Air Duct Accessories" for duct mounted access doors.

C. Rectangular Duct Door: Double wall; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

1. Manufacturers:

a. American Warming and Ventilating.
b. Cesco Products.
c. Ductmate Industries, Inc.
d. Flexmaster U.S.A., Inc.
e. Greenheck.
f. McGill AirFlow Corporation.

g. Nailor Industries Inc.
h. Ventfabrics, Inc.
i. Ward Industries, Inc.
j. Or approved equal

2. Frame: Galvanized-steel sheet; with bendover tabs and foam gaskets.
3. Provide number of hinges and locks as follows:

a. Less Than 12 Inches Square: Secure with two sash locks.
b. Up to 18 Inches Square: Two hinges and two sash locks.
c. Up to 24 by 48 Inches: Three hinges and two compression latches with outside and inside handles.
d. Sizes 24 by 48 Inche sand Larger: Four hinges and two compression latches with outside and inside handles.

D. Round Duct Door: Double wall; fabricated of galvanized sheet metal with insulation fill and 1-inch thickness. Include cam latches.

1. Manufacturers:

a. Flexmaster U.S.A., Inc.
b. Ventfabrics, Inc.
c. Ward Industries, Inc.
d. Or approved equal

2. Frame: Galvanized-steel sheet; with spin-in notched frame.

E. Pressure Relief Access Door: Double wall; fabricated of galvanized sheet metal with insulation fill and thickness as required for duct pressure class. Include vision panel with latches and retaining chain.

1. Manufacturers:

a. American Warming and Ventilating.
b. Cesco Products.
c. Ductmate Industries, Inc.
d. Greenheck.
e. KEES, Inc.
f. McGill AirFlow Corporation.
g. Nexus PDQ; div. of Shilco Holdings Inc.
h. Or approved equal

2. Frame: Galvanized-steel sheet; with bendover tabs and foam gaskets.

F. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

G. Insulation: 1-inch-thick fibrous-glass or polystyrene-foam board.

2.4 FLEXIBLE CONNECTORS

A. See Section 233300 "Air Duct Accessories" for flexible connectors.

B. Manufacturers:

1. Duro Dyne Corp.
2. Ventfabrics, Inc.
3. Ward Industries, Inc.
4. Or approved equal

C. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches wide attached to 2 strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized-steel sheet or 0.032-inch-thick aluminum sheets. Select metal compatible with ducts.

E. Indoor-System, Flexible-Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd.
2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

F. Outdoor-System, Flexible-Connector Fabric: Glass fabric double coated with weatherproof synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd.
2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F.

G. High-Temperature System, Flexible Connectors: Glass fabric coated with silicone rubber.

1. Minimum Weight: 16 oz./sq. yd..
2. Tensile Strength: 285 lbf/inch in the warp and 185 lbf/inch in the filling.
3. Service Temperature: Minus 67 to plus 500 deg F

H. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.

1. Minimum Weight: 14 oz./sq. yd..
2. Tensile Strength: 450 lbf/inch in the warp and 340 lbf/inch in the filling.
3. Service Temperature: Minus 67 to plus 500 deg F

2.5 FLEXIBLE DUCTS

A. See Section 233300 "Air Duct Accessories" for flexible ducts.

B. Manufacturers:

1. Ductmate Industries, Inc.
2. Flexmaster U.S.A., Inc.
3. Hart & Cooley, Inc.
4. McGill AirFlow Corporation.
5. Or approved equal

C. Noninsulated-Duct Connectors: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm
3. Temperature Range: Minus 10 to plus 160 deg F

D. Noninsulated-Duct Connectors: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire.

1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
2. Maximum Air Velocity: 4000 fpm
3. Temperature Range: Minus 20 to plus 175 deg F

E. Noninsulated-Duct Connectors: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire.

1. Pressure Rating: 10-inch wgp ositive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.

F. Noninsulated-Duct Connectors: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound, spring-steel wire.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.

G. Noninsulated-Duct Connectors: UL 181, Class 0, interlocking spiral of aluminum foil.

1. Pressure Rating: 8-inch wg positive or negative.
2. Maximum Air Velocity: 5000 fpm.
3. Temperature Range: Minus 100 to plus 435 deg F.

H. Insulated-Duct Connectors: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; and polyethylene, aluminized vapor barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm
3. Temperature Range: Minus 10 to plus 160 deg F.

I. Insulated-Duct Connectors: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; and aluminized vapor barrier film.

1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
2. Maximum Air Velocity: 4000 fpm
3. Temperature Range: Minus 20 to plus 175 deg F

J. Insulated-Duct Connectors: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire; fibrous-glass insulation; and aluminized vapor barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.

K. Insulated-Duct Connectors: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound, spring-steel wire; fibrous-glass insulation; and aluminized vapor barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.

L. Insulated-Duct Connectors: UL 181, Class 0, interlocking spiral of aluminum foil; fibrous-glass insulation; and aluminized vapor barrier film.

1. Pressure Rating: 8-inch wg positive or negative.
2. Maximum Air Velocity: 5000 fpm
3. Temperature Range: Minus 20 to plus 250 deg F

M. Flexible-Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 through 18 inches to suit duct size.

2.6 DUCT ACCESSORY HARDWARE

A. See Section 233300 "Air Duct Accessories" for duct accessory hardware.

B. Fusible Links: Replaceable, 212 deg Frated.

C. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine systems to determine appropriate methods, tools, and equipment required for performance of work.

B. Prepare written report listing conditions detrimental to performance of work.

C. Proceed with work only after unsatisfactory conditions have been corrected.

D. Provide video documentation of existing duct conditions prior to start of cleaning.

3.3 CLEANING

A. Engage a qualified ASCS to clean the following systems:

1. Supply system.
2. Return system.
3. Exhaust system.

B. Perform cleaning before air balancing or mark position of dampers and air-directional mechanical devices before cleaning.

C. Use duct-mounted access doors, as required, for physical and mechanical entry and for inspection.

1. Install additional duct-mounting access doors to comply with duct cleaning standards. Comply with requirements in Section 233300 "Air Duct Accessories" for additional duct-mounting access doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection. Replace damaged and deteriorated flexible ducts. Comply with requirements "Air Duct Accessories" for flexible ducts.
3. Duct Mounting Access Doors
4. Flexible Connectors
5. Flexible Ducts
6. Duct Accessory Hardware

D. Mark position of dampers and air-directional mechanical devices before cleaning, and restore to their marked position on completion.

E. Particulate Collection and Odor Control:

1. Where venting vacuuming system inside building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron size (or greater) particles.
2. When venting vacuuming system outside building, use filtration to contain debris removed from the HVAC system and locate exhaust down wind and away from air intakes and other points of entry into building.

F. Clean the following metal-duct system components by removing visible surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling-unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, and actuators, except in ceiling plenums and mechanical room.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components.

G. Mechanical Cleaning Methodology:

1. Clean metal-duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of ducts so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts or duct liner.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment, and do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide operative drainage system for washdown procedures.
7. Biocidal Agents and Coatings: Apply biocidal agents if fungus is present; use according to manufacturer's written instructions after removal of surface deposits and debris.

H. Cleanliness Verification:

1. Verify cleanliness after mechanical cleaning and before application of treatment, including biocidal agents and protective coatings.
2. Visually inspect metal-duct systems for contaminants. Provide video of final duct condition.
3. Where contaminants are discovered, reclean and reinspect duct systems.

3.4 DUCT ACCESSORIES INSTALLATION

A. Install duct accessories according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install duct-mounting access doors where access doors do not currently exist to allow for the cleaning of ducts, accessories, and terminal units as follows:

1. On both sides of duct coils.
2. Downstream from volume dampers, turning vanes, and equipment.
3. Adjacent to fire or smoke dampers; reset or install new fusible links.
4. Before and after each change in direction, at maximum 50-footspacing.
5. On sides of ducts where adequate clearance is available.

D. Install the following sizes for duct-mounting, rectangular access doors:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.
3. Head and Hand Access: 18 by 10 inches.
4. Head and Shoulders Access: 21 by 14 inches.
5. Body Access: 25 by 14 inches.
6. Body Plus Ladder Access: 25 by 17 inches.

E. Install the following sizes for duct-mounting, round access doors:

1. One-Hand or Inspection Access: 8 inches in diameter.
2. Two-Hand Access: 10 inches in diameter.
3. Head and Hand Access: 12 inches in diameter.
4. Head and Shoulders Access: 18 inches in diameter.
5. Body Access: 24 inches in diameter.

F. Install the following sizes for duct-mounting, pressure relief access doors:

1. One-Hand or Inspection Access: 7 inches in diameter.
2. Two-Hand Access: 10 inches in diameter.
3. Head and Hand Access: 13 inches in diameter.
4. Head and Shoulders Access: 19 inches in diameter.

3.5 CONNECTIONS

A. Reconnect ducts to fans and air-handling units with existing flexible connectors after cleaning ducts and flexible connectors. Replace existing damaged and deteriorated flexible connectors.

B. For fans developing static pressures of 5-inch wg and higher, cover replacement flexible connectors with loaded vinyl sheet held in place with metal straps.

C. Reconnect terminal units to supply ducts with existing flexible ducts or replace damaged and deteriorated existing flexible ducts with maximum 12-inch lengths of new flexible duct.

D. Reconnect diffusers or light troffer boots to low-pressure ducts with existing flexible ducts or replace damaged and deteriorated existing flexible ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.

E. Reconnect existing and new flexible ducts to metal ducts with adhesive plus sheet metal screws.

3.6 FIELD QUALITY CONTROL

A. Gravimetric Analysis: Sections of metal-duct system, chosen randomly by the Commissioner, may be tested for cleanliness according to NADCA vacuum test gravimetric analysis.

1. If analysis determines that levels of debris are equal to or lower than suitable levels, system shall have passed cleanliness verification.
2. If analysis determines that levels of debris exceed suitable levels, system cleanliness verification will have failed and metal-duct system shall be recleaned and reverified.

B. Verification of Coil Cleaning: Cleaning shall restore coil pressure drop to within 10 percent of pressure drop measured when coil was first installed. If original pressure drop is not known, coil will be considered clean only if it is free of foreign matter and chemical residue, based on thorough visual inspection.

C. Report results of tests in writing to the Commissioner.

END OF SECTION 230130

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:

(1) The Contract Drawings
(2) The Specifications
(3) The general conditions,
(4) The Addendum
(5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes and applies to all work included in Division 23: Heating, Ventilating, and Air Conditioning (HVAC).

B. Work in this Section includes providing labor, materials, equipment, services necessary, fabrication, installation and testing for fully operational and safe systems including all necessary materials , appurtenances and features whether specified or shown in the contract documents or not, in conformity with all NYC Mechanical Code for the following:

1. Mechanical work covered by all sections within Division 23: Heating, Ventilating, and Air Conditioning (HVAC) of the specifications, including:

a. Heating, ventilating and air conditioning systems and equipment and accessories.
b. Motors and controllers.
c. Control systems.
d. Testing and balancing.
e. Cleaning of piping systems.
f. Cleaning of ductwork, casings, plenums, etc.
g. Dielectric fittings.
h. Mechanical sleeve seals.
i. Escutcheons.
j. HVAC demolition.
k. Equipment installation requirements common to equipment sections.
l. Painting and finishing.
m. Supports and anchorages.

C. Provide cutting and patching, for the Mechanical Work.

D. Provide piping from plumbing terminations, 10 feet from equipment, for water, gas, compressed air and as indicated.

E. Provide drainage from noted equipment to floor drains, roof drains, sink, or funnel drains.

F. Provide piping connections to equipment, as required, for kitchens, laboratories, laundries, and as indicated.

1.3 ABBREVIATIONS

A. The following are industry abbreviations for plastic materials.

1. CPVC: Chlorinated polyvinyl chloride plastic.
2. PE: Polyethylene plastic.
3. PVC: Polyvinyl chloride plastic.

B. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

C. Following is a list of abbreviations and symbols that are used in the specifications:

Word or Symbol	Abbreviation or Symbol Used in Specifications
ϕ	Phase
air conditioning unit	ACU
alternating current	AC
Ampere	Amp
brake horsepower (bhp)	BHP
British thermal units	Btu
Celsius	C
Cubic feet per hour	CFH
cubic feet per minute	Cfm
cubic feet per second	Cfs
Department of Design and Construction	DDC
Degree	°
direct current	DC
emergency power system	EPS
Fahrenheit	F
Feet	ft.
feet per minute	Fpm
Gallon	gal.
gallons per minute	Gpm
Hertz	Hz
Horsepower	Hp
Inches	in.
Kilovolt	kV

Word or Symbol	Abbreviation or Symbol Used in Specifications
Kilowatt	kW
Length	Length
Manufacturer	Mfr.
Minute	Min
Number	No.
Ounce	oz.
percent	%
plus and minus	±
pound or pounds	lb. or lbs.
pounds per square inch (psi)	Psi
power factor	Pf
revolutions per minute (rpm)	Rpm
square foot or square feet	sq. ft.
uninterruptible power supply (UPS)	UPS
Variable Frequency Drive	VFD
Volt	V
water gauge	w.g.
wire-gauge	Awg

1.4 UTILITY CONNECTIONS

A. Arrange for and pay utility costs for work of this Division.

B. Included:
1. Connection to utility company mains.
2. Connection to on-site piping mains.
3. Payment of service charges.
4. Provisions for temporary utilities.

1.5 JOB CONDITIONS

A. Examine all drawings and specifications in a manner to be fully cognizant of all work required under this Division.

B. Examine site related work and surfaces before starting work of any Section.

1. Report to Commissioner, in writing, conditions which will prevent proper provision of this work.
2. Beginning work of any Section without reporting unsuitable conditions to Commissioner constitutes acceptance of conditions by Contractor.

3. Perform any required removal, restoration or replacement of this work caused by unsuitable conditions at no additional cost to the City of New York.

C. Connections to existing work.

1. Verification of existing:

   a. Become thoroughly familiar with actual existing conditions and systems at the building, and of the existing installations to which connections must be made, including any necessary alterations, and existing building engineering practices and requirements. The intent of the work is shown on the drawings and described herein, and no consideration will be granted by reason of lack of familiarity on the part of the contractor with actual physical conditions, requirements, and practices at the site.

2. Install new work and connect to existing work with minimum interference to existing facilities.
3. Temporary shutdowns of existing services:

   a. At no additional charges.
   b. At times not to interfere with normal operation of existing facilities.
   c. Only with written consent of Commissioner.

4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
5. Restore existing disturbed work to original condition.

D. Removal and relocation of existing work.

1. Disconnect, remove or relocate material, equipment, plumbing fixtures, piping and other work noted and required by removal or changes in existing construction.
2. Where existing pipes, conduits and/or ducts which are to remain prevent installation of new work as indicated, relocate, or arrange for relocation, of existing pipes, conduits and/or ducts.
3. Provide new material and equipment required for relocated equipment.
4. Plug or cap active piping or ductwork behind or below finish.
5. Do not leave long dead-end branches. Cap or plug as close as possible to active line.
6. Remove unused piping, ductwork and material.
7. Dispose of removed fixtures and equipment as directed.
8. Turn over removed fixtures and equipment to Commissioner as directed.

E. Special Traffic Requirements:

1. Maintain emergency and service entrances useable to pedestrian, truck, and ambulance traffic at all times.
2. Where trenches are cut, provide adequate bridging for above mentioned traffic.

F. If asbestos insulation is found when working in existing areas, immediately stop work and notify Commissioner. Do not restart work until advised in writing by Commissioner that it is safe to do so following abatement, encapsulation, etc.

1.6 CLEARANCE FROM ELECTRICAL EQUIPMENT

A. Piping or ductwork:

1. Prohibited in:

a. Electric rooms and closets.
b. Telephone rooms and closets.
c. Elevator machine rooms.
d. Electric switchboard room.

2. Prohibited above an area within 5 ft. of:

a. Transformers.
b. Motor control centers.
c. Standby power plant.
d. Bus ducts.

1.7 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Submit the following items as hereinafter specified:

1. Names and qualifications of test and balance agencies.
2. Record Files.
3. Operating and Maintenance Manuals.
4. Welding certificates.
5. Equipment and material submittals as required by sections within this division.

C. Items shall comply with the requirements as hereinafter specified.

D. Submit shop drawings, product data, samples and certificates of compliance required by contract documents.

E. For all equipment requiring MEA numbers by NYC, numbers shall be included within the equipment submittals.

F. Schedule of submittals, as agreed to by the Commissioner, will set the basis of the minimum required submittals. Submittals shall be provided by the Contractor promptly and in accordance with the Schedule of submittals and in such sequence as to cause no delay in work or in work of any other divisions.

G. Resubmission Requirements:

1. In addition to DDC General Conditions requirements, make any corrections or change in Submittals required. Resubmit for review until no exceptions are taken or a resubmission is not required.
2. Shop Drawings and Product Data:

a. Revise initial drawings or data, and resubmit as specified for initial submittal.
b. Indicate any changes which have been made other than those requested.

3. Samples: Submit new samples as required for initial submittal.
4. Clearly identify resubmittal by original submittal date, number and revision number and indicate all changes from previous submittal.

H. Corrections or comments made on the shop drawings during review do not relieve the Contractor from compliance with requirements of the drawings and specifications. Shop drawing checking by the Commissioner is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for:

1. Confirming and correlating all quantities and dimensions.
2. Selecting fabrication processes and techniques of construction.
3. Coordinating his work with that of all other trades.
4. Performing his work in a safe and satisfactory manner.

I. Layout (Shop) Drawings:

1. Submit Layout Drawings indicating work within mechanical rooms areas containing, air handlers or pumps, areas containing acoustically lined ductwork, food service areas and for any areas. See DDC General Conditions specification sections for additional requirements on layout drawings.
2. Layout Drawings for mechanical rooms shall be at a scale of 3/8"=1’-0”.
3. Prepare layout shop drawings for all areas.
4. From the layout drawings, prepare and submit Coordinated Drawings as herein specified below.

1.8 RELATED WORK AND REQUIREMENTS

A. Requirements of DDC General Conditions apply to all work in this division.

B. Carefully check the documents of each section with those of other sections and Divisions. Ascertain the requirements of any interfacing materials or equipment being furnished and/or installed by those sections and Divisions, and provide the proper installation and/or required interface.

C. As a minimum requirement and condition, the Contractor shall provide CADD generated drawings (for the purpose of Layout Drawings, Coordinated Drawings, As-built Drawings and Record Drawings) with a proven layering standard. Deviation from this requirement shall be:

1. At the sole discretion of the Commissioner.
2. Submitted as a substitution within the specified time frame.

D. Related work specified elsewhere:

1. Including pipe stenciling.
2. Access doors..

3. Wall louvers and screens.
4. Plenums other than sheet metal.
5. Flashing.

1.9 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.

C. Supply all equipment and accessories new and free from defects.

D. All items of a given type shall be the products of the same manufacturer.

E. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

F. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

1.10 REFERENCE STANDARDS

A. Published codes, specifications, standards, tests or recommended methods of trade, industry or governmental organizations apply to work in this Division where cited below:

1. AABC: Associated Air Balance Council.
2. ADC: Air Diffuser Council.
3. AMCA: Air Moving and Conditioning Association.
4. ANSI: American National Standards Institute.
5. ARI: Air-Conditioning and Refrigeration Institute.
6. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers.
7. ASME: American Society of Mechanical Engineers.
8. ASSE: American Society of Sanitary Engineers.
9. ASTM: American Society for Testing and Materials.
10. AWS: American Welding Standards.
11. FM: Factory Mutual.
12. Local Utility Authorities.
13. NEMA: National Electrical Manufacturer's Association.
14. NFPA: National Fire Protection Association.
15. OSHA: Occupational Safety and Health Act.
16. PDI: Plumbing and Drainage Institute.
17. NYC Energy Conservation Code
18. UBC: Uniform Building Code.

19. UL: Underwriters' Laboratories, Inc.
20. UMC: Uniform Mechanical Code.
21. UPC: Uniform Plumbing Code.
22. New York City Building Code
23. New York City Mechanical Code
24. New York City Fire Code
25. New York City Energy Conservation Code

1.11 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces.

1.12 REQUIRED TOOLS

A. Furnish to Commissioner at completion of work:

1. One set of any required tools required to operate, adjust, dismantle or repair equipment furnished under any section of this Division.
2. "Required tools": needed for certain equipment not normally found.

3. Tag each item and cross reference in Maintenance Manual.
4. Turn over to Commissioner or temporarily secure to unit at Commissioner's instruction.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

C. Check dimensions of access route through the site from delivery point to final location. Where necessary, ship in crated sections of size to permit passing through available space. Dismantle and/or reassemble, reposition and retest equipment too large to pass through available access route to final location in one piece.

D. Ship equipment in original packages, to prevent damaging or entrance of foreign matter.

E. Handle and ship in accordance with manufacturer's recommendations.

F. Provide protective coverings during construction.

G. Replace at no expense to City of New York, equipment or material damaged during storage or handling, as directed by Commissioner.

H. Tag all items with weatherproof tag, identifying equipment by name and purchase order number.

I. Include packing and shipping lists.

J. Special requirements as specified in individual sections.

1.14 PROTECTION OF MATERIALS

A. Protect from damage, water, dust, etc., material, equipment and apparatus provided under this Division, both in storage and installed, until Substantial Completion.

B. Provide temporary storage facilities for material and equipment.

C. Arrange with Commissioner for storage facilities for materials and equipment.

D. Material, equipment or apparatus damaged because of improper storage or protection will be rejected.

1. Remove from site and provide new, duplicate, material equipment or apparatus in replacement of that rejected.

E. Cover motors and other moving machinery to protect from dirt and water during construction.

F. Protect premises and work of other Divisions from damage arising out of installation of work of this Division.

1. Restore or replace, as directed by Commissioner, materials and parts of premises which become damaged as result of installation of work of this Division.
2. Remove replaced parts from premises.

1.15 REVIEW OF CONSTRUCTION

A. Work may be reviewed at any time by Commissioner.

B. Advise Commissioner in writing that work is ready for review at following times:
1. Prior to concealment of work in walls and above ceilings.
2. When all requirements of Contract have been completed.

C. Conceal work only after Commissioner's consent.

1.16 SCHEDULE OF WORK

A. Arrange work to conform to schedule of construction established or required to comply with Contract Documents.

B. In scheduling, anticipate means of installing equipment through available openings in structure.

C. Confirm in writing to Commissioner, anticipated number of days required to perform test, balance, and acceptance testing of mechanical systems:

1. This phase must occur after completion of mechanical systems, including all control calibration and adjustment, and requires substantial completion of the building, including closure, ceilings, lighting, partitioning, etc.
2. Submit for approval at this time, names and qualifications of test and balancing agencies to be used.

D. Arrange with Commissioner schedule for work in each area.

E. Unless otherwise directed by Commissioner perform work during normal working hours.

F. Work delays:

1. In case noisy work interferes with City of New York's operations, Commissioner may require work to be stopped and performed at some other time, or after normal working hours.

1.17 NOISE REDUCTION

A. Cooperate in reducing objectionable noise or vibration caused by mechanical systems.

1. To extent of adjustments to specified and installed equipment and appurtenances.

B. Correct noise problems caused by failure to install work in accordance with Contract Documents. Include labor and materials required as result of such failure.

1.18 PERMITS, LICENSES, AND INSPECTIONS

A. Permits and Licenses:

1. Secure required permits and licenses including payments of all charges and fees.

B. Inspections:

1. Obtain certificates of final inspection approval from NYC DOB, and submit to Commissioner before substantial completion of the Work.
2. Obtain inspections during the Work as required to allow timely progress of these and other trades.

1.19 GUARANTEE

A. Guarantee all materials, equipment, apparatus and workmanship to be free of defective materials and faulty workmanship for period of one year from date of Substantial Completion, unless extended guarantee periods are specified in individual sections.

B. Furnish guarantee covering all work in accordance with general requirements of the Contract.

C. Provide new materials, equipment, apparatus and labor to replace that determined by Commissioner to be defective or faulty.

D. This guarantee also applies to services such as Instructions, Adjusting, Testing, Noise, Balancing, etc.

E. Equipment manufacturers shall include extended warranty to give full coverage during warranty period, unless longer period is specified.

1.20 PRELIMINARY OPERATION

A. Any portion of the system or equipment shall be placed in operation at the request of the Commissioner prior to the substantial completion and acceptance of the work. Such operation shall be under the direct supervision of the Contractor.

B. Preliminary operation thereof shall not be construed as acceptance of any part of the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Division 23 Sections where articles and subparagraphs introduce lists, the following requirements apply for product selection:

2.2 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.3 MISCELLANEOUS METAL WORK

A. Ladders:

1. Under General Construction Work.
2. Galvanized structural steel.
3. 18 in. wide.
4. 2 1/2 in. x 1/2 in. side rails.
5. 3/4 in. diameter rungs 12 in. on center.
6. In accordance with OSHA regulations.

B. Guards and Railings:

1. Furnish guards and railings as indicated and/or as required by OSHA.
2. Provide OSHA approved guards for belt drives and rotating equipment.
3. Guards removable with:

    a. Frames: No. 18 USSG steel.
    b. Fronts: No. 20 USSG galvanized perforated steel with:

        1) Covered test openings to permit rpm readings without removal.

    c. Supports: galvanized steel angles or channels, braced to maintain clearances of moving parts.
    d. Clearance for motor adjustment.

4. Railings: removable of 1¼ in. pipe and rail fittings.

2.4 PAINTING

A. Manufacturers:

1. Sherwin-Williams.
2. Pittsburgh Plate Glass Co.
3. Pratt and Lambert.
4. Rust-Oleum.
5. Or approved equal.

B. Materials:

1. Best grade for its purpose.
2. Deliver in original sealed containers.
3. Apply in accordance with manufacturers instructions.
4. Heat resistant paint for hot piping, equipment and materials.
5. Colors as selected by the Commissioner.

2.5 UNIT HEATER DOUBLE WALL FLUE

A. Manufacturers:

1. American Metal Products
2. MASCO Corporation

3. FAMCO
4. Hart & Cooley, Inc
5. Or approved equal

B. Materials:

1. Double-wall metal vents tested in accordance to UL 441 and rated for 550 deg F (288 deg C) continuously for Type BW; with neutral or negative flue pressure complying with NFPA 211.
2. Inner shell and outer jacket separated by at least 1/4-inch (6-mm) airspace
3. Inner Shell: Type 3105 aluminum
4. Outer Jacket: Aluminized steel
5. Welded fittings, threaded fittings are not allowed.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 HVAC DEMOLITION

A. Refer to Section 024113 "Selective Removals and Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Commissioner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

E. Access to Valves and Equipment.

1. Access shall be possible where valves, expansion joints, fire dampers, motors, filters, control devices, and any other equipment requiring access for servicing, repairs, or maintenance are located in walls, chases, and/or above ceilings.
2. Definition of Accessible:

    a. Valves and dampers may be operated.
    b. Control devices may be adjusted.
    c. Fire dampers may be reset.
    d. Equipment access panels may be opened.
    e. Normal maintenance work such as replacement of filters, lubrication of bearings, etc., may be performed readily within arm's reach of access opening.
    f. It shall not be necessary to crawl through furred ceiling space to perform such operations.

3. Group concealed valves, expansion joints, controls, dampers and equipment requiring service access, so as to be freely accessible through access doors and to minimize the number of access doors required.
4. Relocate piping equipment and accessories as required, at no extra cost to afford proper maintenance access.
5. For access into ductwork see Section 233300: Air Duct Accessories.
6. Coordinate location of access panels with applicable trades installing walls or ceiling.

    a. Coordinate panel locations with lights and other architectural features.
    b. Submit proposed panel locations to Commissioner for review.

7. Access doors or panels will be installed by the Contractor.
8. Arrange for location and marking of removable tiles in splined ceilings where access panels are not installed.
9. Existing Structures:

    a. When installation requires access openings through existing construction, provide necessary panels, and arrange for Contractor.
    b. Restore adjoining existing surfaces to original condition after new access panels have been installed.

3.4 PAINTING

A. Painting of exposed roof-top equipment.

B. Finish painting under Section 099100 “Painting”.

1. Colors coordinated by Contractor as directed by Commissioner.

C. Painting under this Division:

1. Interior of ductwork as far back as visible from outside: flat black.
2. Uncoated hangers, supports, rods and inserts: dip in zinc chromate primer.
3. Factory prime coat for following except as noted.

    a. Pumps.
    b. Fans.
    c. Motors.
    d. Equipment.
    e. Air outlets.
    f. Converter.

4. Marred surfaces of prime coated equipment and piping: spot prime coat to match adjacent coat.
5. Shop prime coat for following, except as noted:

    a. Structural frames.
    b. Platforms.
    c. Ladders.
    d. Railings.
    e. Tanks.

D. General:

1. Labor, materials and equipment necessary for field painting.
2. Protect flooring and equipment with drip cloths.
3. Paint and materials stored in location where directed.
4. Oily rags and waste removed from building every night.
5. Furnish each space containing stored painting materials with approved 2½ gallon fire extinguisher.
6. Wire brush and clean off all oil, dirt and grease areas to be painted before paint is applied.
7. Mixing:

    a. Mixed and strained as required by manufacturer.
    b. Use thinners only in accordance with manufacturers recommendation.
    c. Follow printed instructions on paint containers. If none are available, instructions shall be obtained in writing from manufacturer.

8. Workmanship:

    a. No painting or finishing shall be done with:

1) Dust laden air.
2) Unsuitable weather conditions.
3) Space temperature below 60ºF.

b. Pipes being painted: containing no heat and to remain cold until paint is dried.
c. Paint spread: uniform and proper film thickness showing no runs, sags, crawls or other defects.
d. Finished surfaces shall be uniform in sheen, color, and texture.
e. All coats to be thoroughly dry before succeeding coats are applied, minimum 24 hrs. between coats.
f. Priming undercoat: slightly different color for inspection purposes.

9. Exposed, uninsulated, ungalvanized sheet metal other than stainless steel and aluminum: Two coats of aluminum paint or alkyd paint color as directed.
10. Exposed, uninsulated, galvanized sheet metal in finished space including mechanical equipment rooms:

a. One coat galvanized iron primer.
b. Two coats alkyd oil paint, color as directed.

11. Exposed, insulated piping and equipment covering:

a. One coat primer sealer.
b. Two coats alkyd oil paint, color as directed.

12. Finned tube radiation: One coat factory or field applied coat of heat resisting paint.
13. Paint following with two coats alkyd oil paint, color as directed:

a. Exposed steel and metal work not furnished with factory-painted finish.
b. Structural steel supports for piping ductwork and equipment.
c. Exposed, uninsulated piping.

14. Exposed, uninsulated aluminum sheet metal in finished space:

a. One coat zinc chromate primer.

15. No paint on exposed, uninsulated stainless steel sheet metal in finished space.

E. Finish painting:

1. Consisting of two finished coats of high gloss medium or long alkyd paint over prime coat.
2. Submit color shade for approval.
3. Piping continuously painted in all exposed areas.
4. Color coding shall comply with industry standard practice.

F. Interior of ductwork as far back as visible from outside: flat black.

G. Uncoated hangers, supports, rods and inserts: dip in zinc chromate primer.

H. Factory finish:

1. Steel air outlets in acoustical tile ceilings: baked white enamel.
2. Aluminum air outlets: anodized.
3. Exposed fan coil units: baked enamel.
4. Unit ventilators and unit heaters: baked enamel.

I. Factory prime coat, except as noted:
1. Pumps.
2. Fans.
3. Motors.
4. Equipment.
5. Registers.
6. Diffusers.
7. Grilles.

J. Marred surfaces of prime coated equipment and piping: spot prime coat to match adjacent coat.

K. Shop prime coat for following except as noted:

1. Structural frames.
2. Platforms.
3. Ladders.
4. Railings.
5. Tanks.

3.5 CLEANING AND ADJUSTING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted or exposed work soiled or damaged: clean and restore to match adjoining work before final acceptance.

C. Remove debris from inside and outside of materials and equipment.

D. Flush out piping after installation.

E. Clean piping systems.

F. Adjust valves and automatic control devices.

G. Traps, wastes and supplies: unobstructed.

3.6 FIELD QUALITY CONTROL

A. Tests:

1. Perform as specified in individual sections, and as required by New York City Building Code and NYC Mechanical Code.

2. Duration as required by NYC BC.

B. Provide required labor, material, equipment, and connections.

C. Furnish written report and certification that tests have been satisfactorily completed.

D. Restore or replace defective work, as directed.

3.7 INSTRUCTION

A. Provide instruction by qualified manufacturers' representatives for equipment as specified in this Division.

B. Instruction to include:

1. Site-specific briefing to operating staff.
2. Minimum hours as specified in each Section.
3. Instructional materials (minimum six sets).
4. Video (2 copies) of each instruction session upon completion.

C. Each instruction session to be scheduled with Commissioner at least 30 days in advance.

END OF SECTION 230500

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

   1. Motor controllers.
   2. Torque, speed, and horsepower requirements of the load.
   3. Ratings and characteristics of supply circuit and required control sequence.
   4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.

B. Comply with NEMA MG 1 unless otherwise indicated.

C. Comply with IEEE 841, Institute of Electrical and Electronics Engineers, Standard for Petroleum and Chemical Industry--Premium-Efficiency, Severe-Duty, Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors--Up to and Including 370 kW (500 hp), for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Energy efficient, as defined in NEMA MG 1, including applications of premium efficiency motors.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Multispeed Motors: Separate winding for each speed.

F. Rotor: Random-wound, squirrel cage.

G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

H. Temperature Rise: Match insulation rating.

I. Insulation: Class F.

J. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
5. Shaft Grounding System:
   a. Motors 5 hp and greater shall have a single shaft grounding system to protect the bearings from capacitive discharge through the bearings. A shaft grounding system equal to that manufactured by Shaft Grounding Systems, Inc., CR Series, MME Group, or approved equal shall be used.
   b. The shaft grounding system shall reduce the shaft to frame voltage below 3 volts (as measured with 50 MHZ Fluke 97 oscilloscope), have low drag, be field installable with hand held tools, sealed to be resistant to weather and contaminants and require no periodic adjustments or maintenance for a normal running life of five to ten years at speed up to 1800 rpm. The grounding brush element must be changeable without shutting down or using special tools. Experience has shown that brush life may often be as long as ten years.

C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

END OF SECTION 230513

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:

(1) The Contract Drawings
(2) The Specifications
(3) The general conditions,
(4) The Addendum
(5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following hangers and supports for HVAC system piping and equipment:

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fiberglass pipe hangers.
4. Metal framing systems.
5. Fiberglass strut systems.
6. Thermal-hanger shield inserts.
7. Fastener systems.
8. Pipe stands.
9. Equipment supports.

B. Related Sections include the following:
1. Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.
2. Section 233113 "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. Terminology: As defined in MSS SP-69, "Pipe Hangers and Supports - Selection and Application"

C. Terminology: As defined in MSS SP-89, "Pipe Hangers and Supports - Fabrication and Installation Practices"

D. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

E. Terminology: MFMA-103, "Guidelines for the Use of Metal Framing"

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Manufacturer's catalog data, including load ratings, dimensions and installation instructions, for the following:

1. Steel pipe hangers and supports.
2. Fiberglass pipe hangers.
3. Thermal-hanger shield inserts.
4. Powder-actuated fastener systems.

C. Shop Drawings: Signed and sealed by a Professional Engineer licensed in the State of New York. Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.
3. Fiberglass strut systems. Include Product Data for components.
4. Pipe stands. Include Product Data for components.
5. Equipment supports.

D. Welding certificates.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
5. ASME Boiler and Pressure Vessel Code: Section IX.

C. Codes and Standards: Provide pipe hangers and supports conforming to the following:

1. American Society of Mechanical Engineering:

a. B31.1 Power Piping.
b. B31.2 Fuel Gas Piping.
c. B31.5 Refrigerating Piping and Heat Transfer Components.
d. B31.9 Building Services Piping.

2. American Society for Testing and Materials (ASTM):

a.	A36	Standard Specification for Carbon Structural Steel.
b.	A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
c.	A307	Standard Specification for Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength.
d.	A575	Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
e.	D695	Compressive Properties of Rigid Plastics.
f.	D790	Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
g.	F708	Standard Practice for Design and Installation of Rigid Pipe.

3. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):

a.	SP58	Pipe Hangers and Supports - Materials, Design And Manufacture.
b.	SP69	Pipe Hangers And Supports – Selection And Application.
c.	SP89	Pipe Hangers And Supports – Fabrication And Installation Practices.
d.	SP90	Guidelines on Terminology for Pipe Hangers and Supports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:

1. AAA Technology & Specialties Co., Inc.
2. Bergen-Power Pipe Supports.
3. B-Line Systems, Inc.; a division of Cooper Industries.
4. Carpenter & Paterson, Inc.
5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.

10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.
15. Or approved equal.

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.
8. Or approved equal.

C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.5 FIBERGLASS STRUT SYSTEMS

A. Description: Shop- or field-fabricated pipe-support assembly, similar to MFMA-3, made of fiberglass channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.

2. Champion Fiberglass, Inc.
3. Cope, T. J., Inc.; Tyco International Ltd.
4. Seasafe, Inc.
5. Or approved equal.

2.6 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- (690-kPa-) minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Manufacturers:

1. Carpenter & Paterson, Inc.
2. ERICO/Michigan Hanger Co.
3. PHS Industries, Inc.
4. Pipe Shields, Inc.
5. Rilco Manufacturing Company, Inc.
6. Value Engineered Products, Inc.
7. Or approved equal.

C. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.
1. Insulated pipe shields by:
   a. Mechanical Pipe Shields MFG., “SNAPPITZ”
   b. Fergusion Insulated Pipe Shields
   c. Anvil International.
   d. Or approved equal.

D. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass.
1. Insulated pipe shields by:
   a. Mechanical Pipe Shields MFG., “SNAPPITZ”
   b. Fergusion Insulated Pipe Shields
   c. Anvil International.
   d. Or approved equal.

E. Insert and shield shall cover entire circumference of pipe.

F. Insert Length: Extend a minimum of 2 inches (50 mm) beyond sheet metal shield.

2.7 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

   a. Hilti, Inc.

b. ITW Ramset/Red Head.
c. Masterset Fastening Systems, Inc.
d. MKT Fastening, LLC.
e. Powers Fasteners.
f. Or approved equal.

B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.
b. Empire Industries, Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head.
e. MKT Fastening, LLC.
f. Powers Fasteners.
g. Or approved equal.

2.8 PIPE STAND FABRICATION

A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

1. Manufacturers:

a. ERICO/Michigan Hanger Co.
b. MIRO Industries.
c. Hilti, Inc.
d. Or approved equal.

C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.

1. Manufacturers:

a. ERICO/Michigan Hanger Co.
b. MIRO Industries.
c. Hilti, Inc.
d. Or approved equal.

D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.

1. Manufacturers:

    a. ERICO/Michigan Hanger Co.
    b. MIRO Industries.
    c. Hilti, Inc.
    d. Or approved equal.

2. Base: Stainless steel.
3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

E. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

2.9 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.10 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

C. Hanger Rods: ASTM A 575, hot rolled Steel, ANSI B1.1 threads, continuously threaded, with electro-galvanized finish.

D. Steel Pipe Columns: ASTM A 53, Schedule 40, black steel.

E. Bolts and Nuts: ASTM A 307, Grade A, regular hexagon-head type.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Metal Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are properly trained by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Stand Installation:

1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb.

G. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

J. Install lateral bracing with pipe hangers and supports to prevent swaying.

K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65)

and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

L. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

N. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

    a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
    c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
    d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
    e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate insulation.
6. Inserts of length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

O. Outdoor Piping: Pipe hangers, supports and hardware including screws, bolts, nuts, and washers, located outdoors shall be hot-dip galvanized in accordance with ASTM A123.

P. Miscellaneous Steel: Provide miscellaneous framing, steel members, beams, brackets, etc. for support of work in Division, unless specifically included in other Divisions.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1M procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.6 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099100 “Painting”.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing- touch-up paint to comply with ASTM A 780.

3.7 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.

F. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.

G. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.

H. Use padded hangers for piping that is subject to scratching.

I. Use thermal-hanger shield inserts for insulated piping and tubing.

J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 1050 deg F (566 deg C) pipes, NPS 4 to NPS 16 (DN 100 to DN 400), requiring up to 4 inches (100 mm) of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24 (DN 15 to DN 600), if little or no insulation is required.

5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8 (DN 20 to DN 200).
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8 (DN 10 to DN 200).
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3 (DN 10 to DN 80).
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange or carbon-steel plate and with U-bolt to retain pipe.
16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36 (DN 65 to DN 900), if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30 (DN 25 to DN 750), from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 24 (DN 65 to DN 600), from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42 (DN 50 to DN 1050), if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24 (DN 50 to DN 600), if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30 (DN 50 to DN 750), if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 24 (DN 20 to DN 600).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 24 (DN 20 to DN 600), if longer ends are required for riser clamps.

L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.

M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of standard length.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe. See section 2.6, "Thermal-Hanger Shield Inserts".

O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

P. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

Q. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

R. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

S. Supports of wire rope, wood, chain, strap perforated bar or any other makeshift device shall not be permitted.

END OF SECTION 230529

SECTION 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Isolation pads.
2. Isolation mounts.
3. Freestanding and restrained spring isolators.
4. Housed spring mounts.
5. Spring hangers.
6. Spring hangers with vertical-limit stops.
7. Pipe riser resilient supports.
8. Resilient pipe guides.
9. Restrained vibration isolation roof-curb rails.
10. Seismic snubbers.
11. Restraining braces and cables.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. IBC: International Building Code.

C. Life Safety and Hazardous Components - All systems involved with fire protection including sprinkler piping, fire pumps, jockey pumps, fire pump control panels, service water supply piping, water tanks, fire dampers and smoke exhaust systems and mechanical, electrical, plumbing or fire protection systems that support the operation of or are connected to emergency power equipment including all lighting, generators, transfer switches and transformers. Hazardous components include any pipe, vessel, duct or piece of equipment that contains flammable or toxic material.

D. Component – a part or element of an architectural, mechanical, electrical or structural system.

E. Positive Attachment – a cast in place anchor, a drill in wedge anchor, a chemical anchor, a double sided beam clamp loaded perpendicular to the beam or a welded or bolted connection to the structure.

F. Terminology: MSS SP-127, "Bracing for Piping Systems: Seismic – Wind – Dynamic Design, Selection, and Application"

1.4 PERFORMANCE REQUIREMENTS

A. Wind-Restraint Loading:

1. Values as specified as per ASCE/SEI and as identified on Structural drawings.

B. Seismic-Restraint Loading:

1. Values as specified as per ASCE/SEI and as identified on Structural drawings.

1.5 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
   a. Annotate to indicate application of each product submitted and compliance with requirements.
3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
4. Catalog cuts and data sheets on specific vibration isolators and restraints to be utilized showing compliance with specifications.
5. An itemized list showing the items of equipment or piping to be isolated, the isolator type and model number selected, isolator loading and deflection, and reference to specific drawings showing base and construction where applicable.
6. Seismic restraint calculations and structural or civil engineers stamp verifying design and calculations for seismic restraining system used.
7. Drawings showing equipment base construction for each piece of equipment, including dimensions, structural member sizes and support point locations.
8. Drawing showing methods of suspension, support guides for piping.
9. Drawings showing methods for isolation of pipes piercing walls and slabs.
10. Concrete and steel details for bases including anchor bolt locations.
11. Number and location of seismic restraints and anchors for each piece of equipment.
12. Specific details of restraints including anchor bolts for mounting and maximum loading at each location, for each piece of equipment and or pipe.

C. For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the Professional Engineer licensed in the State of New York responsible for their preparation.

1. Engineer Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators, seismic restraints, and for designing vibration isolation bases.

    a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Division 23 Sections for equipment mounted outdoors.

2. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system has been examined for excessive stress and that none will exist.
3. Vibration Isolation Base Details: Detail overall dimensions, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.
4. Seismic-Restraint Details:

    a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other sections for equipment mounted outdoors.

D. Coordination Drawings: Show coordination of seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and seismic restraints.

E. Welding certificates.

F. Qualification Data: For Professional Engineer licensed in the State of New York and testing agency.

G. Air-Mounting System Performance Certification: Include natural frequency, load, and damping test data performed by an independent agency.

H. Field quality-control test reports.

I. Operation and Maintenance Data: For air-mounting systems to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.

C. Comply with seismic-restraint requirements in the NYCBC unless requirements in this Section are more stringent.

D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

E. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval by ICC-ES, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a Professional Engineer licensed in the State of New York. It is the objective of this Specification to provide the necessary design for the seismic restraint and control of excessive noise and vibration in the buildings due to the operation of machinery or equipment, and/or due to interconnected piping. The installation of all vibration isolation units, and associated hangers and bases, shall be under the direct supervision of the vibration isolation manufacturer's representatives.

1. All vibration isolators shall have either known undeflected heights or calibration markings so that, after adjustment when carrying their load, the deflection under load can be verified, thus determining that the load is within the proper range of the device and that the correct degree of vibration isolation ins being provided according to the design.
2. All isolators shall operate in the linear portion of their load versus deflection curve. Load versus deflection curves shall be furnished by the manufacturer, and must be linear over a deflection range of not less than 50 percent above the design deflection.
3. The theoretical vertical natural frequency for each support point, based upon load per isolator and isolator stiffness, shall not differ from the design objectives for the equipment as whole by more than plus or minus 10 percent.
4. All neoprene mountings shall have a shore hardness of 30 to 60 plus or minus 5, after minimum aging of 20 days or corresponding oven aging.

1.7 MANUFACTURER RESPONSIBILITIES

A. Manufacturer of vibration isolation and seismic control equipment shall have the following responsibilities:

1. Determine vibration isolation and seismic restraint sizes and locations.
2. Provide piping and equipment isolation systems and seismic restraints as scheduled or specified.
3. Guarantee specified isolation system deflection.

4. Provide installation instructions, drawings and field supervision to assure proper installation and performance.
5. Purchased and/or fabricated equipment must be designed to safely accept external forces of one-half "G" load in any direction for all rigidly and resiliently supported equipment and piping without failure and permanent displacement of the equipment. Life safety equipment including, fire pumps, sprinkler piping, and machinery must be capable of safely accepting external forces up to one "G" load in any direction without permanent displacement of the supported equipment.

1.8 CONTRACTOR RESPONSIBILITIES

A. The Contractor performing the work on equipment in the section shall have the following responsibilities.
1. All electrical components for standby or emergency power systems.
2. All flammable, combustible and highly toxic piping and their associated mechanical systems.
3. All ductwork containing hazardous materials.
4. All equipment using combustible or toxic energy sources.
5. List control procedures within the contractor's organization including methods and frequency of reporting and their distribution.
6. Purchased and/or fabricated equipment must be designed to safely accept external forces of load in any direction for all rigidly and resiliently supported life safety or hazardous equipment components, piping and ductwork without failure and permanent displacement of the equipment.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Mountings & Controls, Inc.
6. Or approved equal.

B. Vibration Isolator Types:

1. Type A: Spring isolators shall incorporate the following:

a. Minimum diameter of 0.8 of the loaded operating height.
b. Corrosion resistance where exposed to corrosive environment with:

1) Springs cadmium plated or electro-galvanized.
2) Hardware cadmium plated.
3) All other metal parts hot-dip galvanized.

c. Reserve deflection (from loaded to solid height) of 50 percent of rated deflection.
d. Minimum 1/4-inch-thick neoprene acoustical base pad on underside, unless designated otherwise.
e. Designed and installed so that ends of springs remain parallel and all springs installed with adjustment bolts.
f. Non-resonant with equipment forcing frequencies or support structure natural frequencies.
g. Spring isolators to be manufactured by one of the manufacturers listed above.
h. This isolator must be accompanied by seismic isolator Type II.

2. Type B: Spring isolators shall be same as Type A, except:

a. Provide built-in vertical limit stops with minimum 1/4-inch clearance under normal operation.
b. Tapped holes in top plate for bolting to equipment when subject to wind load.
c. Capable of supporting equipment at a fixed elevation during equipment erection. Installed and operating heights shall be identical.
d. Adjustable and removable spring pack with separate neoprene pad isolation.
e. Housing shall be designed to accept 1 G of acceleration.
f. Spring isolators to be as manufactured by one of the manufacturers listed above.

3. Type C: Spring hanger rod isolators shall incorporate the following:

a. Spring element seated on a steel washer within a neoprene cup incorporating a rod isolation bushing.
b. Steel retainer box encasing the spring and neoprene cup.
c. Requires seismic restraint Type III.
d. Spring hanger rod isolators shall be as manufactured by one of the manufacturers listed above.

4. Type E: Elastomer hanger rod isolators shall be incorporate the following:

a. Molded unit type neoprene element with projecting bushing lining rod clearance hole.
b. Neoprene element shall be minimum 1-3/4 inch thick.
c. Steel retainer box encasing neoprene mounting.
d. Clearance between mounting hanger rod and neoprene bushing shall be minimum of 1/8 inch.
e. Requires seismic restraint Type III.
f. Elastomer hanger rod isolators shall be as manufactured by one of the manufacturers listed above.

5. Type F: Combination spring/elastomer hanger rod isolators to incorporate the following:

a. Spring and neoprene isolator elements in a steel box retainer. Neoprene of double deflection type. Single deflection is unacceptable. Spring seated in a neoprene cup with extended rod bushing.
b. Characteristics of spring and neoprene as describe in Type A and Type E isolators.
c. Requires seismic restraint Type III.
d. Combination spring/elastomer hanger rod isolators shall bras manufactured by one of the manufacturers listed above.

6. Type G: Pad type elastomer mountings to incorporate the following:

a. 0.750-inch minimum thickness.
b. 50 psi maximum loading.
c. Ribbed or waffled design.
d. 0.10-inch deflection per pad thickness.
e. 1/16-inch galvanized steel plate between multiple layers or pad thickness.
f. Suitable bearing plate to distribute load.
g. Pad type elastomer mountings shall be manufactured by one of the manufacturers listed above.

7. Type H: Pad type elastomer mountings to incorporate the following:

a. Laminate canvas duck and neoprene.
b. Maximum loading 1000 psi.
c. Suitable bearing plate to distribute load.
d. Minimum thickness, 1/2 inch.
e. Pad type elastomer mountings shall be as manufactured by one of the manufacturers listed above.

8. Type J: Rail type spring isolators:

a. Rail type spring isolators shall provide steel members of sufficient strength to prevent flexure with equipment operation.
b. Springs shall be the same as Type A with seismic restraint Type II or seismic restraint Type I isolation.
c. Rail type spring isolators shall be as manufactured by one of the manufacturers listed above.

9. Type K: Pipe anchors:

a. Vibration isolator manufacturer shall provide an all directional acoustical pipe anchor, consisting of a telescopic arrangement of two sizes of steel tubing separated by a minimum half inch thickness of heavy duty neoprene and duck or neoprene isolation material.
b. Vertical restraints shall be provided by similar material arranged to prevent vertical travel in either direction.
c. Allowable loads on the isolation material shall not exceed 500 psi and the design shall be balanced for equal resistance in any direction.
d. Pipe anchors shall be as manufactured by one of the manufacturers listed above.

2.2 AIR-MOUNTING SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Kinetics Noise Control.
2. Mason Industries.
3. Vibration Eliminator Co., Inc.
4. Or approved equal.

B. Air Mounts: Freestanding, single or multiple, compressed-air bellows.

1. Assembly: Upper and lower steel sections connected by a replaceable, flexible, nylon-reinforced neoprene bellows.
2. Maximum Natural Frequency: 3 Hz.
3. Operating Pressure Range: 25 to 100 psig (172 to 690 kPa).
4. Burst Pressure: At least three times manufacturer's published maximum operating pressure.
5. Leveling Valves: Minimum of 3 required to maintain leveling within plus or minus 1/8 inch (3 mm).

C. Restrained Air Mounts: Housed compressed-air bellows.

1. Assembly: Upper and lower steel sections connected by a replaceable, flexible, nylon-reinforced neoprene bellows and spring, with angle-iron frame having vertical-limit stops and channel-section top with leveling adjustment and attachment screws.
2. Maximum Natural Frequency: 3 Hz.
3. Operating Pressure Range: 25 to 100 psig (172 to 690 kPa).
4. Burst Pressure: At least three times manufacturer's published maximum operating pressure.
5. Leveling Valves: Minimum of 3 required to maintain leveling within plus or minus 1/8 inch (3 mm).

2.3 VIBRATION ISOLATION EQUIPMENT BASES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibration Eliminator Co., Inc.
5. Vibration Mountings & Controls, Inc.
6. Or approved equal.

B. Type B-1: Integral Structural Steel Base

1. Reinforced, as required, to prevent base flexure at start-up and misalignment of drive and driven units. Centrifugal fan bases complete with motor slide rails. Drilled for drive and driven unit mounting template.
2. Integral Structural Steel Base shall be as manufactured by one of the manufacturers listed above.

C. Type B-2: Concrete Inertia Base

1. Concrete inertia bases shall be formed in a structural steel perimeter base, reinforced as required to prevent flexure, misalignment of drive and driven unit or stress transferal into equipment. The base shall be complete with motor slide rails, pump base elbow supports, and complete with height saving brackets, reinforcing, equipment bolting provisions and isolators.
2. Minimum thickness of the inertia base shall be according to the following tabulation:

Motor Size		Minimum Thickness	
(hp)	(kW)	(in)	(mm)
5-15	(4-11)	6	(150)
20-50	(15-37)	8	(200)
60-75	(45-55)	10	(250)
100-250	(75-190)	12	(300)
300-500	(220-375)	18	(350)

3. Concrete Inertia Base shall be as manufactured by one of the manufacturers listed above.

D. Type B-3: Curb Mounted Base

1. Curb mounted rooftop equipment shall be mounted on spring isolation curbs that directly sit on roof construction and are flashed and incorporated into roof's membrane waterproofing system.
2. All spring locations shall have removable waterproof covers to allow for spring adjustment and/or removal.
3. All spring mounts shall be as Isolator Type B.
4. Curb and spring mounting shall be capable of withstanding 110mph wind and 1.0 g seismic loads for life safety or hazardous components.
5. Curb Mounted Base shall be as manufactured by one of the manufacturers listed above.

2.4 SEISMIC-RESTRAINT DEVICES

A. Type I: Spring Incorporating Seismic Restraint

1. Shall comply with general characteristics of spring isolators.
2. Shall have vertical restraints and are capable of supporting equipment at fixed elevation during equipment erection. Vertical restraint shall be separate from equipment load support.
3. Shall incorporate seismic snubbing restraint in all directions at specified acceleration loadings.

4. System to be field bolted to structure with minimum capability to withstand external forces of 1.0 g.
5. Spring Incorporating Seismic Restraint shall be as manufactured by one of the manufacturers listed above.

B. Type II: Stationary Seismic Restraint

1. Each corner or side seismic restraint shall incorporate minimum 5/8" (16 mm) thick pad limit stops. Restraints shall be made of plate, structural members or square metal tubing in a welded assembly, incorporating resilient pads. Angle bumpers are not acceptable. System to be field bolted to deck with 1.0 g acceleration capacity.
2. Seismic spring mountings as described above are an acceptable alternative providing all seismic loading requirements are met.
3. Stationary Seismic Restraint shall be as manufactured by one of the manufacturers listed above.

C. Type III: Cable Seismic Restraint,

1. Metal cable type with approved end fastening devices to equipment and structure. System to be field bolted to deck or overhead structural members or deck with aircraft cable and clamps as per SMACNA guidelines.

D. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of ICC-ES.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

E. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

F. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

G. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

H. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

I. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

J. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

K. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

L. Adhesive Anchor Bolts: Adhesive anchor bolts are not permitted where seismic restraint is required. Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.5 FLEXIBLE CONNECTORS

A. Elastomer Type FC-1:

1. Manufactured of nylon tire cord and EPDM both molded and cured with hydraulic presses.
2. Straight connectors shall have two spheres reinforced with a molded-in external ductile iron ring between spheres.
3. Elbow shall be long radius reducing type.
4. Rated 250 psi at 170 degrees F dropping in a straight line to 170 psi at 250 degrees F for sizes 1-1/2 inch to 12 inch elbows. Elbows shall be rated no less than 90 percent of straight connections.
5. Sizes 10 inches to 12 inches to employ control cables with neoprene end fittings isolated from anchor plates by means of 1/2 inch bridge bearing neoprene bushings.
6. Minimum safety factor, 4 to 1 at maximum pressure ratings.
7. Submittals shall include test reports.
8. Elastomer Type FC-1 shall be as manufactured by one of the manufacturers listed above.

B. Flexible Stainless Hose, Type FC-2:

1. Braided flexible metal hose.
2. 2 inch pipe size and smaller with male nipple fittings.
3. 2-1/2 inch and larger pipe size with fixed steel flanges.
4. Suitable for operating pressure with 4 to 1 minimum safety factor.
5. Length as required or shown on drawings.
6. Flexible Stainless Hose, Type FC-2 shall be as manufactured by one of the manufacturers listed above.

2.6 FACTORY FINISHES

A. Finish: Manufacturer's standard prime-coat finish ready for field painting.

B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

1. Powder coating on springs and housings.
2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
3. Baked enamel or powder coat for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.4 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Comply with requirements for installation of roof curbs, equipment supports, and roof penetrations.

B. Equipment Restraints:

1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
3. .

C. Piping Restraints:

1. Comply with requirements in MSS SP-127.
2. Space lateral supports a maximum of 40 feet (12 m) o.c., and longitudinal supports a maximum of 80 feet (24 m).
3. Brace a change of direction longer than 12 feet (3.7 m).

D. Install cables so they do not bend across edges of adjacent equipment or building structure.

E. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

F. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

G. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

H. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the Commissioner if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.5 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency.
2. Schedule test with the City of New York, through Commissioner, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' notice.
3. Obtain Commissioner’s approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by the Commissioner.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. Air-Mounting System Leak Test: After installation, charge system and test for leaks. Restore leaks and retest until no leaks exist.
10. Air-Mounting System Operational Test: Test the compressed-air leveling system.
11. Test and adjust air-mounting system controls and safeties.
12. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.7 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust air-spring leveling mechanism.

D. Adjust active height of spring isolators.

E. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.8 INSTRUCTION

A. Engage a factory-authorized service representative to instruct City of New York's operating personnel to adjust, operate, and maintain air-mounting systems. Refer to "DDC General Conditions."

3.9 HVAC VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE

A. As scheduled on drawings.

1. Equipment Location
2. Pads:

   a. Material: Neoprene.
   b. Thickness: 2 inches.
   c. Number of Pads: thick.

3. Isolator Type
4. Base Type
5. Minimum Deflection: 2 inches.
6. Component Importance Factor: 1.5.
7. Component Response Modification Factor: 1.5.
8. Component Amplification Factor: 1.0.

Equipment	Base Type	Isolator Type	Minimum Static Deflection (inches)	Seismic Restraint Type (if part of life safety or hazardous component)
Floor Mounted Centrifugal Fans	B-1	A	1.0	II
Pumps	B-2	A	1.0	II
Generators	--	B	1.0	I

END OF SECTION 23 05 48

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SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Duct labels.
5. Stencils.
6. Valve tags.
7. Access Tile Identification.
8. Warning tags.

1.3 DEFINITIONS

A. Terminology: ASME A13.1, “Scheme for the Identification of Piping Systems”

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated, manufacturer’s catalog data, including size, color and materials.

C. Samples: For color, letter style, and graphic representation required for each identification material and device.

D. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

E. Valve numbering scheme.

F. Valve Schedules: For each piping system to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Comply with ASME A 13.1 "Scheme for the Identification of Piping Systems."

1.6 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers

where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Red.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

1. NPS 5 (DN 125) and smaller: Attach to pipe without fasteners or adhesive.
2. NPS 6 (DN 150) and larger: Attach to pipe with stainless steel spring fasteners.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

D. Maximum Temperature: Able to withstand temperatures up to 180 deg F (83 deg C).

2.4 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8-inch-thick, and having predrilled holes for attachment hardware.

B. Letter Color:
1. Supply: White.
2. Return: Black.
3. All others: White.

C. Background Color:
1. Supply: Green.
2. Return: Yellow.
3. All others: Blue.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.5 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for ductwork; minimum letter height of 1-1/2 inches (32 mm) for ducts.

1. Stencil Material: Fiberboard or metal.
2. Stencil Paint: Exterior, gloss, acrylic enamel unless otherwise indicated. Paint may be in pressurized spray-can form.

3. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

B. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.

2.6 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.7 ACCESS TILE IDENTIFICATION

A. Buttons, tabs, and markers: To identify location of concealed work.

B. Type: As approved by Commissioner.

2.8 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches (100 by 178 mm).
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.3 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Pipe Label Color Schedule:

1. Heating Water Piping:

   a. Background Color: White.
   b. Letter Color: Orange.

2. Refrigerant Piping:

   a. Background Color: White.

b. Letter Color: Yellow.

3. Vent and Relief Piping:

a. Background Color: White.
b. Letter Color: Black.

4. City Water Piping:

a. Background Color: White.
b. Letter Color: Yellow.

3.5 DUCT LABEL INSTALLATION

A. Stencil duct label on air ducts in the following color codes:

1. Blue: For cold-air supply ducts.
2. Yellow: For hot-air supply ducts.
3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.

B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch (25 mm) high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.6 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

a. All systems: 1-1/2 inches (38 mm), round.

2. Valve-Tag Color:

a. All systems: Natural.

3. Letter Color:

   a. All systems: Black.

3.7 ACCESS TILE IDENTIFICATION

A. Install buttons, tabs, or markers, where removable ceiling tiles are provided, to identify location of:

1. Valves.
2. Volume dampers.
3. Terminal Units.
4. Other concealed equipment requiring access.

3.8 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the providing of labor, materials, equipment, and services necessary for complete testing, adjusting, balancing (TAB) of all heating, ventilating and air conditioning systems in accordance with the contract documents for the following:
   1. Air Systems: Balancing of air distribution systems including supply, return and exhaust systems, condensing units, all fan-coils and related equipment for:
      a. Constant-volume air systems.
      b. Variable-air-volume systems.
      c. Terminal devices for HVAC systems.
   2. Hydronic Piping Systems: Testing and balancing, including pumps, chillers, boilers, heat exchangers, coils, and all related equipment for:
      a. Variable-flow systems.
   3. Existing systems TAB.
      a. Recording flow of existing air and water systems which are to remain.
      b. Rebalancing and adjusting of existing systems.
   4. Verifying that automatic control devices are functioning properly.
   5. Reporting results of activities and procedures specified in this Section.
   6. Required Controlled Inspection, including Equipment Use Permits.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

C. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.

D. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.

E. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

F. NC: Noise criteria.

G. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

H. RC: Room criteria.

I. Report Forms: Test data sheets for recording test data in logical order.

J. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.

K. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.

L. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

M. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.

N. TAB: Testing, adjusting, and balancing.

O. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.

P. Test: A procedure to determine quantitative performance of systems or equipment.

Q. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Qualification Data: Within 30 days from Contractor's Notice to Proceed, submit 6 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

C. Strategies and Procedures Plan: Within 90 days from Contractor's Notice to Proceed, submit 6 copies of TAB strategies and step-by-step procedures as specified in Part 3 "Preparation" Article. Include a complete set of report forms intended for use on this Project.

D. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

E. Sample Report Forms: Submit two sets of sample TAB report forms.

F. Warranties specified in this Section.

G. At least fifteen (15) days prior to starting field work, submit three (3) copies of report forms filled out, including design flow values, installed equipment pressure drops and required air flow for air terminals. Submit a complete list of instruments proposed to be used, organized in appropriate categories and include data sheets for each. Indicate each manufacturer and model number, description and use when needed to further identify instrument, size or capacity range and latest calibration date.

1. Commissioner will review submittals for compliance with Contract Documents, and will return one set marked to indicate discrepancies noted between data shown and Contract Documents, additional, or more accurate, instruments required and requests for recalibration of specific instruments.
2. Submit proposed method of balancing variable air volume systems to account for system diversity.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. TAB Firm Qualifications: Engage a TAB firm certified by AABC, NEBB, or TABB.

1. Furnish documentation that TAB firm is a member of one of the noted entities and that it has satisfactorily balanced at least three systems of comparable type and size of this project. Include list of such projects. TAB contractor shall be a certified member of the Testing Adjusting and Balancing Bureau (TABB) or the National Environmental Balancing Bureau (NEBB).
2. Inspection agency contracted by The City of New York will performs all Special Inspections (controlled Inspections) under a separate contract.

C. TAB Conference: Meet with Commissioner on approval of TAB strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of TAB team members, equipment manufacturers' authorized service representatives, HVAC controls installers, and other support personnel. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items: Include at least the following:

a. Submittal distribution requirements.
b. TAB plan.

c. Work schedule and Project-site access requirements.
d. Coordination and cooperation of trades and subcontractors.
e. Coordination of documentation and communication flow.

D. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

E. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems." or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems." Or SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing."

F. Instrumentation Type, Quantity, and Accuracy: As described in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

G. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.

1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

H. ASHRAE Compliance: Applicable requirements in the latest edition of ASHRAE 62.1-, Section 7.2.2 - "Air Balancing."

I. ASHRAE/IESNA 90.1 Latest Edition Compliance: Applicable requirements in the latest edition of ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.6 PROJECT CONDITIONS

A. Full City of New York Occupancy: City of New York will occupy the site and existing building during entire TAB period. Cooperate with City of New York during TAB operations to minimize conflicts with City of New York operations.

B. Partial City of New York Occupancy: City of New Yorkmay occupy completed areas of building before Substantial Completion. Cooperate with City of New York during TAB operations to minimize conflicts with City of New York operations.

1.7 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 WARRANTY

A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

1. Contract Documents are defined in the DDC General Conditions of Contract.
2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in DDC General Conditions.

D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

G. Examine system and equipment test reports.

H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

J. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

K. Examine terminal units, such as variable-air-volume boxes, to verify that they are accessible and their controls are connected and functioning.

L. Examine plenum ceilings used for supply air to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.

M. Examine strainers for clean screens and proper perforations.

N. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

O. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

P. Examine system pumps to ensure absence of entrained air in the suction piping.

Q. Examine equipment for installation and for properly operating safety interlocks and controls.

R. Examine automatic temperature system components to verify the following:

1. Dampers, valves, and other controlled devices are operated by the intended controller.
2. Dampers and valves are in the position indicated by the controller.
3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at indicated values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to indicated values.

S. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values. Submit report recommending addition and/or relocation of balancing devices, including, volume dampers, balancing valves, flow metering devices for air and water, and pressure and temperature measuring points.

3.3 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:

1. Permanent electrical power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so indicated conditions for system operations can be met.
9. Ensure that special equipment such as computers and electronic equipment are in full operation.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111 or AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" or SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.

1. Comply with requirements in the latest edition of ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

E. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling unit components.

L. Check for proper sealing of air duct system.

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:

    a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.

3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
5. Obtain approval from Commissioner for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.

    a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure terminal outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within plus or minus 5 percent of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a maximum set-point airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.

B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:

1. Set outside-air dampers at minimum, and return- and exhaust-air dampers at a position that simulates full-cooling load.
2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
3. Measure total system airflow. Adjust to within +10% of indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.

    a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.

6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.
7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record the final fan performance data.

3.8 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.
2. Check expansion tank liquid level.
3. Check makeup-water-station pressure gage for adequate pressure for highest vent.
4. Check flow-control valves for specified sequence of operation and set at indicated flow.
5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.9 PROCEDURES FOR HYDRONIC SYSTEMS

A. Measure water flow at pumps. Use the following procedures, except for positive-displacement pumps:

1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
4. Report flow rates that are not within plus or minus 5 percent of design.

B. Set calibrated balancing valves, if installed, at calculated presettings.

C. Measure flow at all stations and adjust, where necessary, to obtain first balance.

1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

D. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.

E. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:

1. Determine the balancing station with the highest percentage over indicated flow.
2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
3. Record settings and mark balancing devices.

F. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.

G. Measure the differential-pressure control valve settings existing at the conclusions of balancing.

3.10 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

3.11 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer, model, and serial numbers.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.12 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.13 PROCEDURES FOR BOILERS

A. Measure entering- and leaving-water temperatures and water flow.

3.14 PROCEDURES FOR HEAT-TRANSFER COILS

A. Electric-Heating Coils: Measure the following data for each coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

B. Refrigerant Coils: Measure the following data for each coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.15 PROCEDURES FOR TEMPERATURE MEASUREMENTS

A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.16 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record the operating speed, airflow, and static pressure of each fan.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the refrigerant charge.
4. Check the condition of filters.
5. Check the condition of coils.
6. Check the operation of the drain pan and condensate drain trap.
7. Check bearings and other lubricated parts for proper lubrication.

8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished.

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Deficiencies noted in the preconstruction report are corrected.

C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows and determine the new fan, speed, filter, and coil face velocity.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the airflow and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated airflow and water flow rates. If 5 percent or less, equipment adjustments are not required.
4. Air balance each air outlet.

3.17 TEMPERATURE-CONTROL VERIFICATION

A. Verify that controllers are calibrated and commissioned.

B. Check transmitter and controller locations and note conditions that would adversely affect control functions.

C. Record controller settings and note variances between set points and actual measurements.

D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).

E. Check free travel and proper operation of control devices such as damper and valve operators.

F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water flow measurements. Note the speed of response to input changes.

G. Check the interaction of electrically operated switch transducers.

H. Check the interaction of interlock and lockout systems.

I. Check main control supply-air pressure and observe compressor and dryer operations.

J. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.

K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.18 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 5 to plus 10 percent.
2. Air Outlets and Inlets: 0 to minus 10 percent.
3. Heating-Water Flow Rate: 0 to minus 10 percent.
4. Cooling-Water Flow Rate: 0 to minus 5 percent.

3.19 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.20 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of TAB firm.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB firm who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer, type size, and fittings.
14. Notes to explain why certain final data in the body of reports varies from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outside-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outside, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data: Include the following:

a. Unit identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Unit arrangement and class.
g. Discharge arrangement.
h. Sheave make, size in inches, and bore.
i. Sheave dimensions, center-to-center, and amount of adjustments in inches.
j. Number of belts, make, and size.
k. Number of filters, type, and size.

2. Motor Data:

a. Make and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Sheave dimensions, center-to-center, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Preheat coil static-pressure differential in inches wg.
g. Cooling coil static-pressure differential in inches wg.
h. Heating coil static-pressure differential in inches wg.
i. Outside airflow in cfm.
j. Return airflow in cfm.
k. Outside-air damper position.
l. Return-air damper position.
m. Vortex damper position.

G. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft.
h. Tube size in NPS.
i. Tube and fin materials.

j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outside-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Water flow rate in gpm.
i. Water pressure differential in feet of head or psig.
j. Entering-water temperature in deg F.
k. Leaving-water temperature in deg F.
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig.
n. Refrigerant suction temperature in deg F.
o. Inlet steam pressure in psig.

H. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Fuel type in input data.
g. Output capacity in Btuh.
h. Ignition type.
i. Burner-control types.
j. Motor horsepower and rpm.
k. Motor volts, phase, and hertz.
l. Motor full-load amperage and service factor.
m. Sheave make, size in inches, and bore.
n. Sheave dimensions, center-to-center, and amount of adjustments in inches.

2. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Entering-air temperature in deg F.
c. Leaving-air temperature in deg F.
d. Air temperature differential in deg F.
e. Entering-air static pressure in inches wg.
f. Leaving-air static pressure in inches wg.
g. Air static-pressure differential in inches wg.
h. Low-fire fuel input in Btuh.

i. High-fire fuel input in Btuh.
j. Manifold pressure in psig.
k. High-temperature-limit setting in deg F.
l. Operating set point in Btuh.
m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btuh.

I. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Coil identification.
d. Capacity in Btuh.
e. Number of stages.
f. Connected volts, phase, and hertz.
g. Rated amperage.
h. Airflow rate in cfm.
i. Face area in sq. ft.
j. Minimum face velocity in fpm.

2. Test Data (Indicated and Actual Values):

a. Heat output in Btuh.
b. Airflow rate in cfm.
c. Air velocity in fpm.
d. Entering-air temperature in deg F.
e. Leaving-air temperature in deg F.
f. Voltage at each connection.
g. Amperage for each phase.

J. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Sheave dimensions, center-to-center, and amount of adjustments in inches.

2. Motor Data:

a. Make and frame type and size.

b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Sheave dimensions, center-to-center, and amount of adjustments in inches.
g. Number of belts, make, and size.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

K. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft.
g. Indicated airflow rate in cfm.
h. Indicated velocity in fpm.
i. Actual airflow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

L. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Test apparatus used.
d. Area served.
e. Air-terminal-device make.
f. Air-terminal-device number from system diagram.
g. Air-terminal-device type and model number.
h. Air-terminal-device size.
i. Air-terminal-device effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm.
b. Air velocity in fpm.

c. Preliminary airflow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final airflow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

M. Compressor and Condenser Reports: For refrigerant side of unitary systems, stand-alone refrigerant compressors, air-cooled condensing units, or water-cooled condensing units, include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Unit make and model number.
d. Compressor make.
e. Compressor model and serial numbers.
f. Refrigerant weight in lb.
g. Low ambient temperature cutoff in deg F.

2. Test Data (Indicated and Actual Values):

a. Inlet-duct static pressure in inches wg.
b. Outlet-duct static pressure in inches wg.
c. Entering-air, dry-bulb temperature in deg F.
d. Leaving-air, dry-bulb temperature in deg F.
e. Condenser entering-water temperature in deg F.
f. Condenser leaving-water temperature in deg F.
g. Condenser-water temperature differential in deg F.
h. Condenser entering-water pressure in feet of head or psig.
i. Condenser leaving-water pressure in feet of head or psig.
j. Condenser-water pressure differential in feet of head or psig.
k. Control settings.
l. Unloader set points.
m. Low-pressure-cutout set point in psig.
n. High-pressure-cutout set point in psig.
o. Suction pressure in psig.
p. Suction temperature in deg F.
q. Condenser refrigerant pressure in psig.
r. Condenser refrigerant temperature in deg F.
s. Oil pressure in psig.
t. Oil temperature in deg F.
u. Voltage at each connection.
v. Amperage for each phase.
w. Kilowatt input.
x. Crankcase heater kilowatt.
y. Number of fans.
z. Condenser fan rpm.
aa. Condenser fan airflow rate in cfm.

bb. Condenser fan motor make, frame size, rpm, and horsepower.
cc. Condenser fan motor voltage at each connection.
dd. Condenser fan motor amperage for each phase.

N. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and size.
e. Model and serial numbers.
f. Water flow rate in gpm.
g. Water pressure differential in feet of head or psig.
h. Required net positive suction head in feet of head or psig.
i. Pump rpm.
j. Impeller diameter in inches.
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.
n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.

2. Test Data (Indicated and Actual Values):

a. Static head in feet of head or psig.
b. Pump shutoff pressure in feet of head or psig.
c. Actual impeller size in inches.
d. Full-open flow rate in gpm.
e. Full-open pressure in feet of head or psig.
f. Final discharge pressure in feet of head or psig.
g. Final suction pressure in feet of head or psig.
h. Final total pressure in feet of head or psig.
i. Final water flow rate in gpm.
j. Voltage at each connection.
k. Amperage for each phase.

O. Boiler Test Reports:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and type.
e. Model and serial numbers.
f. Fuel type and input in Btuh.

g. Number of passes.
h. Ignition type.
i. Burner-control types.
j. Voltage at each connection.
k. Amperage for each phase.

2. Test Data (Indicated and Actual Values):

a. Operating pressure in psig.
b. Operating temperature in deg F.
c. Entering-water temperature in deg F.
d. Leaving-water temperature in deg F.
e. Number of safety valves and sizes in NPS.
f. Safety valve settings in psig.
g. High-limit setting in psig.
h. Operating-control setting.
i. High-fire set point.
j. Low-fire set point.
k. Voltage at each connection.
l. Amperage for each phase.
m. Draft fan voltage at each connection.
n. Draft fan amperage for each phase.
o. Manifold pressure in psig.

P. Air-to-Air Heat-Recovery Unit Reports:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and type.
e. Model and serial numbers.

2. Motor Data:

a. Make and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Sheave dimensions, center-to-center, and amount of adjustments in inches.

3. If fans are an integral part of the unit, include the following for each fan:

a. Make and type.
b. Arrangement and size.
c. Sheave make, size in inches, and bore.
d. Sheave dimensions, center-to-center, and amount of adjustments in inches.

4. Test Data (Indicated and Actual Values):

    a. Total exhaust airflow rate in cfm.
    b. Purge exhaust airflow rate in cfm.
    c. Outside airflow rate in cfm.
    d. Total exhaust fan static pressure in inches wg.
    e. Total outside-air fan static pressure in inches wg.
    f. Pressure drop on each side of recovery wheel in inches wg.
    g. Exhaust air temperature entering in deg F.
    h. Exhaust air temperature leaving in deg F.
    i. Outside-air temperature entering in deg F.
    j. Outside-air temperature leaving in deg F.
    k. Calculate sensible and total heat capacity of each airstream in MBh.

Q. Instrument Calibration Reports:

1. Report Data:

    a. Instrument type and make.
    b. Serial number.
    c. Application.
    d. Dates of use.
    e. Dates of calibration.

3.21 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the Final Report.
2. Randomly check the following for each system:

    a. Measure airflow of at least 10 percent of air outlets.
    b. Measure water flow of at least 5 percent of terminals.
    c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
    d. Measure sound levels at two locations.
    e. Measure space pressure of at least 10 percent of locations.
    f. Verify that balancing devices are marked with final balance position.
    g. Note deviations to the Contract Documents in the Final Report.

B. Final Inspection:

1. After initial inspection is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioner.
2. TAB firm test and balance engineer shall conduct the inspection in the presence of Commissioner.

3. Commissioner shall randomly select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
7. Request a second final inspection. If the second final inspection also fails, The City of New York shall contract the services of another TAB firm to complete the testing and balancing in accordance with the Contract Documents.

3.22 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

3.23 RECORD OF EXISTING AIRFLOW

A. Prior to demolition of existing work, measure and record existing air flows in main supply, return and exhaust ducts of each system. Make pitot tube traverse in sections of existing ducts which are to remain, or as near as practicable. Use these recorded measurements to rebalance existing duct systems after completion of new systems.

3.24 RECORD OF EXISTING WATER FLOW RATES

A. Prior to demolition of existing work, measure and record existing flow rates in chilled water, heating water and condenser water systems.

B. Procedure: Make flow meter readings. Where no flow meters are installed in existing systems, measure and record differential pressures across pumps, coils, heat exchangers, and differential temperatures across coils, heat exchangers, boilers, chillers, cooling towers, etc. In sections of existing piping systems which are to remain, or as near as practicable, use these recorded measurements to rebalance existing water systems after completion of new systems.

END OF SECTION 230593

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SECTION 23 07 13 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
7. Outdoor, concealed supply and return.
8. Outdoor, exposed supply and return.

B. Related Sections:
   1. Section 233113 "Metal Ducts" for duct liners.

1.3 DEFINITIONS

A. Terminology: As defined in ASTM C-518, " Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus"

B. Terminology: As defined in ASTM C-177, " Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus"

C. Terminology: As defined in ASTM C-553, " Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications"

D. Terminology: As defined in MIL-PRF-19565C, Type II, " Terminology: As defined in ASTM C-553, " Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications"

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Action Submittals:
1. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
2. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   a. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
   b. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
   c. Detail application of field-applied jackets.
   d. Detail application at linkages of control devices.
3. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
   a. Sheet Form Insulation Materials: 12 inches square.
   b. Sheet Jacket Materials: 12 inches square.
   c. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

C. Informational Submittals:
1. Qualification Data: For qualified Installer.
2. Material Test Reports: From a qualified testing agency.
3. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions

B. Installer Qualifications: Skilled mechanics

C. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

D. Sealant shall meet the applicable requirements of UL-181, 181A or 181B.

E. Duct insulation R values shall be based on insulation only and tested in accordance with ASTM C-518 or C-177.

F. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Commissioner. Use materials indicated for the completed Work.

1. Ductwork Mockups:

a. One 10-foot section each of rectangular and round straight duct.
b. One each of a 90-degree mitered round and rectangular elbow, and one each of a 90-degree radius round and rectangular elbow.
c. One rectangular branch takeoff and one round branch takeoff from a rectangular duct. One round tee fitting.
d. One rectangular and round transition fitting.
e. Four support hangers for round and rectangular ductwork.
f. Each type of damper and specialty.

2. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
3. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.
4. Obtain Commissioner approval of mockups before starting insulation application.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Commissioner specifically approves such deviations in writing.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Insulation shall comply with ASHRAE/IESNA 90.1. All supply and return air ducts and plenums shall be insulated with a minimum of R-5 insulation when located in unconditioned spaces within the building enclosure including hung ceiling spaces and with a minimum of R-8 insulation when located outside the building.

D. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

E. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

F. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Aeroflex USA, Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.
   c. K-Flex USA; Insul-Sheet, K-Flex Gray Duct Liner, and K-FLEX LS.
   d. Or approved equal.

2. Thermal Conductivity (k-value) at 75°F (24°C) mean temperature is 0.245 Btu x in./hr. x ft. x degree F. (0.036 W/m x K) or less. Water absorption not be more than 0.2% by volume.

H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, with factory-applied FSK jacket.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp; Soft Touch Duct Wrap.
b. Johns Manville; Microlite
c. Knauf Insulation; Friendly Feel Duct Wrap.
d. Manson Insulation Inc.; Alley Wrap.
e. Owens Corning; SOFTR All Service Duct Wrap.
f. Or approved equal.

2. Thermal Conductivity (k-value) at 75°F (24°C) mean temperature is 0.29 Btu x in./hr. x ft. x degree F. (0.043 W/m x K) or less.

I. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp; Commercial Board.
b. Johns Manville; 800 Series Spin-glas.
c. Knauf Insulation; Insulation Board.
d. Manson Insulation Inc; AK Board
e. Owens Corning; Fiberglas 700 Series.
f. Or approved equal.

2. Thermal Conductivity (k-value) at 75°F (24°C) mean temperature is 0.23 Btu x in./hr. x ft. x degree F. (0.033 W/m x K) or less.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, of H. B. Fuller Company; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.
e. Or approved equal.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, of H. B. Fuller Company; 85-60/85-70.
d. Mon-Eco Industries, Inc; 22-25.
e. Or approved equal.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, of H. B. Fuller Company; 85-50.
d. Mon-Eco Industries, Inc.; 22-25.
e. Or approved equal.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville;.Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.
e. Or approved equal.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

   a. Foster Brand, of H. B. Fuller Company; 30-80/30-90.
   b. Vimasco Corporation; 749.
   c. Mon-Eco Industries.
   d. Or approved equal.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

   a. Childers Brand, of H. B. Fuller Company; CP-30.
   b. Eagle Bridges - Marathon Industries; 501.
   c. Foster Brand, of H. B. Fuller Company; 30-35.
   d. Mon-Eco Industries, Inc.; 55-10.
   e. Or approved equal.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, , the following:

   a. Childers Brand, of H. B. Fuller Company; Encacel.
   b. Eagle Bridges - Marathon Industries; 570.
   c. Foster Brand, of H. B. Fuller Company; 60-95/60-96.
   d. Or approved equal.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

    a. Childers Brand, of H. B. Fuller Company; CP-10.
    b. Eagle Bridges - Marathon Industries; 550.
    c. Foster Brand, of H. B. Fuller Company; 46-50.
    d. Mon-Eco Industries, Inc.; 55-50.
    e. Or approved equal.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

    a. Childers Brand, of H. B. Fuller Company; CP-50 AHV2.
    b. Foster Brand, of H. B. Fuller Company; 30-36.
    c. Vimasco Corporation; 713 and 714.
    d. Or approved equal.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
4. Service Temperature Range: 0 to plus 180 deg F.
5. Color: White.

2.5 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

    a. Childers Brand, of H. B. Fuller Company; CP-76.
    b. Eagle Bridges - Marathon Industries; 405.
    c. Foster Brand, of H. B. Fuller Company; 95-44.
    d. Mon-Eco Industries, Inc; 44-05.
    e. Or approved equal.

2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

   a. Childers Brand, of H. B. Fuller Company; CP-76.
   b. HB SEALANT
   c. DAP Butyl
   d. Or approved equal.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

    a. Johns Manville; Zeston.
    b. P.I.C. Plastics, Inc.; FG Series.
    c. Proto Corporation; LoSmoke.
    d. Speedline Corporation; SmokeSafe.
    e. Or approved equal.

2. Adhesive: As recommended by jacket material manufacturer.
3. Color: Color-code jackets based on system. Color as selected by Commissioner.

D. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white or stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

    a. Polyguard Products, Inc.; Alumaguard 60.
    b. Johns Manville;
    c. Venturecladd.
    d. Or approved equal.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:
    a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    b. Compac Corporation; 104 and 105.
    c. Ideal Tape Co., Inc,;an American Biltrite Co.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
    e. Or approved equal.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
   b. Compac Corporation; 110 and 111.
   c. Ideal Tape Co., Inc,;an American Biltrite Co.
   d. Venture Tape; 1525 CW NT, 1528 CW Plus, and 1528 CW /SQ.
   e. Or approved equal.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:
   a. Compac Corporation; 130.
   b. Ideal Tape Co., Inc,;an American Biltrite Co.
   c. Venture Tape; 1506 CW NS.
   d. Or approved equal.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
   b. Compac Corporation; 120.
   c. Ideal Tape Co., Inc,;an American Biltrite Co.
   d. Venture Tape; 3520 CW.
   e. Or approved equal.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.9 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

   a. ITW Insulation Systems; Gerrard Strapping and Seals.
   b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
   c. ACME Insulations.
   d. Or approved equal.

2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 1/2 inch wide with wing seal or closed seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

      1) AGM Industries, Inc.; CWP-1.
      2) GEMCO; CD.
      3) Hardcast, Inc.
      4) Midwest Fasteners, Inc.; CD.
      5) Nelson Stud Welding; TPA, TPC, and TPS.
      6) Or approved equal.

2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

      1) AGM Industries, Inc.; CHP-1.
      2) GEMCO; Cupped Head Weld Pin.
      3) Hard Cast, Inc.
      4) Midwest Fasteners, Inc.; Cupped Head.
      5) Nelson Stud Welding; CHP.
      6) Or approved equal.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
2) GEMCO; Perforated Base.
3) Midwest Fasteners, Inc.; Spindle.
4) Or approved equal.

b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
c. Spindle: Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

1) GEMCO; Nylon Hangers.
2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
3) AGM Industries.
4) Or approved equal.

b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
c. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

1) AGM Industries, Inc.; Tactoo Self-Adhering Insul-Hangers.
2) GEMCO; Peel & Press.
3) Hardcast, Inc.
4) Midwest Fasteners, Inc.; Self Stick.
5) Or approved equal.

b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
c. Spindle: Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.

d. Adhesive-backed base with a peel-off protective cover.

6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

      1) AGM Industries, Inc.; RC-150.
      2) GEMCO; R-150.
      3) Hardcast, Inc.
      4) Midwest Fasteners, Inc.; WA-150.
      5) Nelson Stud Welding; Speed Clips.
      6) Or approved equal.

   b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, the following:

      1) GEMCO.
      2) Midwest Fasteners, Inc.
      3) AGM Industries.
      4) Or approved equal.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

D. Wire: 0.062-inch soft-annealed, stainless steel.
   1. C & F Wire.
   2. Simpson Strong.
   3. Southwestern Wire Fabrications Inc.
   4. Or approved equal.

2.10 CORNER ANGLES

A. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 316.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.4 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Restore joint separations and cracking due to thermal movement.

N. Restore damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.5 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches (50 mm).

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches (50 mm).

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    b. On duct sides with dimensions larger than 18 inches (450 mm), place pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.

f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Restore punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches (450 mm) o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

   a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
   b. On duct sides with dimensions larger than 18 inches (450 mm), space pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.

e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Restore punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

   1. Draw jacket smooth and tight to surface with 2-inch (50-mm) overlap at seams and joints.
   2. Embed glass cloth between two 0.062-inch- (1.6-mm-) thick coats of lagging adhesive.
   3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

   1. Draw jacket material smooth and tight.
   2. Install lap or joint strips with same material as jacket.
   3. Secure jacket to insulation with manufacturer's recommended adhesive.
   4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
   5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.9 FIRE-RATED INSULATION SYSTEM INSTALLATION

A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.

B. Insulate duct access panels and doors to achieve same fire rating as duct.

3.10 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Commissioner. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: A qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Inspect ductwork, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be

limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.12 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
7. Outdoor, concealed supply and return.
8. Outdoor, exposed supply and return.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with NYC energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.13 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. General:
1. Provide continuous unbroken vapor barrier on ducts and plenums with surface temperature below ambient.

B. Concealed, round and flat-oval, supply-air duct insulation shall be the following:
1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

C. Concealed, round and flat-oval, return-air duct insulation shall be the following:
1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

D. Concealed, round and flat-oval, outdoor-air duct insulation shall be the following:
1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

E. Concealed, rectangular, supply-air duct insulation shall be the following:
1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

F. Concealed, rectangular, outdoor-air duct insulation shall be the following:
   1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

G. Concealed, rectangular, exhaust-air duct insulation between isolation damper and penetration of building exterior shall be the following:
   1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

H. Concealed, supply-air plenum insulation shall be the following:
   1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

I. Concealed, outdoor-air plenum insulation shall be the following:
   1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

J. Concealed, exhaust-air plenum insulation shall be the following:
   1. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density.

K. Exposed, round and flat-oval, supply-air duct insulation shall be the following:
   1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
   2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

L. Exposed, round and flat-oval, return-air duct insulation, in non-condition space such as mechanical rooms, shall be the following:
   1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
   2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

M. Exposed, round and flat-oval, outdoor-air duct insulation shall be the following:
   1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
   2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

N. Exposed, rectangular, supply-air duct insulation shall be the following:
   1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
   2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

O. Exposed, rectangular, return-air duct in non-conditions space such as mechanical rooms, insulation shall be the following:
   1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
   2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

P. Exposed, rectangular, outdoor-air duct insulation shall be the following:

1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

Q. Exposed, rectangular, exhaust-air duct insulation between isolation damper and penetration of building exterior shall be the following:
1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density. Within 8 feet of finished floor.
2. Mineral-Fiber Blanket: 1-1/2 thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density. 8 feet and above finished floor.

R. Exposed, supply-air plenum insulation shall be the following:
1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

S. Exposed, return-air plenum insulation shall be the following:
1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

T. Exposed, outdoor-air plenum insulation shall be the following:
1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

U. Exposed, exhaust-air plenum insulation shall be the following:
1. Mineral-Fiber Board: 2 inches (50 mm) thick and 3-lb/cu. ft. (48-kg/cu. m) nominal density.

3.14 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. General:

1. Provide continuous unbroken vapor barrier on ducts and plenums with surface temperature below ambient.

B. Insulation materials and thicknesses are identified below. If more than one material is listed for a duct system, selection from materials listed is Contractor's option.

C. Exposed, round and flat-oval, supply-air duct insulation shall be the following:
1. Mineral-Fiber Board: 3 inche thick and 6-lb/cu. ft. nominal density.

D. Exposed, round and flat-oval, return-air duct insulation shall be the following:
1. Mineral-Fiber Board: 3 inche thick and 6-lb/cu. ft. nominal density.

E. Exposed, rectangular, supply-air duct insulation shall be the following:
1. Mineral-Fiber Board: 3 inche thick and 6-lb/cu. ft. nominal density.

F. Exposed, rectangular, return-air duct insulation shall be the following:
1. Mineral-Fiber Board: 3 inche thick and 6-lb/cu. ft. nominal density.

G. Exposed, supply-air plenum insulation shall be the following:
   1. Mineral-Fiber Board: 3 inche thick and 6-lb/cu. ft. nominal density.

H. Exposed, return-air plenum insulation shall be one of the following:
   1. Mineral-Fiber Board: 3 inche thick and 6-lb/cu. ft. nominal density.

END OF SECTION 230713

SECTION 23 08 00 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract]

1.2 SUMMARY

A. This section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:

1. DDC General Conditions Section 019113 General Commissioning Requirements for MEP Systems for general commissioning process requirements.

1.3 DESCRIPTION

A. Commissioning is a systematic process of confirming that all building systems perform interactively according to the New York City's Project Requirements and the Basis of Design and continuing through construction, acceptance and the warranty period with actual verification of performance.

B. The Commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.

C. The CxA directs and coordinates the commissioning activities and reports to the Commissioner. All members in the construction process work together to fulfill their contracted responsibilities and meet the objectives of the New York City's Project Requirement's as detailed in the Contract Documents.

1.4 DEFINITIONS

A. Refer to DDC General Conditions for definitions.

1.5 SUBMITTALS

A. The CxA will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the

Contractor, or Commissioner as requested, of items missing or areas that are not in conformance with Contract and which require resubmission.

B. The CxA will receive a copy of the final approved submittals.

C. In addition, the contractor is to provide the following:

1. Certificate of readiness

2. Certificates of completion of installation, prestart, and startup activities.

3. O&M manuals

4. Test reports

D. Refer to DDC General Conditions Sections 013300 Submittal Procedures and 019113 General Commissioning Requirements for MEP Systems for general commissioning submittal requirements.

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: The Contractor will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Commissioning Kick-Off Meeting – Construction Team: The Contractor will attend a meeting of the Commissioning Team, chaired by the CxA, to review the scope of commissioning process activities and the Commissioning Plan with discussions on milestones, activities, and assignments of responsibilities. The flow and type of documents and the amount of submittal data given to the CxA will be determined. Meeting minutes will then be distributed to all parties by the CxA.

B. Commissioning Meetings: The Contractor will attend coordination meetings with the Commissioning Team, chaired by the CxA, to review progress on the Commissioning Plan, construction deficiencies, scheduling conflicts, and to discuss strategies and processes for upcoming commissioning process activities.

C. Miscellaneous Construction Meetings: The CxA attends selected planning and job-site meetings in order to remain informed on construction progress and to update parties involved in the commissioning process. This will not include 100% meeting attendance, but the CxA shall be provided with the subsequent meeting minutes for review.

D. Pre-testing Meetings: The Contractor will attend pretest meetings with the Commissioning Team, chaired by the CxA, to review startup reports, pre-test inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

E. Testing: The Contractor will coordinate with testing personnel and agencies for timing and access for CxA to witness test.

F. Manufacturers' Inspection and Startup Services: The Contractor will coordinate services of manufacturers' inspection and startup services.

G. Testing, Adjusting and Balancing: The Contractor will coordinate with plan and schedule for testing, adjusting and balancing for timing and access for CxA to witness process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the Contractor shall ultimately be responsible for all standard testing equipment for the HVAC&R system and controls system in Division 23. A sufficient quantity of two-way radios shall be provided by the Contractor.

B. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York's personnel upon completion of the commissioning process.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the Contractor, the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems. These checklists shall be provided to the Contractor for completion. The CxA shall gather and review the completeness and accuracy of these checklists via site visits.

B. Red-lined Drawings (As-Builts): Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The Contractor will create the as-built drawings.

C. Operation and Maintenance Data: Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

D. Demonstration and Orientation: Contractor will provide demonstration and orientation as required by the specifications. A complete orientation plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any orientation. An orientation agenda for each orientation session must be submitted to the CxA one (1) week prior the orientation session.

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Refer to the DDC 019113 General Commissioning Requirements for MEP systems for contractor's responsibilities.

B. The Contactor will ensure that the HVAC and controls subs attend construction phase controls coordination meetings.

C. The Contactor will ensure that the HVAC and controls subs attend testing, adjusting, and balancing review and coordination meetings.

D. Provide information requested by the CxA for final commissioning documentation.

E. Prepare preliminary schedule for mechanical system orientations and inspections, operation and maintenance manual submissions, orientation sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for City of New York. Distribute preliminary schedule to commissioning team members at the beginning of the construction phase.

F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

G. Provide detailed startup procedures.

H. Provide a written list of all user adjustable set-points and reset schedules with a brief discussion of the purpose of each and the range of reasonable adjustments with energy implications

I. Provide a written schedule frequency to review the various set-points and reset schedules to ensure they are current relevant and efficient values.

J. Respond to provided new deficiencies and/or responses within five (5) business days.

K. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the Contract Documents. Submit to CxA 45 days after submittal acceptance.

L. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

M. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

N. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
1. HVAC&R equipment including all fans, air handling units, ductwork, dampers, terminals, and all other equipment furnished under this Division.
2. Fire stopping in the fire rated construction, including fire and smoke damper installation, caulking, gasketing and sealing of smoke barriers.
3. Fire detection and smoke detection devices furnished under other divisions.

O. The equipment suppliers shall document the performance of their equipment.

P. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

Q. Test, Adjust and Balance subcontractor, under the direction of the Contractor:
1. Attend initial commissioning coordination meeting scheduled by the CxA.
2. Submit the site-specific testing and balancing plan to the CxA and Commissioner for review and acceptance.
3. Attend the testing and balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in testing, adjusting, and balancing the HVAC&R system.
4. At the completion of the testing and balancing work, and the submittal of the final testing and balancing report, notify the HVAC&R subcontractor and the Contractor.
5. Participate in verification of the testing and balancing report, which will consist of repeating measurements contained in the testing and balancing reports. Assist in diagnostic purposes when directed.
6. Provided recommended setpoints as determined by testing, adjusting, and balancing, such as static pressure and differential pressure setpoints.

R. Contractor responsibilities to be completed by Equipment Suppliers:
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the City of New York's personnel, to keep warranties in force.
2. Assist in equipment testing.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

3.3 CxA'S RESPONSIBILITIES

A. Roles and Responsibilities

1. Refer to the 019113 General Commissioning Requirements for MEP Systems for CxA responsibilities.

3.4 TESTING PREPARATION

A. Certify in writing to the CxA that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 TESTING, ADJUSTING AND BALANCING VERIFICATION

A. Prior to performance of Testing, Adjusting, and Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least ten (10) days in advance of testing and balancing Work and provide access for the CxA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.

1. The CxA will notify the Contractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
2. The Contractor will ensure that the testing and balancing subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.6 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space.

Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Contractor, who will ensure that the HVAC&R subcontractor, testing and balancing subcontractor, and HVAC&R Instrumentation and Control subcontractor participate, shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.7 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 23 sections. Provide submittals, test data, inspector record, and certifications to the CxA.

B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment: Test requirements are specified in Division 23 piping Sections. HVAC&R subcontractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.

2. Description of equipment for flushing operations.
3. Minimum flushing water velocity.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

F. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

G. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. Commissioning shall be performed on equipment and systems including but not limited to the following:

1. Air Cooled Air Condensing Units
2. Exhaust Fans
3. Cabinet Unit Heaters
4. Gas Fired Unit Heaters
5. Split AC Units
6. Dedicated Outdoor Air Systems
7. Make Up Units
8. Heating Ventilation Units
9. Roof Top Units
10. Variable Frequency Drives
11. Variable Air Volume Terminal Units
12. Building Management System

3.8 DEFICIENCIES/NON-CONFORMANCE, FAILURE DUE TO MANUFACTURER DEFECT

A. Deficiencies/Non-Conformance

1. The CxA will record the results of the functional test on the test form. All deficiencies or non-conformance items shall be noted and reported to the Commissioner and the Contractor on a standardized form.
2. The Contractor shall respond to new deficiencies within five (5) business days. The response shall either indicate the issue will be corrected with anticipated date of completion indicated or the response should clearly indicate why the Contractor disputes the claim while referencing the Contract Documents in dispute or request further information to clarify the concern.
3. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA.
4. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
5. As tests progress and a deficiency is identified, the CxA discusses the issue with the Contractor.

6. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it, the CxA documents the deficiency and the Contractor's response and intentions or corrections. The CxA and Contractor then proceed to another test or sequence. Once the Contractor corrects the deficiency, the test is rescheduled and repeated in the anticipation of correct operation or function.
7. When there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible, the CxA documents the deficiency and the Contractor's response. The deficiency is then forwarded to parties assumed to be responsible for the deficiency. Resolutions are made at the lowest management level possible. Other parties are brought into the discussion as needed. Final interpretive authority is with the Commissioner. Final acceptance authority is with the Commissioner and CxA. The CxA will then document the resolution process. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency. The CxA then reschedules the test as stated in the section above.
1. Deficiencies that are not corrected at the time of documentation, shall be completed by the affected Contractor and photo evidence of the deficiency resolution shall be sent to both the Commissioner and the CxA.

B. Failure due to Manufacturer Defect

1. If 10% or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA and the Commissioner. In such case, the Contractor shall provide the Commissioner with the following:
    i. Within one week of notification from the Contractor the manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the Commissioner within two weeks of the original notice.
    ii. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
    iii. Commissioner will determine whether a replacement of all identical units or a repair is acceptable.
    iv. Two examples of the proposed solution will be installed by the Contractor and the Contractor will be allowed to test the installations for up to one week, upon which the Commissioner will decide whether to accept the solution.
    v. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

3.9 APPROVAL

A. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA. The CxA recommends acceptance of each test to the Commissioner using a standard form.

3.10 SEASONAL TESTING

A. Seasonal Testing – During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the Contractor, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and record documents due to seasonal testing will be made by the Contractor.

3.11 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract requirements as stated in the DDC General Conditions Sections 017839 Contract Record Documents and 019113 General Commissioning Requirements for MEP Systems.

B. The specific content and format requirements for the standard O&M manuals are detailed in the DDC General Conditions 017839 Contract Record Documents and 019113 General Commissioning Requirements for MEP Systems. Special requirements for the controls Contractor and TAB Contractor are found in Division 23.

C. CxA Review and Approval – Prior to substantial completion, the CxA shall review the O&M manuals, documentation and record documents for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the Contractor, or Commissioner, as requested. Upon a successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the Commissioner. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated.

3.12 INSTRUCTION OF CITY OF NEW YORK PERSONNEL

A. The Contractor shall be responsible for instruction coordination, scheduling, and ultimately for ensuring that instruction is completed.

B. The CxA shall oversee the instruction of the City of New York's personnel for commissioned equipment and systems.

1. The CxA shall interview the City of New York's personnel to determine the special needs and areas where instruction will be most valuable. The Commissioner and CxA shall decide how rigorous the instruction should be for each piece of commissioned equipment. The CxA shall communicate the results to the Contractor who will ensure participation by the subcontractors.

2. In addition to these general requirements, the specific instruction requirements of the City of New York's personnel by the Contractor are specified in the DDC's General Conditions Section 017900 Demonstration and Owners' Pre-Acceptance Orientation.

3. The Contractor shall ensure that each subcontractor and vendor responsible for instruction will submit a written instruction plan to the Contractor for review and approval prior to instruction. The Contractor will submit one comprehensive instruction plan to the CxA and the Commissioner.

4. The plan will be reviewed by the CxA and the Commissioner. Comments pertaining to its deficiencies will be forwarded to the Contractor. The instruction plan will be rewritten until approved by the CxA and the Commissioner. The final approved instruction plan will cover the following elements:
    a. Equipment (included in instruction)
    b. Intended audience
    c. Location of instruction
    d. Objectives
    e. Subjects covered (description, duration of discussion, special methods, etc.)
    f. Duration of instruction on each subject
    g. Qualified instructor for each subject
    h. Instructor qualifications
    i. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)

5. For the primary HVAC equipment, the Contractor shall ensure that the controls subcontractor provide a discussion of the control of the equipment during the mechanical or electrical instruction conducted by each subcontractor or vendor.

6. Instruction documentation shall include the following items:
    a. Copy of the instruction plan, including schedule, syllabus, and agenda.
    b. Copy of the Owner's Project Requirements.
    c. Copy of the Basis of Design.
    d. Compiled operations manuals.
    e. Compiled maintenance manuals.
    f. Completed manufacturer instruction manuals.
    g. Red-lined drawings.

7. The CxA develops criteria for determining that the instruction was satisfactorily completed, including attending the instruction, etc. The CxA recommends approval of the instruction to the Commissioner using a standard form. The Commissioner signs the approval form/letter template.

8. At one of the instruction sessions, the CxA presents a presentation discussing the use of the blank functional test forms for re-commissioning equipment.

9. Video recording of the instruction sessions will be verified by the CxA in electrical format, at the discretion of the Commissioner.

END OF SECTION 230800

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SECTION 23 09 00 – INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1. Summary
   a. The contractor is responsible to provide and install all control and monitoring devices to provide a complete system. The Contractor shall provide a complete system consisting of Direct Digital Control Panels, field I/O devices, power supplies, and supportive software, to meet the written sequences of operations, as written in contract specifications. The system shall support communications to Direct Digital Control Panels, and provide operator interaction, data consolidation and global control functions via a Local Area Network (LAN) or Wide Area Network (WAN) communication.
   b. The Contractor shall install the primary communication network for the facility. Work shall include HVAC control, energy management, alarm monitoring, point trending, point reporting and maintenance management functions. Coordinate with all site low voltage systems as specified.
   c. All labor, material, equipment, and software not specifically referred to herein or on the plans, that is required to meet the functional intent of this specification, shall be provided without additional cost to the City of New York.
   d. All BMS network cabling, Ethernet switches, routers etc. shall conform to Department of Design and Construction standards.
   e. Refer to “Scope of Work” paragraph for additional information.

1.2 RELATED SECTIONS

A. Section 230993 - Sequence Of Operations For HVAC Controls

B. Section 234103 – Carbon Monoxide Detection System with Alarm Control

1.3 ABBREVIATIONS

A/C	-	Air Conditioning
ASHRAE	-	American National Standards Institute
BTL	-	BACnet Testing Laboratory
BIBB	-	BACnet Interoperability Building Block
BMA	-	BACnet Manufacturers Association
BMS	-	Building Management System
CCP	-	Communications Control Panel

CCR	-	Central Command Room
CD-RW	-	Compact Disk with Read and Write Capability
CIBSE	-	Chartered Institution of Building Services Engineers
CPU	-	Central Processing Unit
DAT	-	Digital Audio Tape
DDR	-	Double Data Rate
DCV	-	Demand Control Ventilation
EIA	-	Electronics Industries Association
EMI	-	Electro-Magnetic Interference
ELV	-	Extra Low Voltage
EP	-	Electric-to-Pneumatic
FAS	-	Fire Alarm System
FCU	-	Fan Coil Unit
HMI	-	Human Machine Interface
HVAC	-	Heating, Ventilating and Air Conditioning
HT	-	Humidity Transmittter
IBSS	-	Integrated Building Security System
IT	-	Information and Communication Technology
IDE	-	Integrated Drive Electronics (Hard Disk)
IEEE	-	Institute of Electrical and Electronic Engineers
IP	-	Internet Protocol
ISO	-	International Standards Organization
ID	-	Identification
I/O	-	Input/Output
ISA	-	Instrument Society of America (also known as International Society for Measurement and Control)
LAN	-	Local Area Network
LCD	-	Liquid Crystal Display
LED	-	Light Emitting Diode
LLA	-	Low Level Alarm
MCC	-	Motor Control Center
NEMA	-	National Electric Manufacturers' Association
NFPA	-	National Fire Protection Association (US Standards)
ODBC	-	Open database Connectivity
OEM	-	Original Equipment Manufacturer
OIW	-	Operator Interface Workstation
OLE	-	Object Linking and in Embedding
OPC	-	Open Process Control
OSHA	-	Occupational Safety and Health Administration
PABX	-	Private Automatic Branch Exchange
PC	-	Personal Computer
PCI	-	Peripheral Component Interconnect
PE	-	Pneumatic-to-Electric
PICS	-	Protocol Implementation Conformance Statement
PDA	-	Personal Digital Assistant
PIM	-	I/O Point Interface Module
POT	-	Portable Operator Terminal

PTFE	-	Polytetrafluoroethylene (Teflon)
PT	-	Pressure Transmitter
RAID	-	Redundant Array of Inexpensive Disks
RAM	-	Random Access Memory
RFI	-	Radio Frequency Interference
RH	-	Relative Humidity
RTD	-	Resistance Temperature Device
SCADA	-	Supervisory Control and Data Acquisition
SNVTs	-	Standard Network Variables Types
SOAP	-	Simple Object Access Protocol (LonMark™)
SQL	-	Structured Query Language
SSPC	-	Standing Standard Project Committee (ASHRAE)
SVGA	-	Super Video Graphics Adapter
TT	-	Temperature Transmitter
UC	-	Unitary Controller
UPS	-	Uninterruptible Power Supply
UL	-	Underwriters Laboratories
VAV	-	Variable Air Volume
VDU	-	Video Display Unit
VPN	-	Virtual Private Network
VFD	-	Variable Frequency Drive
WAN	-	Wide Area Network
XIF	-	External Interface File
XML	-	Extensible Mark-up Language

1.4 DEFINITIONS

A. Refer to DDC General Conditions

B. Algorithm: A software procedure for solving a recurrent mathematical or logical problem.

C. Analog: A continuously varying signal or value (temperature, current, velocity, etc.).

D. BACnet: The Building Automation and Control Network open protocol communication standard develop by ASHRAE (ASHRAE SSPC/135) and which is now an ISO and ANSI standard. BACnet can operate over multi-media including Ethernet, ARCnet and MSTP. BACnet components shall be UL listed; and shall be fully complaint with ASHRAE Standard SSPC/135 and all other applicable codes.

E. BACnet Object: A physical or virtual point with a set of associated properties such as a temperature sensor that has properties including – name, current value, maximum/minimum values, high/low alarm levels, etc.

F. BACnet Conformance: A description of the capabilities of a device for communicating information to other BACnet devices. It is usually a set of requirements to be met in order for a device to conform to BACnet standards. There are 6 class levels of conformance for standard BACnet objects and services. The higher the conformance class level, the more features that are

covered. The BACnet devices furnished under this contract shall at a minimum, be conformance class 3. Preference will be given to higher conformance class of the latest controllers at time of purchase.

G. BACnet Interoperability Building Blocks (BIBBs): A BIBB defines a small portion of BACnet functionality needed to perform a particular task. BIBBs come in pairs, A and B, which reflect the client/server nature. The "A" BIBB represents the client, i.e. the device furnishing the information. The "B" BIBB represents the server, i.e. the device furnishing the information or executing the command. For 2 devices to be interoperable the "A" BIBB and the "B" BIBB must be the same.

H. BACnet/IP: The Building Automation and Control Network open protocol communication standard using Internet Protocol (IP) complying with Annex J of the ASHRAE SSPC/135 standard.

I. Binary: A two-state system where an "ON" condition is represented by a high signal level and an "OFF" condition is represented by a low signal level.

J. Building Management System (BMS): The entire system of hardware and software specifically designed to centrally manage building HVAC and related utilities. The BMS includes the Direct Digital Control subsystem, open system ports, and open protocol bus or integrators and network routers for connection to information networks. It includes components at the Field, Automation and Management Levels.

K. Contractor: The Building Management System Contractor responsible for the installation of the Building Management System specified herein.

L. Control Process: The software required to perform a complete control loop from input signal to interlock logic, process calculation to final output signal control.

M. Component: Any individual element of the BMS furnished under this contract including hardware, software and materials.

N. Control Wiring: Includes conduit, wire and wiring devices to install a complete Control System including motor control circuits, interlocks, thermostats, PE and EP switches and like devices. Includes all wiring from controllers to all sensors and points specified herein and required to execute the sequence of operation. Does not include line voltage power wiring.

O. Dead band: A temperature range over which no heating or cooling energy is supplied, such as 23-26 degrees C, i.e. as opposed to single point changeover or overlap, or a range from setpoint over which no control action is taken.

P. Diagnostic Program: Machine executable instructions used to detect and isolate system and component malfunctions.

Q. Direct Digital Control System: The portion of the BMS that involves the connection of microprocessor-based controllers to field level sensors and actuators. The signals received from field level instrumentation are converted from analog to digital format so that the data can be

used in software logic. Control signals are determined by software logic and they are converted from digital to analog format so that the final control element can be adjusted.

R. Distributed Control: A system whereby all control processing is decentralized and independent of a central computer. The control system is built up of stand-alone controllers. A single controller failure shall not impact more than one system.

S. Furnish: Purchase and deliver to the appropriate installing contractor, complete with every appurtenance, document, commission and warranty.

T. Integration: The ability of control system components from different manufacturers connect together while providing coordinated control via real-time data exchange through a common communications data exchange protocol. Integration shall extend to the BMS controllers which shall support user interaction with all control system components. Methods of integration include industry standard protocols such as: BACnet, LonMark/LonTalk, Modbus and OLE for Process Control (OPC) or integrator interfaces between cooperating manufacturer's systems.

U. Interoperability: The ability of systems from different manufacturers and of different types to share information with each other without losing any of their independent functional capabilities and without the need for complex programming.

V. Native BACnet: This term is used to imply that BACnet devices (i.e. the BMS controllers and workstation) only communicate in BACnet protocol and do not require an intermediate gateway for protocol conversion. The BACnet devices shall be connected on a peer-to-peer network using one of the approved LAN technologies such as Ethernet, MS/TP, LonTalk or BACnet/IP.

W. Network: A system of distributed control units that are linked together on a communication highway. A network allows sharing of point information between all control units. Additionally, a network provides central monitoring and control of the entire system from any distributed control unit location. First tier (Management Level) networks shall provide "Peer-to-Peer" communications. Second tier (Automation Level) networks shall provide either "Peer-to-Peer", Master-Slave or Supervised Token Passing communications.

X. Open Protocol Bus (OPB): A pre-programmed communications integrator that allows devices from one manufacturer to communicate and interact with those of another.

Y. Operating System (OS): Software that controls the execution of computer programs and which provides scheduling, debugging, input/output controls, accounting, compilation, storage assignment, data management and related services.

Z. Open System Port (OSP): A user programmable communications port that provides the ability to develop custom communications processes to integrate other operating systems with the BMS System.

AA. Operator Interface Workstation (OIW): The OIW consists of a high-level processing personal computer and peripheral I/O devices that enable access to the PC and to the entire Management Level Network. The OIW allows an operator to command, monitor, and program the system.

BB. Peer-to-Peer Communications: Communications directly between devices that operate on the same communications level of a network, without intervention from any intermediary devices such as a host computer or server.

CC. Peripheral: Input/Output equipment used to communicate with the computer and make copies of system outputs; peripherals include VDUs, printers, hard drives, disk drives and modems, etc.

DD. Portable Operator Terminal (POT): Permits portable operator interface remotely from the Operator Interface Workstation (OIW) to facilitate network management, point-to-point node commissioning, diagnostics and general operator interface with the BMS.

EE. Programmable Device: A device that does not have a pre-established built-in application. An application creation software tool is required for an application to be created and downloaded to the device.

FF. Pick Point: A pick point is a graphical display element that allows the operator to "click" the item and automatically display the associated screen or service. Any screen may have pick points to or be linked from any other screen. Pick points shall be configured on each display screen to provide a logical user navigation system using a ladder tree hierarchy.

GG. PID Control Loop: A mathematical calculation used to evaluate a control input and determine the control output value required to maintain the input value at setpoint. The PID (Proportional, Integral, and Derivative) control loop shall have operator adjustable maximum rate of change, P and D gains and loop response time delay. The loop shall be self-integrating so that no integral constant is required and the loop shall not be subject to "Integral Windup".

HH. Provide: The term "provide" means "provide complete in place", that is, furnish, install, commission, test, warrant and ready for operation and use. Refer to the definition of "Furnish".

II. Router: A device that routes messages destined for another segment net or domain of the control network. The device controls message traffic based on node address and priority. Media converters which serve as communication links between power line, twisted pair, fiber optic, coax and RF media are sometimes referred to as Routers.

JJ. Software: Programs that are executed by a computer-based BMS beyond the physical hardware of the computer system, encompasses any programs such as operating systems (OS), application programs, operating sequences and databases. The term "Software" in this specification shall also include all firmware provided with read-only memory as part of the BMS to meet all applicable criteria detailed to meet sequence of operations.

KK. SOAP: Simple Object Access Protocol (SOAP) is a simple extensible mark-up language (XML) - based protocol that enables applications to exchange information through a WEB Service.

LL. Unitary Controller: A controller generally designed for a specific application and for a single piece of equipment. Fully programmable unitary controllers shall be provided for this project.

MM. Virtual Private Network (VPN): This is a network that uses encryption and other technologies to provide secure communications over the Internet or an Intranet.

NN. XIF: External Interface File that contains contents of the manufacturer's product documentation.

1.5 BMS SYSTEM ARCHITECTURE

A. The BMS shall connect to one of the two new Local Area Networks (LANs) using BACnet/IP Protocol. These LANs are hereafter referred to as the "Site Management Level".

B. The Site Management Level
1. Network controllers and related applications shall reside on the management level.
2. Routers shall reside on the management level.
3. Communication Control Panels (CCPs) shall reside on the management level.
4. All Management Level components shall be support by a site or local Uninterruptible Power Supply (UPS).

C. The Automation Level
1. The automation level shall comprise of Direct Digital Control Panels (Direct Digital Control Panels) and Unitary Controllers (UC). The controllers shall be in compliance with ASHRAE SSPC/135, BACnet Protocol standards latest revision.
2. Supervisory controllers shall reside on the Automation level.
3. All Automation Level components shall be support by a site or local Uninterruptible Power Supply (UPS).

D. The Field Level
1. The field level shall include all instrumentation interfaced to the automation level controllers such as temperature, humidity, level, pressure and switches, etc.
2. It shall also include the final control elements such as the control valves, damper actuators and control relays.
3. All field level cables shall Plenum-type Teflon insulated (LSF - Low Smoke and Fire) rated.

1.6 SCOPE OF WORK

A. Installation of Building Management System (BMS)
1. The Contractor shall furnish and install a complete Building Management System (BMS) for all mechanical systems and other facility systems as included in the project documents. The BMS will provide the functional features as defined in Part 1-General requirements, Part 2-Products, and Part 3- Execution of these Specifications. The Contractor shall provide a complete and operational system that will perform sequences of operations as verified by Commissioner.
2. The components furnished shall be the most recent products offered by the BMS manufacturer that meet the specifications. If there are improved models of any components that become available before the on-site commencement of installation, then

these shall be offered by the Contractor to the subcontractor at no additional cost to The City of New York. The Commissioner shall have the option to accept or decline the offer. The components offered shall have been in successful operation in at least 2 similar applications for a minimum of 12 months.

3. The Contractor shall provide all software licenses necessary for the legal operation of the BMS. Coordinate with the subcontractor.
4. The Contractor is responsible to coordinate all installation activities with the subcontractor Site Facility personnel and the Commissioner by submitting a written installation schedule outlining all proposed BMS installation activities. The schedule should include the anticipated time to install new controllers and network equipment, removal of existing equipment if applicable, installation of new monitoring devices and wiring, software programming, testing/the commissioning performed by DDC, instructing and system acceptance.
5. Commissioning of Mechanical Systems: The Contractor shall provide all labor as required to assist with the commissioning of all equipment and systems as scheduled and required by the project's Commissioning Agent.

6. In addition, the following apply:
   a. The work under this Section shall include all materials and labor to perform all work required for the installation of the BMS as specified.
   b. The drawings and Specifications are complementary to one another—meaning that what is called for on one is to be considered called for in both. Where conflicts exist between the Specifications and/or drawings, the more stringent requirement shall apply.
   c. Where work specified under other Sections of this Specification connects to equipment or systems that are listed and described in this Section, the Contractor shall provide proper connection(s) to such equipment, including trade coordination.
   d. The BMS shall control shall include but not be limited to:
      1) RTUs
      2) Split AC Units
      3) Purge Fans
      4) H&V Units
      5) Exhaust Fans
      6) CAV Boxes
      7) Make-up Air Units
      8) Solar power generation integration
      9) Networking
   e. The BMS ethernet networks shall be limited to make-up air units, their respective exhaust fans, purge fans, and the CO detection systems. Each garage will have it's own BMS ethernet network which shall facilitate communication between the controllers for that garage.
   f. All other equipment shall be considered standalone
   g. Where VFDs or motor starters are within close proximity to one another, the Contractor shall make an effort to consolidate their controls on to a single controller

B. Provide all miscellaneous low voltage field device mounting and interconnecting wiring for all Building mechanical systems.

C. Provide control power transformers/power supplies for all new equipment.

D. Provide and install proper earth ground on all BMS equipment to prevent the build-up of electromagnetic voltage potential. All BMS equipment shall be EMI immune.

E. All components of the BMS at the Management level and at the BMS Automation level, except for the unitary controllers, shall be support by the Uninterruptible Power Supply (UPS).

F. Interface/integrate with third-party equipment as defined and specified.

G. Provide hardwire interlocks for all systems requiring interlock as noted (Fire Alarm System, Mechanical, etc.).

H. Provide communication network amplification devices as required whenever device quantity and/or network wiring standard limitations length are exceeded.

I. Provide the following support for all components furnished under this contract:
   1. Submittals, samples and record documentation, refer to DDC General Conditions.
   2. Comprehensive commissioning and testing services.
   3. Detailed theoretical and practical instructing services for the BMS Supervisors and Operators.
   4. BMS equipment coordination with other site Specialists (Fire Alarm, etc.).
   5. Comprehensive and complete interoperability documentation and method statement for all third-party systems.
   6. Comprehensive PICS documentation regarding the BACnet Protocol object ID, component IP addresses, databases for all system database points.

1.7 COORDINATION WITH OTHER TRADES

A. Contractors Employees
   1. It will be the duty of this Contractor to work in cooperation with Commissioner, rendering assistance and arranging his or her work so that the entire project will be delivered in the best possible condition and in the shortest time. The Contractor will coordinate with other Trade Contractors regarding the location and size of pipes, equipment, fixtures, conduit, ducts, openings, switches, outlets, structural, architectural features and so forth, in order to eliminate any delays in the progress of the job.
   2. Any task related to the BMS turnkey installation that is not clearly identified in this document as being the responsibility of another trade shall be the responsibility of the Contractor.

B. Coordination with Commissioner
   1. The Contractor shall cooperate with Commissioner when performing work on this project as necessary to achieve a complete and neat installation. The Contractor shall also consult

the drawings and specifications of existing on-site documentation, if applicable to further determine the nature and extent of BMS work.

1.8 BMS EXPANSION

A. Network architecture shall allow unlimited expandability by the addition of new sub networks and associated routers, gateways and controllers, etc.

B. Each BMS as installed shall be capable to be expandable, at minimum to incorporate the following in addition to the above:
   1. A minimum of 200 percent additional hardware (field) points with the addition of CCP, Direct Digital Control Panels and UC.
   2. A minimum of 2 additional communication interfaces to other low voltage building systems to those integrated under this contract.

C. Subsequent to the potential expansion cited in "B" above, the BMS performance shall not be degraded in any manner and shall meet all performance criteria detailed in these specifications.

1.9 SUBMITTAL PROCEDURES

A. Refer to the Department of Design and Construction General Conditions for all submittals.

B. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
   1. Each control device labeled with setting or adjustable range of control.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1. Shop drawings shall be CAD generated, minimum 11 X 17 inches. Drawings shall include diagrams, mounting instructions, installation procedures, equipment details and software descriptions for all aspects of the system to be installed.
   2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
   3. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
   4. Details of control panel faces, including controls, instruments, and labeling.
   5. Submit shop drawings of all control field panels for review before fabrication.
   6. Written description of sequence of operation.
   7. Schedule of dampers including size, leakage, construction data, and flow characteristics.
   8. Schedule of valves including leakage, construction data, and flow characteristics. Submit valve calculations for each valve for Commissioner's approval.
   9. Trunk cable schematic showing programmable control unit locations and trunk data conductors. Listing of connected data points, including connected control unit and input device.

10. System configuration showing peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
11. Provide Table of Contents for Devices' data Sheets.

D. Samples: For each color required, of each type of thermostat cover.

E. Software and Firmware Operational Documentation: Include the following:
1. Software operating and upgrade manuals.
2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
3. Device address list.
4. Printout of software application.
5. Software license required by and installed for BMS control systems.

F. Software Upgrade Kit: For The City of New York to use in modifying software to suit future monitoring and control revisions.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

H. Maintenance Data: For systems to include in maintenance manuals as specified. Include the following:
1. Maintenance instructions for each type of control device.
2. Interconnection wiring diagrams with identified and numbered system components and devices.
3. Keyboard illustrations and step-by-step procedures indexed for each operator function.
4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
5. Calibration records and list of set points.

I. Qualification Data:
1. General: Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors. Revise Shop Drawings to reflect actual installation and operating sequences.

J. Contract Closeout Submittals: Refer to DDC General Conditions. All manuals shall be 100 percent custom written for this project. Closeout documents will include all asbuilt software and hardware revision documentation, including a step-by-step, `easy to read' decision tree diagram, which would lead facility operating personnel to specific manual sections for operating procedures, maintenance procedures, and diagnostic/trouble-shooting procedures. All manuals will be subject to the approval of Commissioner prior to the warranty period, and shall provide as a minimum:
1. Project Record Documents for:
   a. Electronic As-Built Drawings in AutoCAD Format.
   b. As-Built Riser Diagram.

c. Final software database (electronic). Includes PICS documentation regarding the BACnet Protocol object ID, component IP addresses, databases for all system database points.
d. Complete program listing with section and line by line comments.
e. Color coding, labeling, and other identification for point to point wiring.

2. Operation and Maintenance Documentation for:
   a. Operation and maintenance manuals for each system component.
   b. List of recommended system spare parts.
3. Test Data for:
   a. All final system field test data to of temperature, humidity, air flow measurement, room differential pressure, etc. shall be provided in a standalone document to The City of New York.
4. Warranty Documentation for:
   a. Materials, manufactured units, equipment and components.
   b. Software.
   c. Auxiliary system equipment.

1.10 WARRANTY AND SERVICES DURING THE WARRANTY PERIOD

A. Contractor's Guarantee :
   1. The Control System shall be free from defects in material and workmanship under normal use and service. Warranty shall begin after the substantial completion of the installation. If within one year from the date of substantial completion any of the equipment herein described is defective in operation, workmanship or materials, it will be replaced, restored or adjusted at the option of the Contractor free of charge. The warranty period for all components of the BMS and their installation shall be 1 year following the date of substantial completion of the project.

B. Any material furnished by the Contractor which is defective or fails during normal operation of the system, shall be remedied (replaced or restored) immediately by the Contractor at no additional cost to The City of New York, during the period prior to the issue of the certificate of substantial completion, and during the warranty period.

C. Restored work shall only be undertaken at times approved by the Commissioner.

D. Respond and be on site within 4 hours of the Commissioner placing a system trouble call for items of an immediate nature (e.g. failed component, non-functioning controller, etc.).

E. Response to warranty calls made by the Commissioner shall be within 24 hours for items not requiring immediate attention.

F. Work to troubleshoot and identify the cause of the BMS system or component failure shall begin immediately and shall continue until restored to the satisfaction of the Commissioner

G. Any software upgrades and new software programs that become standard product offerings from the Contractor and/or BMS equipment vendors during the Warranty Period shall be brought to the attention of the Commissioner together with the cost and, if the Commissioner

wishes, he shall purchase the software. If at any time during the Warranty Period, software patches that correct software errors becomes available, the Commissioner shall be notified immediately, and they shall be made available to The City of New York at no additional cost.

1.11 CODES, PERMITS AND APPROVAL

A. All work shall conform to the following Codes and Standards, where applicable:
1. NYC Electrical Code.
2. National Fire Protection Association (NFPA) Standards, as specified.
3. National Electrical Code (NEC)
4. Underwriters Laboratories (UL) listing and labels, as specified.
5. American National Standards Institute (ANSI).
6. National Electric Manufacturers' Association (NEMA).
7. Building Automation and Control Network (BACnet) open protocol communication standard develop by ASHRAE (ASHRAE SSPC/135).
8. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
9. American Society of Mechanical Engineers (ASME).
10. Air Movement and Control Association (AMCA).
11. Institute of Electrical and Electronic Engineers (IEEE).
12. American Standard Code for Information Interchange (ASCII).
13. Electronics Industries Association (EIA).
14. Occupational Safety and Health Administration (OSHA).
15. American Society for Testing and Materials (ASTM).
16. NYC Energy Code.
17. NYC Building Code.
18. ANSI/TIA/EIA-862, Building Automation Systems Cabling Standards for Commercial Building.
19. NFPA 92A and 92B/UL 864/UUKL Smoke Purge Control Equipment.

B. Obtain all required permits and inspection certificates. All permits and certificates shall be made available to The City of New York.

C. All electrical equipment, devices and components and their installation shall comply with the latest edition of the IEEE Wiring and all associated addenda.

D. Interior enclosures shall be, at minimum, NEMA I and exterior enclosures shall be weatherproof NEMA IV unless specifically noted otherwise within these documents.

E. The Contractor shall only offer equipment that meets UL 916 requirements and all electrical components shall be UL listed and shall carry the UL label.

F. The BMS shall be listed and manufactured to ISO 9001 and ISO 9002 standards.

G. Equipment, devices and materials shall be immune against Electro-Magnetic interferences and shall conform to all performance requirements of' the specifications when exposed to the following interferences:

1. Project lighting, telephone and elevator equipment.
2. AM signals as generated from transmitters.
3. VHF and UHF signals as generated by external or internal portable or fixed transmitters.
4. Electrical noise on the building power system, both spurious and harmonies.
5. The installations shall not radiate signals that cause interference that hinder the correct operation of the Commissioner's on-site equipment.
6. The BMS and all individual electrical equipment, devices and components shall comply with the requirements of the Federal Communication Commission (FCC) rules and regulations Part 15, sub part J with respect to the radiation and conduction of radio frequency interference.

1.12 SCHEDULE

A. Complete site requirements of the BMS contract in accordance with the project program and prior to the scheduled Substantial Completion date for each phase.

B. Attend project meetings as requested by the Contractor.

C. Provide to the Contractor a schedule indicating the sequence of work, durations of individual tasks, delivery dates for all material, devices and equipment and detail any interface that must be coordinated with any other Specialists.

D. Provide written status reports at required intervals in an electronic format acceptable to the Commissioner. An updated schedule of work shall be included in each status report.

E. Comply with, the Project Construction Schedule. Provide additional staffing or as required to comply with the Project Schedule so as not to interfere with other on-site Specialists in their effort to comply with the Overall Project Schedule. Confirm, prior to tender submittal that all equipment, devices, material and services proposed are available and will be delivered accordingly to comply with the Overall Project Schedule.

F. Provide written Request 'For Information (RFI) notices to the Commissioner when specific information or clarification of the specifications is required. Request For Information notices shall be provided at least two (2) weeks prior to the need for the information to the Commissioner.

1.13 HEALTH AND SAFETY

A. Work shall comply with the requirements of Occupational Safety and Health Administration (OSHA), the Health and Safety requirements for the project and with all of the daily Health and Safety instructions given by the Contractor.

1.14 DELIVERY, STORAGE AND HANDLING

A. Provide factory-shipping cartons for each piece of equipment and control device. Maintain cartons through shipping, storage, and handling as required to prevent equipment damage.

B. Deliver, store, protect, and handle products to site under provisions of the contract Documents. Coordinate all site delivers with the Commissioner.

C. Accept products on-site and verify any damage equipment. Damage equipment shall be re-ordered/replaced immediately without cost to The City of New York.

D. Protect products from construction operations, dust, and debris, by storing materials inside, protected from weather in a conditioned space.

1.15 QUALITY ASSURANCE

A. Refer to the Department of Design and Construction General Conditions.

B. General
1. The Building Management System (BMS) herein specified shall be fully integrated and installed as a complete package by the Building Management System subcontractor. The System shall include all wiring, piping, installation supervision, calibration, adjustments, and checkout necessary for a complete and fully operational system.
2. The Building Management System subcontractor shall be a factory owned branch office that is regularly engaged in the engineering, programming, installation and service of Building Management Systems of similar size and complexity.
3. The Contractor shall be responsible for all work fitting into place in a satisfactory and neat workmanlike manner acceptable to the Commissioner.

C. Products
1. The Building Management System architecture shall consist of the products of a manufacturer regularly engaged in the production of Building Management Systems, and shall be the manufacturer's latest standard of design. Direct Digital Control Panels, CCP and UC system components shall be latest (current) production products.
2. All other equipment shall be the products of the BMS manufacturers or of an approved manufacturer regularly engaged in production of specialized Building Management System materials or equipment.

D. ISO-9001
1. The manufacturer of the Building Management System shall provide documentation supporting compliance with ISO-9001 (Model of Quality Assurance in Design/Development, Production, Installation, and Servicing). Product Literature provided by the BMS manufacturer shall contain the ISO-9001 Certification Mark from the applicable registrar. Manufacturers delivering products that do not comply with the ISO-9001 certification requirement shall provide the following information to assure that quality systems are in place and are equivalent to the ISO-9001 standard:
   a. Marketing Specification Standards

b. Design File Standards
c. Manufacturing Test Standards
d. Calibration Standards
e. Quality System Standards
f. Quality System Procedures
g. Documented management commitment that all employees participate in quality programs
h. Instructing Procedures
i. Methods by which corrective actions are taken for problems identified within the factory process.

E. Quality Assurance Program
1. The Contractor shall implement a Quality Assurance Program. At minimum, this program shall consist of the following requirements:
a. The Contractor shall assign a single individual to serve as the Quality Assurance Manager, who is to be responsible for the management of the program.
b. The Quality Assurance Manager shall provide or maintain:
1) Documentation of instructions for employees—including office, field, and subcontractors—on the Quality Assurance Program.
2) Written verification that each worker on the project has read the Specification sections outlining the project requirements for his or her area of specialty. The initial project team shall be documented in the first project submittal.
3) A detailed audit trail for all Quality Assurance issues, including: problem ID number, date of original problem report, name of individual initiating report, and individual assigned responsibility for resolving the problem.
c. Each individual team member shall be responsible for identifying and reporting Quality Assurance problems and for assisting, as requested by the Quality Assurance Manager, in the resolution thereof.

F. Governing Code Compliance
1. The Contractor shall comply with NYC Building Code and Electrical Code.

G. FCC Regulation
1. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Section 15, Governing Radio Frequency Electromagnetic Interference and Subpart J, governing Class A Computing Devices and be so labeled.

PART 2 - PRODUCTS

2.1 APPROVED SYSTEM MANUFACTURERS

A. General: Subject to compliance with requirements, provide products by the manufacturer specified or approved equal:
1. Schneider Electric
2. Johnson Controls Inc. (JCI)

3. Alerton Controls
4. Approved Equal

2.2 EQUIPMENT AND MATERIAL – GENERAL

A. All equipment and materials shall be new and without any defect.

B. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, the Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

2.3 PERFORMANCE CERTIFICATION

A. The Contractor shall certify in writing with the tender submittal that all components proposed for this project comply with all of the following requirements:
   1. Complete and thorough testing has proven that performance shall not be affected when the building electrical distribution system experiences disturbances of the type and magnitude normally encountered in building of this nature.
   2. An independent testing laboratory has verified that the VAV terminal unit unitary controller meets the performance requirements detailed in these specifications. If so required by the Commissioner, the testing laboratory shall test a project VAV terminal unit complete with the BMS unitary controller and the Contractor shall demonstrate that the VAV terminal unit UC can meet all of the requirements for monitoring and control accuracy and can undertake all of the sequences of operation associated with the VAV as detailed in these specifications. The independent testing laboratory test report is to be submitted with the shop drawings.
   3. Provide power line disturbance tests involving the cycling of mains voltage that will show that all BMS components operate satisfactorily when voltage drops to 75% or less of the nominal mains voltage and normal operation resumed when the voltage returned to less than 85% of the normal mains voltage. Following these brownout conditions, BMS components shall be free of any stress and/or damage, and shall operated normally with no data at the PC, CCP, Direct Digital Control Panels and/or UC lost or corrupted.

B. The Contractor shall certify in writing with the tender submittal that all components are free of date related problems.

2.4 AMBIENT CONDITIONS

A. Provide equipment, devices and materials for interior and exterior applications that shall be capable of withstanding and operating satisfactory in, at a minimum, at the following ambient conditions:
   1. BMS central hardware (processors, console, and peripherals): 50 deg F to 100 deg F 10 percent to 90 percent RH.
   2. Indoor hardware: 32 deg F to 120 deg F, 10 percent to 90 percent RH.
   3. Outdoor hardware: -30 deg F to 150 deg F, 0 percent to 100 percent RH.

2.5 REQUIRED PARTS

A. Submit required parts for each different item of equipment furnished. Data to include a complete list of each supplier and product by part number, a list of parts and supplies that are either normally furnished at extra cost with the purchase of the equipment, or specified hereinafter as "Required Materials" to be furnished as part of the contract.

B. Submit a list of additional items recommended by the manufacturer to assure efficient operation for a period of 360 days at the particular installation. The foregoing shall not relieve the Contractor of any responsibilities during the BMS Warranty Period.

2.6 REQUIRED MATERIALS

A. Provide special hardware and software tools required for maintenance.

2.7 LABELING

A. Provide labeling for all DIRECT DIGITAL controllers, gateways, routers, hubs, field level components, panels and enclosures, etc., Labeling shall meet, at minimum, the following requirements:
1. Plastic laminated label that shall be affixed to the panel or enclosure with rivets or permanent adhesive.
2. Lettering 6mm (025 inch) high that sharply contracts the background color.
3. Consistent throughout the project.
4. Indicated on the record (close-out) documentation.

B. Provide labeling of all cabling and containment. Labeling shall meet, at minimum, the following requirements:
1. Identified with permanent tag or self-adhesive label within the panel.
2. Cross referenced on the associated record (close-out) documentation and laminated record drawing within the panel enclosure.
3. The Contractor shall provide labeling for all cable furnished and installed by the Contractor.

2.8 PANEL AND ENCLOSURES

A. Install equipment in a secure, lockable enclosure, suitable for mounting peripheral equipment and data network equipment. Enclosure will be free-standing, with a minimum height of 4.5 foot from finish floor.

B. Direct Digital Control panels used for as a "Master" panel shall be installed separately from its mirrored "Redundant" panel.

C. Provide panels and enclosures for all components of the BMS except where it is specifically identified within these contract documents that the enclosure shall be furnished by another trade. Panels and enclosures shall meet, at minimum, the following requirements:
   1. Painted steel panels with locking door. All panels shall be lockable with the same key.
   2. Ventilated to prevent excessive heat buildup, where required.
   3. Field cabling shall be terminated on a terminal strip. Provide cable support.
   4. Internal components shall be installed to allow easy access for diagnostics, maintenance, removal or replacement.
   5. Panel or enclosure shall be suitable rated for the environment for which it is to be installed, Interior enclosures shall he, at minimum, NEMA I and exterior enclosures shall be weatherproof NEMA IV unless specifically noted otherwise within these documents.
   6. Panel or enclosures shall have 20% spare space for future addition of BMS controllers.

D. Panels and enclosures shall only be located as indicate on the drawings and at Commissioner approved locations.

E. The Contractor shall coordinate with the trade furnishing the motor starters and variable frequency drives to provide an interface terminal strip (for Contractor use) in a dedicated external enclosure or may be a compartment within the motor starter enclosure. Refer to the contract documents for the trade furnishing the motor starter and the variable frequency drive controllers for the details of the enclosure. Direct Digital controllers shall not be located in the MCC panels.

2.9 CONDUIT AND FITTING

A. The Contractor shall provide conduit and fittings as necessary for a fully functioning system as detailed in these specifications.

B. Flexible metallic rustproof conduit shall be provided for the final one (1) meter before connection from a non-vibrating location to equipment subject to vibration or movement. Flexible metallic conduit shall be provided for between the last 300mm and the last l000mm of connection to field instrumentation, relays and final control elements as necessary to facilitate the removal of devices without the disconnection or the bending of the non-flexible conduit. Watertight conduit to be provided where appropriate.

C. Conduit shall be securely mounted in accordance with IEEE Regulations and shall be concealed in all, areas to which the public have access.

D. Conduit shall run parallel or perpendicular to the building lines and shall be installed in a workmanlike manner. Avoid obstructions and crossovers where possible.

E. Conduit shall be installed such that any condensation in the conduit cannot run into BMS equipment. Where necessary conduit shall enter enclosures from the bottom or shall be sloped up to the enclosure.

F. Junction and pull boxes shall be securely fastened to the conduit and be accessible where required by NYC Electrical Code or where necessary to facilitate the pulling of cables.

G. Coordinate installation of conduit with building structure and other trades.

H. Containment shall be provided, for all BMS cable except where specifically noted otherwise.

I. Signal wiring and cables shall be installed in minimum sized raceways and/or electric metallic tubing (EMT) where required by The City of New York.

J. Following shall be minimum approved raceways for their specific application:
   1. EMT: machine rooms, electrical closets, building exterior and in all locations where cables are subject to mechanical damage.
   2. Plenum Rated Cable (Without Conduit): from field equipment/sensors above accessible ceilings. Locations where cable is protected by building construction.

2.10 CABLE – COPPER

A. Provide all cables for the BMS Automation and Field levels, including all cables to interconnect the BMS Management level devices and the BMS Management level Network as detailed in these specifications. Cables shall meet, at minimum, the following requirements:
   1. Minimum 98% conductivity copper.
   2. Stranded conductors.
   3. Proper impedance for the application as recommended by the BMS component manufacturer.
   4. Monitoring and control cable shall be screen #18 AWG (1.02362 mm) or larger dependent on the application.
   5. LAN cable shall be screened #24 AWG (0.51054 mm) CAT 6 or twisted pair as identified elsewhere in these documents.
   6. All monitoring and control cable shall be screened with the screen earthed at the CCP, Direct Digital Control Panels, UC or control panel end only so as to avoid earth loops.
   7. Continuous runs without splices.
   8. Identification of each end at the termination point. Field identification of all BMS cables shall correspond to the record drawings.
   9. All cabling installed without conduit shall be suitable rated for the application and the cable jacket shall be clearly marked. Use unique color schemes for easy identification and prevention of inadvertent splicing of cabling. If there no conflict with existing color schemes, the color for exposed cable shall be purple.

B. Power wiring shall be sized in accordance with the NYC Electrical Code and shall be a minimum of # 14 AWG (1.62814 mm) stranded copper. The contractor shall provide all power cable and containment and shall terminate the power cable at a power outlet close to the BMS component to be powered. The contractor shall terminate the power cable at the MCC/distribution board as applicable. The Contractor shall coordinate all BMS equipment power requirements at all BMS equipment locations with the contractor.

C. All field level cables shall Plenum-type Teflon insulated (LSF - Low Smoke and Fire) rated.

D. Terminations shall be mechanically and electrically secure. Twist type wire nuts shall not be acceptable. Insulated tinned copper lugs shall be provided.

E. Cable within panels or enclosures shall be installed in wiring guides.

F. LSF cables not required to be in conduit (refer to requirements for conduit above) shall be routed parallel and perpendicular with the building column lines. Provide cable rings and supports to support the cabling. Supports shall be positioned in accordance with NEC.

G. All wiring terminations within field panels shall be terminated at terminal stripes and shall be marked by identification tags on each end of the cable at each terminal strip. All termination strips shall be labeled.

H. All LSF wiring installation above accessible ceilings shall be such that there will be no interference with the installation of lighting fixtures, fire protection devices, air distribution devices or any other devices.

I. Cable run in vertically shall have means of cable support, at minimum, every 3 m.

J. Cables shall comply with all NYC electrical codes including, the IEEE wiring regulations latest edition and the contract documents. Where there is a conflict between any codes, standards, ordinances, regulations or The City of New York, the most stringent requirements shall apply.

2.11 UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. The Contractor shall provide uninterruptible power for all BMS components, such as CCP, Direct Digital Control Panels, routers, switches, gateways, field instrumentation, final control elements etc., as necessary to ensure continuous monitoring and control by the BMS and the associated satellite OIW of all equipment that operates on emergency power.

2.12 SYSTEM SOFTWARE

A. General
   1. All necessary software to form a complete operating system as described in this specification shall be provided.
   2. The software programs specified in this section shall be provided as an integral part of the Direct Digital controller and shall not be dependent upon any higher level computer for execution.

B. Control Software Description:
   1. Pre-Tested Control Algorithms: The Direct Digital controllers shall have the ability to perform the following pre-tested control algorithms:
      a. Two Position Control
      b. Proportional Control
      c. Proportional plus Integral Control
      d. Proportional, Integral, plus Derivative Control
      e. Automatic Control Loop Tuning
   2. Equipment Cycling Protection: Control software shall include a provision for limiting the number of times each piece of equipment may be cycled within any one-hour period.

3. Heavy Equipment Delays: The system shall provide protection against excessive demand situations during start-up periods by automatically introducing time delays between successive start commands to heavy electrical loads.
4. Power fail Motor Restart: Upon the resumption of normal power, the Direct Digital Control panel shall analyze the status of all controlled equipment, compare it with normal occupancy scheduling, and turn equipment on or off as necessary to resume normal operation. (i.e. - Restart of equipment following the return to normal condition after equipment shutdown by the Fire Alarm System).
5. Sequential Start: Provide sequential start for all equipment. After a power failure, and after restoration of normal power, equipment shall start per a predetermined sequence as programmed via the BMS.

C. Energy Management Applications: Direct Digital controllers shall have the ability to perform any or all of the following energy management routines:
1. Time-of-Day Scheduling.
2. Calendar Based Scheduling.
3. Holiday Scheduling.
4. Temporary Schedule Overrides.
5. Optimal Start/Optimal Stop.
6. Night Setback Control.
7. Enthalpy Switch Over (Economizer).
8. Peak Demand Limiting.
9. Energy Usage & Demand.
10. Fan Speed/CFM Control.
11. Heating/Cooling Interlock.
12. Supply Air Reset.
13. Chilled Water Reset.
14. Condenser Water Reset.
15. Hot Water Reset.
16. Chiller Sequencing.

D. All programs shall be executed automatically without the need for operator intervention, and shall be flexible enough to allow operator customization. Programs shall be applied to building equipment as described in the Execution portion of this specification.

E. Custom Process Programming Capability: Direct Digital controllers shall be able to execute custom, job-specific processes defined by the operator, to automatically perform calculations and special control routines.
1. Process Inputs and Variables: It shall be possible to use any of the following in a custom process:
   a. Any system-measured point data or status.
   b. Any calculated data.
   c. Any results from other processes.
   d. User-Defined Constants.
   e. Arithmetic functions (+,-,*, /, square root, exponential, etc.).
   f. Boolean logic operators (and, or, exclusive or, etc.).
   g. On-delay/Off-delay/One-shot timers.

2. Process Triggers: Custom processes may be triggered based on any combination of the following:
   a. Time interval.
   b. Time of day.
   c. Date.
   d. Other processes.
   e. Time programming.
   f. Events (e.g., point alarms).
   g. Restart of equipment following the return to normal condition after equipment shutdown by the Fire Alarm System (FAS).

F. Dynamic Data Access: A single process shall be able to incorporate measured or calculated data from any and all other Direct Digital controllers on the local area network. In addition, a single process shall be able to issue commands to points in any and all other Direct Digital Control panels on the local area network.

G. Advisory/Message Generation: Processes shall be able to generate operator messages and advisories to operator I/O devices. A process shall be able to directly send a message to a specified device, buffer the information in a follow-up file, or cause the execution of a dial-up connection to a remote device such as a printer.

H. Custom Process Documentation: The custom control programming feature shall be self-documenting. All interrelationships defined by this feature shall be documented via graphical flowcharts and English language descriptors.

I. Runtime Totalization: Standalone Direct Digital Control panels shall automatically accumulate and store runtime hours for binary input and output points as specified in the Execution portion of this specification.
   1. The Totalization routine shall have a sampling resolution of one minute or less.
   2. The user shall have the ability to define a warning limit for Runtime Totalization. Unique, user-specified messages shall be generated when the limit is reached.

J. Analog/Pulse Totalization: Standalone DIRECT DIGITAL CONTROL's shall automatically sample, calculate and store consumption totals on a daily, weekly, or monthly basis for user-selected analog and binary pulse input-type points.
   1. Totalization shall provide calculation and storage of accumulations of up to 99,999.9 units (e.g. KWH, gallons, KBTU, tons. etc.).
   2. The Totalization routine shall have a sampling resolution of one minute or less.
   3. The user shall have the ability to define a warning limit. Unique, user-specified messages shall be generated when the limit is reached.

K. Event Totalization: Standalone Direct Digital Control panels shall have the ability to count events such as the number of times a pump or fan system is cycled on and off. Event totalization shall be performed on a daily, weekly, or monthly basis.
   1. The Event Totalization feature shall be able to store the records associated with a minimum of 9,999,999 events before reset.

2. The user shall have the ability to define a warning limit. Unique, user-specified messages shall be generated when the limit is reached.

L. Integration
1. Open, Interoperable, Integrated Architectures
   a. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system utilizing ANSI/ASHRAE SSPC/135 (BACnet Protocol) communication protocol in an open, interoperable system.
   b. In addition, adherence to BACnet Protocol industry standard ANSI / ASHRAE SSPC/135 to assure interoperability between all system components is required. For each BACnet Protocol device, the device supplier must provide a PICS document showing the installed device's compliance level. Minimum compliance is Level 3; with the ability to support data read and write functionality. Physical connection of BACnet Protocol devices shall be via Ethernet.
   c. All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not be acceptable.
   d. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open Database Connectivity (ODBC), Open Process Control (OPC) DX and Structured Query Language (SQL) compliant server database is required for all system database parameter storage. This data shall reside on a supplier-installed server for all database access. Systems requiring proprietary database and user interface programs shall not be acceptable.
   e. Protocols: The following standard control protocols shall be provided for Programmable Logic Controller (PLC) and Direct Digital Control platforms for control and data acquisition:
      1) ModBus TCP
      2) ModBus RTU
      3) BACnet MS/TP
      4) BACnet/IP
   f. A network topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network.
   g. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
   h. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.
2. Third Party Communication Software
   a. Provide direct Protocol Integration software to allow bi-directional data communications between the BMS system and 3rd party manufacturers' control panels. The BMS shall receive, react to, and return information from multiple building systems, the chillers, boilers, variable frequency drives, power monitoring system, fire alarm, access control, lighting systems, etc.

b. All data required by the application shall be mapped into the Network Controller's database, and shall be transparent to the operator.
c. Point inputs and outputs from the third-party controllers shall have real-time interoperability with BMS software features such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, Totalization, and Dial-Up and Local Area Network Communications.
d. The Building Management System shall provide any combination of third-party controllers on a single network. A minimum of 100 third-party controllers shall be supported on a single network. Integration shall be via RS-232, RS-485 or Modbus technologies.
e. The system operator shall have the ability to verify, and diagnose communication messages and point information between third-party controllers and the BMS.

2.13 BMS CONTROLLERS: GENERAL

A. There shall be 3 types of BMS control panels:
1. Communications Control Panels (CCP).
2. Direct Digital Control Panels (Direct Digital Control Panels).
3. Unitary Controllers (UC).

B. All BACnet Protocol controllers shall be based on native BACnet Protocol and shall support all applicable BIBBs from the data sharing, alarm event, schedule, trend and device manager groups. Standard BACnet Protocol object types supported by the controllers shall include:
1. Binary input and output and value.
2. Analog input, output and value.
3. Multi-state input and output.
4. Loop calendar, notification class, command, file, program, schedule, group, event enrollment and device.
5. Proprietary object types shall not be used unless specifically approved by the Commissioner.

C. All Controllers shall have a minimum of 10-bit Input /Output resolution.

D. Following a loss of power the PC, CCP, Direct Digital Controland UC shall reboot in an orderly fashion and attain a normal operating status within 2 minutes of the return of power. That shall be accomplished without operator intervention.

2.14 COMMUNICATION CONTROL PANELS (CCP)

A. The Communication Control Panels shall be programmable controllers on the BMS primary LAN and shall undertake two roles:
1. Gateway interface to third-party controllers, if the data communicated from the third party system cannot be provided in the form of BACnet Protocol Objects.

B. The CCP shall incorporate software as necessary to provide communications on the network including Network interface Cards if necessary. Additionally, if the CCP acts as a gateway, then the CCP shall incorporate all software as necessary to perform this function including any change of protocol between the networks. The Contractor shall provide all third-party controller gateways and complete software/hardware documentation.

C. Communication Control Panels shall also meet the following requirements:
1. Provide integral network communication connections.
2. CCP shall be totally independent of any other LAN/BMS Management Level Network nodes for their operating functions.
3. CCP failure shall not place any BMS component or any component controlled by the BMS in a situation that may cause damage to equipment or harm or discomfort to building occupants and operations staff. The failure of a CCP shall not affect the operation of any other network node.
4. The failure of any CCP shall be annunciated as a critical alarm at the OIW.
5. Cabling shall be terminated on rugged and easily accessible terminal strips. Each termination shall be clearly marked and shall be as detailed in the shop and record drawings.
6. Each CCP shall have, at minimum, an l6 bit microprocessor.
7. All CCP shall be powered from a UPS source, but memory shall be battery-backed RAM. Battery shall be rechargeable with a minimum life of 7 years and shall be capable of providing data retention for a minimum of 60 days.
8. Provide a real-time clock at each CCP. The real-time clock at the CCP shall be synchronized at least once every 24 hours.
9. Provide a hardware or software watchdog timer.
10. Provide interoperability documentation for the CCP. All the data related to the CCP shall be presented along with their respective BACnet Protocol object ID created in the system, along with their PICS, BIBBS, addresses and method statements to read and write data via integration of the CCP with another system in the future. This may be part of the overall interoperability documentation.
11. The CCP shall have a port for the connection of POT.

D. The CCP shall be housed in the enclosure panels as detailed in the “Panels and Enclosures” Paragraph.

E. Diagnostics – Controller shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all panel components. The network controller shall provide both local and remote annunciation of any detected component failures, low battery conditions, or repeated failures to establish communication.

F. Certification – All controllers shall be listed by Underwriters Laboratories (UL).

2.15 DIRECT DIGITAL CONTROL PANELS (DDCP)

A. The Direct Digital Control shall be standalone, shall reside on the Automation Level and shall meet the following requirements:

1. Direct Digital Control Panels controllers shall be freely programmable and shall have an I/O capability to handle major items of equipment such as air handling units.
2. Direct Digital Control Panels shall interface via Point Interface Modules (PIM) to the field instrumentation and final control elements.
3. Direct Digital Control Panels may be used for any equipment monitored and controlled by the BMS. A dedicated Direct Digital Control Panels shall be provided at minimum to monitor and control the following:
   a. A Single Air Handling Unit (each AHU shall have a dedicated Direct Digital Control Panels).
   b. Other major items of equipment.
4. The Direct Digital Control Panels shall control its own communications so that the failure of any one node, including any PC shall not inhibit communications on the network between the remaining nodes. Provide integral network communications connections.
5. Direct Digital Control Panels shall be totally independent of any other primary and secondary LAN nodes for their monitoring and control functions. Direct Digital Control Panels shall monitor and control entire systems, multiple Direct Digital Control Panels for a single system shall not be allowed.
6. Where a Direct Digital Control Panels receives data from other nodes, such as an outdoor air temperature, which is used for a global system program strategy executed at that Direct Digital Control Panels, then alternative control strategies shall be automatically initiated, based on operator definable default values, if there is a loss of communication of the required data.
7. Direct Digital Control Panels failure shall not place any BMS component or any BMS controlled component in a situation that may cause damage to equipment or harm or discomfort to building occupants and operations staff. The failure of a Direct Digital Control Panels shall not affect the operation of any other network node.
8. The failure of any Direct Digital Control Panels shall be annunciated as a critical alarm at the OIW.
9. Cabling shall be terminated on rugged and easily accessible terminal strips. Each termination shall be clearly marked and shall be as detailed in the shop and record drawings.
10. Each Direct Digital Control Panels shall have its own power supplies that shall be rated such that they will adequately accommodate all foreseeable uses of the Direct Digital Control Panels.
11. Each Direct Digital Control Panels shall have, at minimum, an l6 bit microprocessor.
12. All operating sequences, schedules and trend data for equipment controlled by the Direct Digital Control Panels shall reside at the Direct Digital Control Panels.
13. Provide each Direct Digital Control Panels with a battery back-up for the protection of volatile memory for a minimum of 72 hours. Provide a 10-hour minimum full function, battery support capability.
14. Provide a real-time clock, at each Direct Digital Control Panels. The real-time clock at the Direct Digital Control Panels shall be synchronized at least once every 24 hours.
15. The Direct Digital Control Panels shall have a port for the connection of the POT.
16. Direct Digital Control Panels shall be housed in enclosures that shall meet the requirements detailed in Section titled “Panels and Enclosures” of these specifications. The Direct Digital Control Panels shall be placed at the same location as the equipment they control. The Contractor shall provide a suitably rated enclosure for all associated

BMS components, including the controllers, relays, wiring guides, terminal strips, etc. The installation of the control enclosure and the installation of all cable and containment between the field instrumentation, including any current sensing relays in the MCC panels, and the Direct Digital Control Panels shall be by the Contractor.

17. Interfaces to field instrumentation and final control elements shall have Point Interface Modules (PIM) that shall:
    a. Enable the Direct Digital Control Panels to receive signals from the digital and analog instrumentation.
    b. Enable the Direct Digital Control Panels to output control signals to the final control elements.
18. PIM shall be incorporated into the Direct Digital Control Panels by one or the following methods:
    a. Plug-in type modules with specific or universal input/output capabilities.
    b. Integral to the Direct Digital Control Panels controller board.
19. PIM shall accommodate the following point types:
    a. Analog and digital inputs.
    b. Analog and digital outputs.
    c. Pulse inputs.
20. Analog input PIM shall have a minimum 14-bit analog-to-digital conversion and shall interface to all of the signal types required by the sequence of operations.
21. Analog output PIM shall have a minimum 10-bit digital-to-analog conversion and shall meet all of the output signal required by the sequence of operations.
22. Digital input and output PIM shall have electrical isolation and all relay contacts shall be suitably rated for the application.
23. All PIM shall be easily exchanged and the failure of one PIM shall not affect any other PIM. Field terminations shall be such that the removal of a failed PIM shall not require the removal and reconnecting of field device cable terminations.
24. All PIM shall be such that all output points can be manually positioned via an on board on-off-auto or potentiometer dial as applicable to the individual point.
25. Control shall be based on either three term algorithms, i.e. proportional plus integral plus derivative, or two term algorithms, i.e. proportional plus integral, unless specified otherwise.
26. Direct Digital Control Panels mounted on vibrating equipment, such as an air handling units, shall have vibration isolation protection that ensures their satisfactory operation.
27. Direct Digital Control Panels shall have optic-isolation or equivalent.
28. Direct Digital Control Panels shall be BACnet Protocol compliant and shall comply with all of the requirements of ASHRAE SSPC/135.
29. The Contractor shall provide interoperability documentation for the Direct Digital Control Panels. All the data related to the Direct Digital Control Panels shall be presented along with their respective BACnet Protocol object ID created in the system, along with their PICS, BIBBS, addresses and method statements to read and write data via integration of the Direct Digital Control Panels with another system in the future. This may be part of the overall interoperability documentation.

2.16 UNITARY CONTROLLERS (UC) – GENERAL

A. Unitary Controllers (UC) shall be "freely programmable" controllers with pre-packaged operating sequences maintained in EEPROM or flash EPROM.

B. Unitary controllers shall reside at the BMS Automation Level.

C. Customization of "freely programmable" controllers shall be possible to the extent that variable operating parameters, such as sequences of operation, setpoints, control loop parameters, control constants, and schedules shall be changeable on-line by the OIW operator.

D. UC shall reside on a BACnet Protocol BMS LAN.

E. UC shall provide an interface via PIM to the field instrumentation and final control elements of the following types of equipment:
1. One (1) Fan Powered VAV terminal unit with or without Electric Reheat
2. One (1) Fan Coil Unit with or without Electric Reheat
3. One (1) VAV terminal unit (cooling only).
4. Up to Six (6) miscellaneous fans.
5. Up to Four (4) miscellaneous pumps.
6. Up to Two (2) self-contained A/C units.
7. Miscellaneous equipment input monitoring.

F. Panels meeting the requirements of Direct Digital Control Panels shall control all other types of 'equipment and systems.

G. The UC shall be a node on the primacy BMS LAN. The UC shall control its own communications so that the failure of any one node shall not inhibit communications on the network between the remaining nodes and the BMS Management Level Network.

H. UC shall be totally independent of other Management and BMS Automation Level components for their monitoring and control functions.

I. UC failure shall not place any BMS component or any BMS controlled component in a situation that may cause damage to equipment or harm or discomfort to building occupants and operations staff. The failure of a UC shall not affect the operation of any other network node.

J. The failure of any UC shall be annunciated as a critical alarm at the OIW.

K. Cabling shall be terminated on rugged and easily accessible terminal strips. Each termination shall be clearly marked and shall be as detailed in the shop and record drawings.

L. UC shall be powered from the electrical service that serves the equipment monitored and controlled by the UC. The Contractor shall furnish transformers suitably rated for the application. The UC shall be housed in an enclosure that provides adequate physical and electrical protection.

M. Each UC shall have, at minimum, a 16 bit microprocessor.

N. Provide each UC with a battery back-up for the protection of volatile memory for a minimum of 72 hours. Batteries shall be rated for a 7 year life. The UC serving VAV terminal units and FCU shall not be placed on UPS power.

O. UC shall be housed in enclosures that shall meet the requirements detailed in Section titled "Panels and Enclosures" of these specifications. The UC shall be placed at the same location as the equipment they control. The Contractor shall provide a suitably rated enclosure for all associated BMS components, including the controllers, relays, wiring guides, terminal strips, etc. The installation of the control enclosure and the installation of all cable and containment between the field instrumentation and the UC shall be by the Contractor.

P. Interfaces to field instrumentation and final control elements shall have Point Interface Modules (PIM) that shall:
1. Enable the UC to receive signals from the digital and analog instrumentation.
2. Enable the UC to output control signals to the final control elements.

Q. PIM shall accommodate the following point types:
1. Analog and digital inputs.
2. Analog and digital outputs.
3. Pulse inputs.

R. Analog input PIM shall have a minimum 8-bit analog-to-digital conversion and shall interface to all of the signal types required by the sequence of operations.

S. Analog output PIM shall have a minimum 8-bit digital-to-analog conversion and shall meet all of the output signal required by the sequence of operations.

T. Digital input and output PIM shall have electrical isolation and all relay contacts shall be suitably rated for the application.

U. UC shall control and monitor all points associated with a system. Multiple UC shall not be used to control and monitor a single system.

V. All application programs shall reside at the UC.

W. Operating sequences for UC shall be resident at the UC. Database changes shall be undertaken from the OIW and POT. Schedules and trend data shall reside at the UC.

X. Control shall be based on either three term algorithms, i.e. proportional plus integral plus derivative, or two term algorithms, i.e. proportional plus integral, unless specified otherwise.

Y. UC mounted on vibrating equipment, such as on FCUs, shall have vibration isolation protection that ensures their satisfactory operation.

Z. UC shall be BACnet Protocol compliant and shall comply with all of the requirements of ASHRAE SSPC/135.

AA. The Contractor shall provide interoperability documentation for the UC. All the data related to the UC shall be presented along with their respective BACnet Protocol object ID created in the system, along with their PICS, BIBBS, addresses and method statements to read and write data via integration of the UC with another system in the future. This may be part of the overall interoperability documentation.

2.17 VAV TERMINAL UNIT CONTROLLER (VAV - UC)

A. General: Ship VAV-UC Controllers to terminal box manufacturer's factory for controller mounting prior to shipping to site. Coordinate with Box manufacturer.

B. The VAV UC shall provide both standalone and networked direct digital control of pressure-independent, variable air volume terminal units.

C. The integral damper actuator shall be a fast response stepper motor capable of stroking 90 degrees in 30 seconds for quick damper positioning to speed commissioning and troubleshooting tasks.

D. The VAV UC shall be a configurable digital controller with an integral differential pressure transducer. It shall be compatible with 3 wire (incremental) and proportional damper actuators.

E. The VAV UC shall determine airflow by dynamic pressure measurement using an integral dead-ended differential pressure transducer. The transducer shall be maintenance-free and shall not require air filters.

F. Each VAV UC shall have the ability to automatically calibrate the flow sensor to eliminate pressure transducer offset error due to ambient temperature / humidity effects.

G. The VAV UC shall utilize a proportional plus integration (PI) algorithm for the space temperature control loops.

H. Each VAV UC shall continuously, adaptively tune the control algorithms to improve control and controller reliability through reduced actuator duty cycle. In addition, this tuning reduces commissioning costs, and eliminates the maintenance costs of manually re-tuning loops to compensate for seasonal or other load changes.

I. The VAV UC shall provide the ability to download and upload UC configuration files, both locally and via the communications network. Controllers shall be able to be loaded individually or as a group using a zone schedule generated spreadsheet of controller parameters.

J. UC control setpoint changes initiated over the network shall be written to UC non-volatile memory to prevent loss of setpoint changes and to provide consistent operation in the event of communication failure.

K. The VAV UC firmware shall be flash-upgradeable remotely via the communications bus to minimize costs of feature enhancements.

L. The VAV UC shall provide fail-soft operation if the airflow signal becomes unreliable, by automatically reverting to a pressure-dependent control mode.

M. The VAV UC shall interface with balancer tools that allow automatic recalculation of box flow pickup gain ("K" factor), and the ability to directly command the airflow control loop to the box minimum and maximum airflow setpoints.

N. The VAV UC shall be capable of direct electronic connection to a balancing hood. Connection shall be through a port located on the room sensor, or directly at the controller. As an alternative, software balancing tools shall be provided that will run in a hand-held PC tablets/laptops. The balancing tools shall allow adjustment of airflow setpoints and parameters, and provide permanent upload of the values entered to the UC. The PC tablets/laptops shall connect to the terminal unit through the room sensor port.

O. The VAV UC performance shall be self-documenting via on-board diagnostics. These diagnostics shall consist of control loop performance measurements executing at each control loop's sample interval, which may be used to continuously monitor and document system performance. The UC shall calculate exponentially weighted moving averages (EWMA) for each of the following. These metrics shall be available to the end user for efficient management of the VAV terminals.
1. Absolute temperature loop error.
2. Signed temperature loop error.
3. Absolute airflow loop error.
4. Signed airflow loop error.
5. Average damper actuator duty cycle.

P. The VAV UC shall detect system error conditions to assist in managing the VAV zones. The error conditions shall consist of:
1. Unreliable space temperature sensor.
2. Unreliable differential pressure sensor.
3. Starved box.
4. Insufficient cooling.
5. Insufficient heating.

Q. The VAV UC shall provide a compliant interface for ASHRAE Standard 62-1989 (indoor air quality), and shall be capable of resetting the box minimum airflow based on the percent of outdoor air in the primary air stream.

R. The VAV UC shall comply with ASHRAE Standard 90.1 (energy efficiency) by preventing simultaneous heating and cooling, and where the control strategy requires reset of airflow while in reheat, by modulating the box reheat device fully open prior to increasing the airflow in the heating sequence.

S. The VAV UC shall be compatible with the U.S. EPA Energy Star Buildings recommendations for fan energy reduction via demand-based static pressure reset down to 2/3 of duct static pressure set point, "VSD 2/3 Reset."

T. Inputs:

1. Analog inputs shall monitor the following analog signals, without the addition of equipment outside the terminal controller cabinet:
   a. 0-10 VDC Sensors
   b. 4-20 mA Sensors
   c. 1000ohm RTDs
   d. NTC Thermistors
2. Binary inputs shall monitor dry contact closures. Input shall provide filtering to eliminate false signals resulting from input "bouncing."
3. For noise immunity, the inputs shall be internally isolated from power, communications, and output circuits.

U. Outputs
1. Analog outputs shall provide the following control outputs:
   a. 0-10 VDC
   b. 4-20 mA
2. Binary outputs shall provide a SPST Triac output rated for 500mA at 24 VAC.
3. For noise immunity, the outputs shall be internally isolated from power, communications, and other output circuits.

2.18 BACNET PROTOCOL ROUTERS

A. Provide all BACnet Protocol routers as necessary to meet the requirements of these specifications.

B. BACnet Protocol routers shall be native BACnet Protocol only. Proprietary and other standard protocols shall not be provided. Routers shall be provided at necessary to connect one medium to another, e.g. BACnet/IP to BACnet MS/TP, etc.

C. The BACnet Protocol routers shall, at minimum, support BIBBs for data sharing, alarm and event management.

2.19 HVAC INPUT DEVICES

A. General Requirements
1. Installation, testing, and calibration of all sensors, transmitters, and other input devices shall be provided to meet the system requirements.

B. Temperature Sensors
1. General Requirements:
   a. Sensors and transmitters shall be provided, as outlined in the input/output summary and sequence of operations.
   b. The temperature sensor shall be of the resistance type, and shall be either two-wire 1000 ohm nickel RTD, or two-wire 1000 ohm platinum RTD.
   c. The following point types (and the accuracy of each) are required, and their associated accuracy values include errors associated with the sensor, lead wire, and A to D conversion:

Point Type	Accuracy
Chilled Water	± .5°F.
Room Temp	± .5°F.
Duct Temperature	± .5°F.
All Others	± .75°F.

2. Room Temperature Sensors with Integral Display
   a. Room sensors shall be constructed for either surface or wallbox mounting.
   b. Thermistors are acceptable for space temperature monitoring.
   c. Room sensors shall have an integral LCD display and four button keypad with the following capabilities:
      1) Display room and outside air temperatures.
      2) Display and adjust room comfort setpoint.
      3) Display and adjust fan operation status.
      4) Timed override request push button with LED status for activation of after-hours operation.
      5) Display controller mode.
      6) Password selectable adjustment of setpoint and override modes.
3. Thermowells
   a. When thermowells are required, the sensor and well shall be supplied as a complete assembly, including well head and flexible conduit fitting.
   b. Thermowells shall be pressure rated and constructed in accordance with the system working pressure.
   c. Thermowells and sensors shall be mounted in a threadolet or 1/2" NFT saddle and allow easy access to the sensor for repair or replacement.
   d. Thermowells shall be constructed of 316 stainless steel.
4. Outside Air Sensors
   a. Outside air sensors shall be designed to withstand the environmental conditions to which they will be exposed. They shall also be provided with a solar shield.
   b. Sensors exposed to wind velocity pressures shall be shielded by a perforated plate that surrounds the sensor element.
   c. Temperature transmitters shall be of NEMA IV construction and rated for ambient temperatures.
5. Duct Mount Sensors
   a. Duct mount sensors shall mount in an electrical box through a hole in the duct, and be positioned so as to be easily accessible for repair or replacement.
   b. Duct sensors shall be insertion type and constructed as a complete assembly, including lock nut and mounting plate.
   c. For outdoor air duct applications, a weatherproof mounting box with weatherproof cover and gasket shall be used.
6. Averaging Sensors
   a. For ductwork greater in any dimension that 48 inches and/or where air temperature stratification exists, an averaging sensor with multiple sensing points shall be used.

b. For plenum applications, such as mixed air temperature measurements, a string of sensors mounted across the plenum shall be used to account for stratification and/or air turbulence. The averaging string shall have a minimum of 4 sensing points per 12-foot long segment.
c. Capillary supports at the sides of the duct shall be provided to support the sensing string.

C. Humidity Sensors
1. The sensor shall be a solid state type, relative humidity sensor of the Bulk Polymer Design. The sensor element shall resist service contamination.
2. The humidity transmitter shall be equipped with non-interactive span and zero adjustments, a 2-wire isolated loop powered, 4-20 mA, 0-100% linear proportional output.
3. The humidity transmitter shall be factory calibrated to an accuracy of plus or minus 2% RH over a range of 0% - 90% RH meet the following overall accuracy, including lead loss and Analog to Digital conversion.
4. Outside air relative humidity sensors shall be installed with a rain proof, perforated cover. The transmitter shall be installed in a NEMA IV enclosure with liquid-tight fittings and stainless steel bushings.
5. A single point humidity calibrator shall be provided, if required, for field calibration. Transmitters shall be shipped factory pre-calibrated.
6. Duct type sensing probes shall be constructed of 304 stainless steel, and shall be equipped with a neoprene grommet, bushings, and a mounting bracket.
7. Manufacturers: Johnson Controls, Siemens, Veris Industries or Mamac or approved equal.

D. Humidity and Temperature Transmitter Assembly
1. Assembly shall consist of capacitive type humidity sensing element with 1000 ohm platinum RTD and a solid-state, 2-wire, 4-20mA transmitter mounted in housing suitable for outdoor installation (NEMA IV) or indoor (wall-mounted) applications. Sensing elements shall be installed in a weatherproof aspirating enclosure.
2. Assembly shall be factory calibrated to an accuracy of plus or minus 2% RH over a range of 0% - 90% RH.
3. Manufacturers: Hy-Cal Engineering, Rotronics, Vaisala, or approved equal.

E. Differential Pressure Transmitters
1. General Air and Water Pressure Transmitter Requirements:
a. Pressure transmitters shall be constructed to withstand 100% pressure over-range without damage, and to hold calibrated accuracy when subject to a momentary 40% over-range input.
b. Pressure transmitters shall transmit a 0 to 5 VDC, 0 to 10 VDC, or 4 to 20 mA output signal.
c. Differential pressure transmitters used for flow measurement shall be sized to the flow sensing device, and shall be supplied with Tee fittings and shut-off valves in the high and low sensing pick-up lines to allow the balancing subcontractor and Commissioner permanent, easy-to-use connection.

d. A minimum of a NEMA 1 housing shall be provided for the transmitter. Transmitters shall be located in accessible local control panels wherever possible.

2. Low Differential Water Pressure Applications (0" - 20" w.c.)
   a. The differential pressure transmitter shall be of industrial quality and transmit a linear, 4 to 20 mA output in response to variation of flow meter differential pressure or water pressure sensing points.
   b. The differential pressure transmitter shall have non-interactive zero and span adjustments that are adjustable from the outside cover and meet the following performance specifications:
      1) .01-20" w.c. input differential pressure range.
      2) 4-20 mA output.
      3) Maintain accuracy up to 20 to 1 ratio turndown.
      4) Reference Accuracy: +0.2% of full span.
   c. Manufacturers: Setra, Mamac, ABB or approved equal.
3. Medium to High Differential Water Pressure Applications (Over 21" w.c.)
   a. The differential pressure transmitter shall meet the low pressure transmitter specifications with the following exceptions:
      1) Differential pressure range 10" w.c. to 300 PSI.
      2) Reference Accuracy: $\pm$1% of full span (includes non-linearity, hysteresis, and repeatability).
   b. Standalone pressure transmitters shall be mounted in a bypass valve assembly panel. The panel shall be constructed to NEMA 1 standards. The transmitter shall be installed in the panel with high and low connections piped and valved. Air bleed units, bypass valves, and compression fittings shall be provided.
   c. Manufacturers: Setra, Mamac, Fisher Porter, or Dieterich Standard Co. - Producer series, or approved equal.
4. Building Differential Air Pressure Applications (-1" to +1" w.c.)
   a. The differential pressure transmitter shall be of industrial quality and transmit a linear, 4 to 20 mA output in response to variation of differential pressure or air pressure sensing points.
   b. The differential pressure transmitter shall have non-interactive zero and span adjustments that are adjustable from the outside cover and meet the following performance specifications:
      1) -1.00 to +1.00 w.c. input differential pressure ranges. (Select range appropriate for system application)
      2) 4-20 mA output.
      3) Maintain accuracy up to 20 to 1 ratio turndown.
      4) Reference Accuracy: +0.2% of full span.
   c. Manufacturers: Johnson Controls, Siemens, Setra, or approved equal.
5. Low Differential Air Pressure Applications (0" to 5" w.c.)
   a. The differential pressure transmitter shall be of industrial quality and transmit a linear, 4 to 20 mA output in response to variation of differential pressure or air pressure sensing points.
   b. The differential pressure transmitter shall have non-interactive zero and span adjustments that are adjustable from the outside cover and meet the following performance specifications:

1) (0.00 - 1.00" to 5.00") w.c. input differential pressure ranges. (Select range appropriate for system application.)
2) 4-20 mA output.
3) Maintain accuracy up to 20 to 1 ratio turndown.
4) Reference Accuracy: +0.2% of full span.

c. Manufacturers: Johnson Controls, Ashcroft, Setra, or approved equal.

6. Medium Differential Air Pressure Applications (5" to 21" w.c.)
   a. The pressure transmitter shall be similar to the Low Air Pressure Transmitter, except that the performance specifications are not as severe. Differential pressure transmitters shall be provided that meet the following performance requirements:
      1) Zero & span: (c/o F.S. /Deg. F): .04% including linearity, hysteresis and repeatability.
      2) Accuracy: 1% F.S. (best straight line) Static Pressure Effect: 0.5% F.S. (to 100 PSIG.
      3) Thermal Effects: <+.033 F.S. /Deg. F. over 40°F. to 100°F. (calibrated at 70°F.).
   b. Standalone pressure transmitters shall be mounted in a bypass valve assembly panel. The panel shall be constructed to NEMA 1 standards. The transmitter shall be installed in the panel with high and low connections piped and valved. Air bleed units, bypass valves, and compression fittings shall be provided.
   c. Manufacturers: Johnson Controls, Siemens, Setra, or approved equal.

F. Indoor Air Quality (CO2) Sensors- Wall and Duct Mounted
   1. Provide indoor air quality sensors to monitor Carbon Dioxide (CO2). The sensors shall be of microprocessor-based photo-acoustic type with heated stannic dioxide semiconductor.
   2. The CO2 sensors shall have no more than 1% drift during the first year of operation and minimal drift thereafter so that no calibration will be required.
   3. The units shall be wall or duct mounted type as indicated on plans and in the sequence of operation.
   4. Wall mounted sensors shall be provided with white plastic cover, without LED indicators.
   5. Duct mounted sensors shall be provided with LED indicators in a dust proof plastic housing with transparent cover.
   6. The sensor shall meet the following requirements:
      a. Operating voltage: 24 VAC +/- 20%
      b. Frequency: 50/60 Hz
      c. Power consumption: max. 6 VA
      d. CO2 measuring range: 0 – 2000 ppm
      e. Tolerance: +/- 100 ppm
      f. Output: 0 – 10 VAC
      g. Calibration: none required
      h. Permissible air velocity in duct: <26.2 Ft/s.
      i. The sensors shall be model: Siemens QPA63 Series, Johnson Controls, Honeywell or approved equal

G. Carbon Monoxide (CO) Transmitter

1. Sensor assemblies to be rated general purpose and suitable for N.E.C. installation. (NEMA 1 enclosure).
2. Carbon monoxide analyzer shall be capable of measurement in the range of 0-500 parts per million with 4-20 mA output. (7000 to 9000 square feet per sensor).
3. Operating temperature: -15 deg C to 40 deg C
4. Stability: ±1%
5. Repeatability: less than ±2% full scale
6. Manufacturer: Siemens, Honeywell, Brasch gas detector or an approved equal.

H. Flow Monitoring

1. Air Flow Monitoring (Main Ductwork and/or Outdoor Air Intakes)
   a. Duct Air Flow Measuring Stations
      1) Each device shall be designed and built to comply with, and provide results in accordance with, accepted practice as defined for system testing in the ASHRAE Handbook of fundamentals, as well as in the Industrial Ventilation Handbook.
      2) Airflow measuring stations shall be fabricated of 14-gauge galvanized steel welded casing with 90 Deg. connecting flanges in configuration and size equal to that of the duct into which it is mounted. Each station shall be complete with an air directionalizer and parallel cell profile suppressor (3/4" maximum cell) across the entering air stream and mechanically fastened to the casing in such a way to withstand velocities up to 6000 feet per minute. This air directionalizer and parallel cell honeycomb suppressor shall provide 98% free area, equalize the velocity profile, and eliminate turbulent and rotational flow from the air stream prior to the measuring point.
      3) The total pressure measurement side (high side) will be designed and spaced to the Industrial Ventilation Manual 16th Edition, Page 9-5. The self-averaging manifolding will be manufactured of brass and copper components.
      4) The static pressure sensing probes (low side) shall be bullet-nosed shaped, per detailed radius, as illustrated in Industrial Ventilation Manual 16th Edition, Page 9-5.
      5) The main take-off point from both the total pressure and the static pressure manifolds must be symmetrical.
      6) Total and static pressure manifolds shall terminate with external ports for connection to control tubing. An identification label shall be placed on each unit casing, listing model number, size, area, and specified airflow capacity.
      7) Installation Considerations. The maximum allowable pressure loss through the Flow and Static Pressure elements shall not exceed .065" w.c. at 1000 feet per minute, or .23" w.c. at 2000 feet per minute.

         a) Each unit shall measure the airflow rate within an accuracy of plus 2% as determined by U.S. – GSA certification tests, and shall contain a minimum of one total pressure sensor per 36 square inches of unit measuring area.

b) The units shall have a self-generated sound rating of less than NC40, and the sound level within the duct shall not be amplified nor shall additional sound be generated.

c) Where the stations are installed in insulated ducts, the airflow passage of the station shall be the same size as the inside airflow dimension of the duct. Station flanges shall be two inch to three inch to facilitate matching connecting ductwork.

d) Where control dampers are shown as part of the airflow measuring station, opposed blade precision controlled volume dampers integral to the station and complete with actuator, pilot positioner, and linkage shall be provided. Stations shall be installed in strict accordance with the manufacturer's published requirements, and in accordance with ASME Guidelines affecting non-standard approach conditions.

8) Air flow measurement accuracy shall be ±3% of actual flow over a range of 6 to 1 capacity turndown. The probe installation shall not produce any static barrier (resistance to air flow). Provide a minimum of two (2) probes per each outdoor air intake. Follow manufacturer guidelines for installation and additional probe requirements.

9) Manufacturers: Air Monitor Corp., Tek-Air, Ebtron Gold GP1, Dietrich Standard, or approved equal.

b. Fan Inlet Probe Type

1) Fan Inlet Type: Provide where indicated on the plans, airflow measuring stations of fan inlet type. Airflow traverse probes shall be suitable for mounting in the inlet bell(s) of the indicated fan.

2) Probes shall be provided with the appropriate end support brackets for mounting in the inlet bell(s). Where fans are of dual inlet type, two sets of inlet probes must be provided.

3) Fan inlet probes shall be provided with the fittings to allow for the connection of control tubing to the probe assemblies.

4) Probes shall be capable of operating with an accuracy of 3% of actual volume over the fan operating range.

5) The installation of the air flow measuring stations shall be coordinated with sheet metal contractor to ensure actual accuracy and accessibility for maintenance.

6) The installation of the air flow measuring stations shall be coordinated with sheet metal subcontractor to ensure actual accuracy and accessibility for maintenance.

7) Fan inlet probes shall be Tek-Air T-FP7000, Ebtron GCA/STA, Dwyer STRA series or approved equal.

c. Static Pressure Traverse Probe

1) Duct static probes shall be provided where required to monitor duct static pressure.

2) Manufacturers: Air Monitor, Tek-Air, Ebtron or an approved equal.

2. BTU Monitoring Devices

a. BTU Meter: (Chilled water and Hot Water Applications): Provide a BTU Meter. The BTU meter shall provide the following information via both an integral LCD, and via serial network communications (protocol conforming to BACnet Protocol): Energy Total, Energy Rate, Flow Total, Flow Rate, Supply Temperature and Return Temperature. Each BTU meter shall be factory programmed for its specific application, and shall be re-programmable using the front panel keypad (no special interface device or computer required). Provide the following with each BTU meter application:

1) Temperature sensors: Temperature sensors shall be loop-powered current based (mA) sensors and shall be bath-calibrated and matched (NIST* traceable) for the specific temperature range for each application. The calculated differential temperature used in the energy calculation shall be accurate to within $\pm 0.15^{0}$F (including the error from individual temperature sensors, sensor matching, input offsets, and calculations).

2) Ultrasonic Flow Meter: The flowmeter shall be a clamp-on, dual channel or dual path transit-time precluding the requirement of penetrating into the pipe. The dual channel operating mode shall be capable of acting as two independent meters with the ability to perform math functions between the two channels (add or subtract). The dual path operating mode will eliminate the effects of flow profile distortion, cross flow or swirl errors caused by upstream interference or pumping irregularities. The flowmeter shall be completely microprocessor based utilizing the transit-time flow measurement technique. The flowmeter shall employ the phase detection multiple pulse transmit principle in conjunction with multiple frequency axial beam transducer technology to insure operation on liquids with solids and/or bubbles. In addition, the flowmeter shall incorporate an alternate Doppler method measurement mode for highly aerated or heavy solid bearing liquids.

3) The flowmeter shall provide automatic transducer spacing utilizing a Universal Mounting Frame or mounting track. The meter shall also provide automatic Reynolds Number and liquid sonic velocity variation compensation and live zero flow as well as the ability to zero flow automatically at programmed intervals. The flowmeter shall have the ability to indicate flow rate, flow velocity, total flow, signal strength, liquid sonic velocity, Reynolds Number and liquid aeration level for both channels or paths. The flowmeter shall also have the ability to be programmed to compensate for specific upstream profile disturbances. The flowmeter shall be equipped with an integral front panel keypad and multifunction 240 x 128 pixel LCD display with the ability of displaying both channels or paths simultaneously. In addition, the flowmeter shall provide self and application diagnostics to isolate any fault conditions to either equipment failure or abnormal process conditions. The flowmeter shall have full HELP menu routines corresponding to all levels of programming and operation.

4) The flowmeter electronics shall be housed in a NEMA 4X enclosure and powered by 115 VAC, 60 Hz. One (1) isolated 4 to 20 ma DC and one (1) 0 to 5,000 Hz. pulse output proportional to flow shall be provided for each channel or the average of both paths. In addition, the unit shall provide one

(1) 0 to 10 volt output and four (4) SPDT alarm relays assignable to flow velocity, liquid sonic velocity, signal strength or liquid aeration. An internal 250 KB datalogger shall be provided to allow storage of all measured and calculated variables and alarms. A bi-directional RS-232 connection shall be provided to allow remote programming and interrogation.

5) The flowmeter shall have an accuracy of ±1% of flow over a ±40 fps flow range. Repeatability shall be 0.1% of flow with a flow sensitivity of 0.001 fps at any flow rate including no flow conditions.

6) Flowmeters that employ amplitude detection/correlation routines or use a single frequency transducer design will not be acceptable. Shear mode flowmeters or meters utilizing wetted transducers or electrodes, or flow-measuring techniques other than previously described will not be acceptable.

7) By use of either transit-time or Doppler modes of operation, the flowmeter shall be capable of measuring all liquids in full sonically conductive pipes. Flowmeters that simply offer standalone transit-time or Doppler measurement modes are not acceptable.

8) The furnished flowmeter shall be Controlotron, Model 1010DN, Panametrics or approved equal.

3. Water Flow Monitoring Devices
   a. Magnetoflow Flow Meter:
      1) The magnetoflow flowmeter shall be completely microprocessor based utilizing pulsed DC creating a magnetic field across the diameter of the pipe.
      2) The magnetoflow flowmeter shall be equipped with an optional panel for remote monitoring and signaling.
      3) The magnetoflow flowmeter electronics shall be housed in a NEMA 4 enclosure and powered by 115 VAC, 60 Hz.
      4) The magnetoflow flowmeter shall have an accuracy of ±.5% of flow over a ±.1 -1 fps flow range. Repeatability shall be 0.25% of flow with a flow sensitivity of 1-33 fps at any flow rate including no flow conditions.
      5) Magnetoflow flowmeter shall be Onicon F 1220, Badgermeter Inc. Mag Meter, Model Magnetoflow Wafer or an approved equal.

I. Status and Safety Switches
   1. General Requirements
      a. Switches shall be provided to monitor equipment status, safety conditions, and generate alarms at the BMS when a failure or abnormal condition occurs. Safety switches shall be provided with two sets of contacts and shall be interlock wired to shut down respective equipment.
   2. Current Sensing Switches
      a. The current sensing switch shall be self-powered with solid state circuitry and a dry contact output. It shall consist of a current transformer, a solid state current sensing circuit, adjustable trip point, solid state switch, SPDT relay, and an LED indicating the on or off status. A conductor of the load shall be passed through the window of the device. It shall accept over-current up to twice its trip point range.
      b. Current sensing switches shall be used for run status for fans, pumps, and other miscellaneous motor loads.

c. Current sensing switches shall be calibrated to show a positive run status only when the motor is operating under load. A motor running with a broken belt or coupling shall indicate a negative run status.
d. Manufacturers: Veris Industries, Kele, Hawkeye or approved equal.

3. Water Flow Switches
   a. Water flow switches shall be equal to the Siemens, Johnson Controls P74, Honeywell or approved equal.
4. Low Temperature Limit Switches
   a. The low temperature limit switch shall be of the manual reset type with Double Pole/Single Throw snap acting contacts rated for 16 amps at 120VAC.
   b. The sensing element shall be a minimum of 15 feet in length and shall react to the coldest 18-inch section. Element shall be mounted horizontally across duct in accordance with manufacturers recommended installation procedures.
   c. For large duct areas where the sensing element does not provide full coverage of the air stream, additional switches shall be provided as required to provide full protection of the air stream.
   d. The low temperature limit switch shall be Johnson Controls A70, Honeywell, Siemens or approved equal.

2.20 HVAC OUTPUT DEVICES

A. Actuators
1. General Requirements
   a. Damper and valve actuators shall be electric/electronic. Provide local position indicator dial on all actuators.
   b. Provide a separate actuator for each damper bank. Linkages are not allowed.
2. Electronic Damper Actuators
   a. Electronic damper actuators shall be direct shaft mount.
   b. Modulating and two-position actuators shall be provided as required by the sequence of operations. Damper sections shall be sized based on actuator manufacturer's recommendations for face velocity, differential pressure and damper type. The actuator mounting arrangement and spring return feature shall permit normally open or normally closed positions of the dampers, as required. All actuators (except terminal units) shall be furnished with mechanical spring return unless otherwise specified in the sequences of operations. All actuators shall have external adjustable stops to limit the travel in both direction, and a gear release to allow manual positioning. Spring-return actuators with more than 7 Nm (60 in.-lb) torque capacity shall have a manual crank for this purpose.
   c. Minimum Torque Requirements: 150 inch-lbs.
   d. Modulating actuators shall accept 24 VAC or VDC power supply, consume no more than 15 VA, and be UL listed. The control signal shall be 2-10 VDC or 4-20 mA, and the actuator shall provide a clamp position feedback signal of 2-10 VDC. The feedback signal shall be independent of the input signal and may be used to parallel other actuators and provide true position indication. The feedback signal of one damper actuator for each separately controlled damper shall be wired back to a terminal strip in the control panel for trouble-shooting purposes.

e. Two-position or open/closed actuators shall accept 24 or 120 VAC power supply and be UL listed. Isolation, smoke, exhaust fan, and other dampers, as specified in the sequence of operations, shall be furnished with adjustable end switches to indicate open/closed position or be hard wired to start/stop associated fan. Two-position actuators, as specified in sequences of operations as "quick acting," shall move full stroke within 20 seconds. All smoke damper actuators shall be quick acting and be UL listed for smoke control service.
f. Provide normally open spring-return actuators for dampers serving all battery room locations.
g. Manufacturers: Belimo, Siemens, Honeywell or approved equal.

3. Pneumatic Damper Actuator:
   a. Pneumatic: Shall be spring return piston type with metal housing, rolling diaphragm and low friction shaft bearing. Shall be capable of modulating 20 square feet of damper section.
4. Electronic Valve Actuators
   a. Electronic valve actuators shall be manufactured by the valve manufacturer.
   b. Each actuator shall have current limiting circuitry incorporated in its design to prevent damage to the actuator.
   c. Provide electric/electronic actuators in all areas, sized by the manufacturer, of sufficient size and power to operate the valve under all conditions and to close the valve tight against 150% maximum differential pressure.
   d. Provide pilots for sequence operations, and cases where valve spring ranges have been increased to close off against system pressure.
   e. Provide pilots for sequence operations, and cases where valve spring ranges have been increased to close off against system pressure.
   f. Valve actuators for finned tube radiation and terminal units shall be electronic, floating control, fail to last position.
   g. Modulating and two-position actuators shall be provided as required by the sequence of operations. Actuators shall provide the minimum torque required for proper valve close-off against the system pressure for the required application. The valve actuator shall be sized based on valve manufacturer's recommendations for flow and pressure differential. All actuators shall fail in the last position unless specified with mechanical spring return in the sequence of operations. The spring return feature shall permit normally open or normally closed positions of the valves, as required. All direct shaft mount rotational actuators shall have external adjustable stops to limit the travel in either direction.
   h. Modulating Actuators shall accept 24 VAC or VDC and 120 VAC power supply and be UL listed. The control signal shall be 2-10 VDC or 4-20 mA and the actuator shall provide a clamp position feedback signal of 2-10 VDC. The feedback signal shall be independent of the input signal, and may be used to parallel other actuators and provide true position indication. The feedback signal of each valve actuator (except terminal valves) shall be wired back to a terminal strip in the control panel for trouble-shooting purposes.
   i. Two-position or open/closed actuators shall accept 24 or 120 VAC power supply and be UL listed. Butterfly isolation and other valves, as specified in the sequence of operations, shall be furnished with adjustable end switches to indicate

open/closed position or be hard wired to start/stop the associated equipment such as a pump, chiller, etc.

B. Control Dampers/Smoke Control Dampers/Fire Smoke Dampers
   1. The Contractor shall furnish all automatic dampers. All automatic dampers shall be sized for the application by the Contractor or as specifically indicated on the Drawings.
   2. All dampers used for throttling airflow shall be of the opposed blade type arranged for normally open or normally closed operation, as required. The damper is to be sized so that, when wide open, the pressure drop is a sufficient amount of its close-off pressure drop to shift the characteristic curve to near linear.
   3. All dampers used for two-position, open/close control shall be parallel blade type arranged for normally open or closed operation, as required.
   4. Damper frames and blades shall be constructed of either stainless steel or aluminum. Maximum blade length in any section shall be 48". Damper blades shall be 16-gauge minimum and shall not exceed six (6) inches in width. Damper frames shall be 16-gauge minimum hat channel type with corner bracing. Additional stiffening or bracing shall be provided for any section exceeding 48" in height. All damper bearings shall be made of stainless steel or oil-impregnated bronze. Dampers shall be tight closing, low leakage type, with synthetic elastomer seals on the blade edges and flexible stainless steel side seals. Dampers of 48"x48" size shall not leak in excess of 6 cfm per square foot when closed against 4" w.g. static pressure when tested in accordance with AMCA Std. 500.
   5. Air foil blade dampers of double skin construction with linkage out of the air stream shall be used whenever the damper face velocity exceeds 1500 FPM or system pressure exceeds 2.5" w.g., but no more than 4000 FPM or 6" w.g.
   6. Manufacturers: Fire Smoke/Smoke control damper (Class I) - Ruskin Industries, Johson; Control Damper – Siemens, Johnson Controls D-1300, Ruskin CD50 or approved equal.
   7. One piece rolled blade dampers with exposed linkage may be used with face velocities of 1500 FPM or below. Manufacturers: Johnson Controls D-1100, Ruskin CD36, Portoff CD36 or approved equal.
   8. Multiple section dampers may be jack-shafted to allow mounting of direct connect electronic actuators. Each end of the jack shaft shall receive at least one actuator to reduce jack shaft twist.

C. Control Relays
   1. Control Pilot Relays
      a. Control pilot relays shall be of a modular plug-in design with retaining springs or clips.
      b. Mounting bases shall be snap-mount.
      c. DPDT, 3PDT, or 4PDT relays shall be provided, as appropriate for application.
      d. Contacts shall be rated for 10 amps at 120VAC.
      e. Relays shall have an integral indicator light and check button.
      f. Manufacturers: Johnson Controls, Honeywell, ASCO, Lectro or approved equal.

D. Control Valves
   1. All automatic control valves shall be fully proportioning and provide near linear heat transfer control. The valves shall be quiet in operation and fail-safe open, closed, or in their last position. All valves shall operate in sequence with another valve when required

by the sequence of operations. All control valves shall be sized by the control manufacturer, and shall be guaranteed to meet the heating and cooling loads, as specified. All control valves shall be suitable for the system flow conditions and close against the differential pressures involved. Body pressure rating and connection type (sweat, screwed, or flanged) shall conform to the mechanical pipe schedule.

a. Leakage: Control valves shall provide tight shut off in the closed position at 150 percent of maximum working pressure.

2. Chilled water control valves shall be modulating plug, ball, and/or butterfly, as required by the specific application. Modulating water valves shall be sized per manufacturer's recommendations for the given application. In general, valves (2 way) serving variable flow air handling unit coils shall be sized for a pressure drop equal to the actual coil pressure drop, but no less than 3 PSI. Valves for terminal reheat coils shall be sized for a 2 PSIG pressure drop, but no more than a 5 PSI drop.
3. All modulating steam valves shall have linear characteristic for 90 percent of the closing stroke and equal-percentage for the final 10 percent. Size low pressure steam valves for a 10 psig inlet pressure and a pressure drop of 8 psig, unless otherwise noted on drawings. On low pressure steam systems, when load exceeds the capacity of 2-1/2" valve, provide two valves each controlling 50 percent of load.
4. Characteristics:
   a. Chilled Water Service: equal percentage flow characteristics, single seated type.
   b. Hot water service: equal percentage, single seated. For water temperature 12-120 deg C or greater provide stainless steel plug.
   c. Steam service: Equal percentage flow characteristics, single seated. Provide stainless steel plug.
   d. Bypass service: linear flow characteristics. Double seated.
5. Valve action: Cooling valves normally closed, Preheat valves normally open, Reheat valves normally closed, humidity control valve normally closed (spring return type).
6. Modulating plug water valves of the single-seat type with equal percentage flow characteristics shall be used for all steam and chilled water applications, except those described hereinafter. The valve discs shall be composition type. Valve stems shall be stainless steel.
7. Ball valves shall be acceptable for water terminal reheat coils, radiant panels, unit heaters, package air conditioning units, and fan coil units.
8. Globe valves are acceptable for use with Air Handlers. Automatic control valves for temperature control shall be fully proportioning with V-port inner guides, unless otherwise specified. Valves shall be quiet in operation and fail safe in either normally open or normally closed position in the event of control air failure. Valves shall be capable of operation in sequence when required by the sequence of operation. Size all globe control valves by the control manufacturer and guarantee they meet the heating and cooling loads as specified. Control valves shall be suitable for the system pressure conditions and shall close against the differential pressure involved.
9. Butterfly valves shall be acceptable for modulating large flow applications greater than modulating plug valves, and for all two-position, open/close applications. In-line and/or three-way butterfly valves shall be heavy-duty pattern with a body rating comparable to the pipe rating, replaceable lining suitable for temperature of system, and a stainless steel vane. Valves for modulating service shall be sized and travel limited to 50 degrees of full

open. Valves for isolation service shall be the same as the pipe. Valves in the closed position shall be bubble-tight.

10. Provide electric high performance butterfly motorized valves for on/off service with manually operated declutchable handwheels for overriding the operator in both emergency and normal operation. Valve body shall be carbon steel with 316 stainless disc with a stainless shaft. Valve seat material shall be teflon. All valves shall be provided with two (2) limit switches that will indicate open and close valve positions remotely at the BMS. Minimum ANSI B16.104 Shut-off Class: Class 300.
11. Manufacturers: Johnson Controls, Siemens, Honeywell or as approved equal.

2.21 HVAC MISCELLANEOUS DEVICES

A. Local Control Panels

1. All control panels shall be factory constructed, incorporating the BMS manufacturers standard designs and layouts. All control panels shall be UL inspected and listed as an assembly and carry a UL 508 label listing compliance. Control panels shall be fully enclosed, with sub-panel, hinged door, and key-locking latch.
2. In general, the control panels shall consist of the Direct Digital Control controller(s), display module, and I/O devices—such as relays, transducers, and so forth—that are not required to be located external to the control panel due to function. The display module shall be flush mounted in the panel face unless otherwise noted.
3. All I/O connections on the Direct Digital controller shall be extended to a numbered, color-coded, and labeled terminal strip for ease of maintenance and expansion. Wiring to I/O devices shall be made from this terminal strip.
4. All other wiring in the panel, internal and external, shall be made to additional line or low voltage color-coded and labeled terminal strips. Low and line voltage wiring shall be segregated. All terminal strips and wiring shall be UL listed 300-volt service and provide adequate clearance for field wiring.
5. All wiring for every control panel shall follow a common color-coded format. All terminal strip color coding and numbering shall follow a common format. All wiring shall be neatly installed in plastic trays or tie-wrapped.
6. A convenience 120 VAC duplex receptacle shall be provided in each enclosure, fused on/off power switch, and required transformers.

B. Power Supplies (Provide new power supplies for all new BMS control panels)

1. DC power supplies shall be sized for the connected device load. Total rated load shall not exceed 75% of the rated capacity of the power supply.
2. Input: 120 VAC +10%, 60Hz.
3. Output: 24 VDC.
4. Line Regulation: +0.05% for 10% line change.
5. Load Regulation: +0.05% for 50% load change.
6. Ripple and Noise: 1 mV rms., 5-mV peak to peak.
7. An appropriately sized fuse and fuse block shall be provided and located next to the power supply.
8. A power disconnect switch shall be provided next to the power supply.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to the Department of Design and Construction General Conditions for the requirements governing execution.

3.2 INSTALLATION PRACTICES

A. Control System Wiring
   1. All conduit, wiring, accessories and wiring connections required for the installation of the Building Management System, as herein specified, shall be provided by the BMS Sub - Contractor. All wiring shall comply with the requirements of NYC electric codes, unless specified otherwise in this section.
   2. The Contractor is responsible for the installation of all low voltage control, monitoring and network wiring.
   3. Power wiring 120VAC and greater shall be provided by the Contractor.
   4. All system-input wiring shall be twisted shielded pair, minimum 18-gauge wire. All system analog output wiring shall be twisted shielded pair/3-wire as required, minimum 18-gauge wire. Preconfigured cables between Terminal Unit Controllers and Thermostats are acceptable, minimum 24 gauge.
   5. All internal panel device wiring for binary outputs and pilot relay shall be minimum 16-gauge wire.
   6. All Class 2 (24VAC or less) wiring shall be installed in conduit unless otherwise specified.
      a. Class 2 wiring not installed in conduit shall be supported every 5’ from the building structure utilizing metal hangers designed for this application. Wiring shall be installed parallel to the building structural lines. All wiring shall be installed in accordance with NYC code requirements. Exposed wiring shall only be allowed in concealed accessible locations.
   7. Low voltage control wiring and 24VAC can be run in the same conduit. Power wiring 120VAC and greater must be in a separate conduit.
   8. All wiring in mechanical rooms shall be in conduit. Minimum control wiring conduit size 3/4”.
   9. All cabling installed without conduit shall be suitable rated for the application and the cable jacket shall be clearly marked.

B. Identification Standards
   1. Controller Identification: All controllers shall be identified by a plastic engraved nameplate securely fastened to the outside of the controller enclosure.
   2. Panel Identification: All local control panels shall be identified by a plastic engraved nameplate securely fastened to the outside of the controller enclosure.
   3. Field Devices: All field devices shall be identified by a typed (not handwritten) securely attached tag label.
   4. Panel Devices: All panel devices shall be identified by a typed label securely fastened to the backplane of the local control panel.

5. Raceway Identification: All the covers to junction and pull boxes of the control system raceways shall be painted blue or have identification labels stating "Control System Wiring" affixed to the covers. Labels shall be typed, not hand written.
6. Wire Identification: All low and line voltage control wiring shall be identified by a number, as referenced to the associated control diagram, at each end of the conductor or cable. Identification number shall be permanently secured to the conductor or cable and shall be typed.

C. Dedicated Digital Controller Per Major System
1. Each major system will be provided with its own dedicated BMS controller. Mechanical systems such as AHUs or Refrigeration Plant shall not share or be controlled from the same BMS controller.

D. Input Devices
1. All Input devices shall be installed per the manufacturer's recommendation. The mechanical contractor shall install all in-line devices such as temperature wells, pressure taps, duct smoke detectors, air flow stations, etc.
   a. Low Differential Air Pressure Applications (Under 5" w.c.) Differential pressure transmitters used for flow measurement shall be sized to the flow sensing device and shall be supplied with Tee fittings and shut-off valves in the high and low sensing pick-up lines to allow the balancing subcontractor and Commissioner permanent easy-to-use connection. Provide a minimum of a NEMA 1 housing for the transmitter. Locate transmitters in accessible local control panels wherever possible. Except on VAV box applications.
   b. Medium Differential Air Pressure Applications (5" to 21" w.c.) Mount stand-alone pressure transmitters in a bypass valve assembly panel. The panel shall be constructed to NEMA 1 standards. The transmitter shall be installed in the panel with hi and low connections piped and valved. Air bleed units, bypass valves and compression fittings shall be provided.
   c. Medium to High Differential Water Pressure Applications (Over 21" w.c.): Mount stand-alone pressure transmitters in a bypass valve assembly panel. The panel shall be constructed to NEMA 1 standards. The transmitter shall be installed in the panel with hi and low connections piped and valved. Air bleed units, bypass valves and compression fittings shall be provided.
   d. Building Differential Air Pressure Applications (-1" to +1" w.c.): Mount pressure transmitter in the local control panel. Transmitter's exterior sensing tip shall be installed with a shielded static air probe to reduce pressure fluctuations caused by wind. The interior tip shall be inconspicuous and located within a central corridor shown on the drawings.
   e. Air Flow Measuring Stations: Where the stations are installed in insulated ducts, the airflow passage of the station shall be the same size as the inside airflow dimension of the duct. Station flanges shall be two inch to three inch to facilitate matching connecting ductwork. Stations shall be installed in strict accordance with the manufacturer's published requirements, and with ASME Guidelines affecting non-standard approach conditions.

f. Water Flow Monitoring Stations: Water Flow Monitoring Stations shall be installed in strict accordance with the manufacturer's published requirements, and with ASME Guidelines affecting non-standard approach conditions.

g. Outside Air Humidity Sensors: Outside air relative humidity sensors shall be installed with a rain proof, perforated cover. The transmitter shall be installed in a NEMA IV enclosure with sealtite fittings and stainless steel bushings.

h. Outside Air Sensors: Outside air sensors shall be mounted on the North wall to minimize solar radiant heat impact or located in a continuous intake flow adequate to monitor outside air temperatures accurately. Sensors exposed to solar radiation must be installed with solar shields. Sensors exposed to wind velocity pressures shall be shielded by a perforated plate surrounding the sensor element.

i. Duct Temperature Sensors: Duct mount sensors shall mount in an electrical box through a hole in the duct and be positioned so as to be easily accessible for repair or replacement. The sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate. For ductwork greater in any dimension that 48 inches and/or air temperature stratification exists such as a mixed air plenum, utilize an averaging sensor with multiple sensing points. The sensor shall be mounted to suitable supports using factory approved element holders. For large plenum applications such as mixed air temperature measurements, utilize a string of sensors mounted across the plenum to account for stratification and/or air turbulence. The averaging string shall have a minimum of 4 sensing points per 12 foot long segment.

j. Space Temperature Sensors: Shall be mounted at 60" above the finished floor. Temperature sensors installed in public areas shall be provided with lockable covers to prevent tampering.

k. Low Temperature Limit Switches: Mount element horizontally across duct in a serpentine pattern insuring each square foot of coil is protected by 1 foot of sensor. For large duct areas where the sensing element does not provide full coverage of the air stream, provide additional switches as required to provide full protection of the air stream.

l. Differential Pressure Status Switches: Provide complete installation kit including; static pressure tops, tubing, fittings and air filters. Provide appropriate scale range and differential adjustment for intended service.

m. Valve Limit Switches: Mount limit switch on valve yolk as recommended by switch manufacturer. Provide valve limit switches that will indicate both 100% Open and 100% Closed Positions.

E. Output Devices

1. All output devices shall be installed per the manufacturer's recommendation. The mechanical contractor shall install all in-line devices such as control valves, dampers, etc.
2. Actuators: All control actuators shall be sized capable of closing against the maximum system shut-off pressure. The actuator shall modulate in a smooth fashion through the entire stroke.
3. Control Dampers: Shall be opposed blade for modulating control of air flows. Parallel blade dampers shall be installed for two position applications.

4. Control Valves: Shall be sized for proper flow control with equal percentage valve plugs. The maximum pressure drop for water applications shall be 5 PSI. The maximum pressure drop for steam applications shall be 7 PSI.
5. Electronic Signal Isolation Transducers: Whenever an analog output signal from the Building Management System is to be connected to an external control system as an input (such as a chiller control panel), or is to receive as an input a signal from a remote system, provide a signal isolation transducer. Signal isolation transducer shall provide ground plane isolation between systems. Signals shall provide optical isolation between systems.

3.3 INSTRUCTION

A. General
1. The controls subcontractor shall provide the following instructing services.
2. Operator Instruction (provide 24 hours): Operator instruction shall include the detailed review of the control installation drawings, points list, and equipment list. The instructor shall then walk through the building identifying the location of the control devices installed. For each type of systems, the instructor shall demonstrate how the system accomplishes the sequence of operation.

END OF SECTION 230900

SECTION 23 09 93 – SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. The Building Management System (BMS) vendor is responsible to provide and install all control and monitoring devices for HVAC and Electrical equipment including third party interfaces, software, graphics, wiring and commissioning of automatic control systems, so as to provide a complete control system, meeting equipment manufacturer's requirements as noted, and in accordance with Contract Documents, as listed and specified.

B. Refer to "Section 230900 INSTRUMENTATION AND CONTROL FOR HVAC" for equipment and installation scope requirements.

C. The BMS Vendor is responsible to review all mechanical, electrical, plumbing Contract drawings to meet system technical performance requirements as specified. Additional devices required by other specification sections to meet performance, or due to variations in duct and piping configurations shown on mechanical or electrical plans shall be provided at no cost to the City of New York.

D. Operation of typical motor starter controls:
   1. Adjustable Frequency Control Drives with HOA mode Selector:
      a. The BMS contractor is to provide a BACnet Protocol communication interface between each VFD and it's respective Direct Digital Control panel. All Direct Digital Control equipment shall have the capabilities of remote monitoring and control at a BMS System.
      b. Coordinate with fan drive supplier specific wiring and location of all control and monitoring interfaces.
      c. Variable Frequency Drives (VFD) shall start at the minimum speed setting and shall ramp to the control point. Unless otherwise noted, the VFD shall ramp up and down full scale over 30 seconds (Adjustable). If an electrical disconnect is connected between the VFD and the equipment, the VFD shall not be allowed to operate if the disconnect is open.
      d. In addition to the BMS direct communication interface to each VFD, the following points shall be hard-wired:
         1) Enable/Disable
         2) Speed Control
         3) Run Status
         4) Bypass Status
   2. HOA switches:

a. Safety devices interlocked with "hand" and "automatic" positions in series with motor controller holding coil circuit.
b. Interlocking (via software) with other fans and equipment of system through "automatic" position only.
c. "Hand", "On", position for local control only.
d. Automatic starting from BMS through Automatic ("Auto") position only.
e. Where fans are equipped with HOA switches without BMS tie-in, operators will manually toggle HOA switches between "Hand" and "Off" to operate equipment

3. Starter switches: exhaust fans software interlocked with supply fans or CO detection system.
   a. Remote starting from BMS system through "automatic" position only.
   b. "Hand", "On", position for maintenance operation only.
4. Exhaust fans, general exhaust fans, and toilet exhaust fans controlled independently from each other. All other exhaust fans shall be controlled as per their respective associated system's specified sequence of operations. All specified fans are to be started and stopped from the BMS system. All specified fans are to have fan status. Variable frequency driven fans are to include fan "bypass" status.
   a. All safety devices interlocked with "high", "low", "on", "bypass" and "automatic" positions in series with motor controller holding coil circuit.
   b. Remote starting from BMS system through "automatic" position only.
   c. "Hand", "On", position for local control only.
   d. Automatic starting from BMS through Automatic ("Auto") position only.
   e. Where fans are equipped with HOA switches without BMS tie-in, operators will manually toggle HOA switches between "Hand" and "Off" to operate equipment

E. Operation of typical control safety devices: Provide for all systems except as otherwise noted.
   1. General:
      a. To be manually reset (except as noted), hardwired and operated to protect system in the event of Direct Digital Control Panel failure.
      b. Provide auxiliary contact on each device for connection to Direct Digital Control Panels (DDCPs) as specified.
   2. Freeze protection thermostat (freezestat, TSL) - provide one (1) 20 foot long bulb freeze protection thermostat (TSL) in length for the face of coils up to 80 square foot coil section, wired to stop supply fan (via Hard-Wired Connections). Freezestat devices are to be mounted in a serpentine pattern at the face of the cooling coil. Freeze protection thermostat (TSL) shall stop the supply fan if the air entering the cooling coil drops below 35°F (adjustable) when the fan stops, an alarm shall be transmitted to the workstation. Low temperature switches shall be capable of being reset locally and at the BMS workstation using latching relays. Fan shutdown will be operative whether the starter H-O-A switch is in the "Auto" or "Hand" or "Bypass" position.
   3. High static and low devices (PSH, PSL): Provide at AHU unit to prevent physical damage to AHU unit casing due to local mechanical equipment failure. Provide both a high static and low static device that will stop the supply fan (associated return fan noted) and annunciate a remote signal at the BMS system. Pressure differential switches installed in the discharge of each supply and exhaust fan, which sense discharge pressure, shall stop the fan and transmit an alarm to the operator workstation if the pressure set point of the switch is met. When the fan stops, an alarm shall be transmitted to the workstation. Pressure differential switches shall be capable of being reset locally and at

the BMS workstation using latching relays. Fan shutdown will be operative whether the starter H-O-A switch is in the "Auto" or "Hand" or “Bypass” position.

4. Damper end switches: Provide to prevent operation of fans until damper is fully open. Provide damper end switches as follows:
   a. On dampers, which if closed with fan running, could cause distribution system damage.
   b. On exhaust fan dampers as noted.
   c. When a fan is commanded to start (by BMS system, hand position or bypass position), the dampers will open. When open position is confirmed via end switches, fan will then start through appropriate hardware and software interlocks.
   d. Normally closed return smoke-rated control damper end switch is bypassed after startup sequence is complete to allow for mixing damper control.
   e. On air handler unit’s normally closed smoke-rated dampers.
   f. When a fan is commanded to start (by BMS system, hand position or bypass position), the dampers will open. When open position is confirmed via end switches, fan will then start through appropriate hardware and software interlocks.

F. Pump with Current Sensor for Feedback:
   1. When the device is required to run, the control system shall command the device to start by energizing the discrete output to the motor starter. The device shall run until the control system commands the device to stop or an equipment failure occurs.
   2. Equipment failure is detected by a significant reduction in amp draw as measured by a hardwired current sensor in the starter when the device is commanded on. If a failure occurs, the device shall be stopped and a critical alarm shall be generated designating that device as failed. This interlock shall be disabled for 20 seconds after the device is initially commanded to start.

G. Lead/Stand-By Device Operation
   1. The lead device (adjustable) shall be defined to be the active device. The device shall be switched between lead and standby based on run-time (adjustable based on a pre-determined schedule). The device with the lowest run-time shall become the lead device when both devices are stopped. If the lead device runs for 24 hours (adjustable), the stand-by device shall be started and the lead device shall stop. The stand-by device shall become the primary. Before the run time switchover occurs, the operator will be prompted by the BMS to determine if the switchover is appropriated. If message not responded within 10 minutes (adjustable), BMS shall switch automatically.
   2. On a failure of the lead device as sensed by feed-back instrumentation e.g. current sensor across a pump, flow switch, or a motor starter contact), the stand-by device shall become the lead and started. The original lead device shall be disabled and a critical alarm shall be generated.

H. Lead/Lag Device Operation
   1. The lead device (Adjustable) is defined as the device which starts before any other system devices and stops after all other devices have stopped. The lag device(s) start after the lead device and stop before the lead device. If multiple lag devices exist, the first lag device (Adjustable) shall start first, followed by the second (Adjustable), third (Adjustable), etc. Stopping shall occur in reverse order.
   2. The device(s) shall be switched between lead and lag based on run-time (Adjustable). The device with the lowest run-time shall become the lead device when all devices are

stopped. The device with the highest run-time shall become the lag device if all devices are operating. If the lead device runs for 24 hours (adjustable), the lag device with the lowest runtime shall be started and the lead device shall be stopped. This lag device shall then become the lead. Before the switchover occurs, the operator shall be prompted to determine if the switchover is appropriate.

3. On a failure of the lead device as measured by feedback instrumentation (e.g. current switch), the lag device with the lowest runtime shall become the lead and started by the BMS system. The original lead device shall be disabled and a critical alarm shall be generated.

I. Operation Of On/Off Valves Equipped With Limit Switches

1. The valve shall stroke in the direction of the command. If the valve has not reached the command position as measured by the appropriated position switch within the required stroking time, a critical alarm shall annunciate at the BMS workstation.

J. Loss of Power or Control Signal to Plant Valve Actuator

1. Upon loss of electrical power or control signal serving Chilled Water Plant control valves, valves shall remain at their last commanded state prior to incident. An alarm will be reported to the BMS.

K. Loss of Power or Control Signal to Spring Return Damper Actuators:

1. Upon loss of electrical power or control signal serving spring return damper actuators, actuators shall be positioned in their “normally open” or “normally closed” failsafe position.

L. System Digital Inputs

1. All digital inputs shall be provided with latching relays to remain at last commanded state.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230993

SECTION 23 23 00 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes refrigerant piping, valves and refrigerant accessories used for air-conditioning applications.

1.3 DEFINITIONS

A. ASTM: American Society for Testing and Materials

B. Terminology: As defined in ASTM B828, " Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings"

C. Terminology: As defined in ASTM B31.5, " Refrigeration Piping and Heat Transfer Components"

1.4 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 300 psig.
2. Suction Lines for Heat-Pump Applications: 535 psig.
3. Hot-Gas and Liquid Lines: 535 psig.

1.5 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:

1. Thermostatic expansion valves.
2. Solenoid valves.
3. Hot-gas bypass valves.
4. Filter dryers.
5. Strainers.
6. Pressure-regulating valves.
7. Receivers.
8. Miscellaneous specialties and accessories

C. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1. Shop Drawing Scale: 1/4 inch equals 1 foot.
2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

D. Product Data: Catalog cuts giving general assembly of specialties and data including load capacity.

E. Welding certificates.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals, including assembly views, instructions for changing cartridges, and spare parts list.

1.6 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, dielectric unions, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASTM unless indicated otherwise.

C. Refrigerant Charging (Packed Angle) Valve: Use in liquid line between receiver shut-off valve and expansion valve.

D. Pressure Relief Valves: Install on ASME receivers. Discharge piped to outdoors.

1.7 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

C. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

D. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.8 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed. Dehydrated and charge components such as piping and receivers, seal prior to shipment, and maintain seal until connected into system.

1.9 COORDINATION

A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations.

1.10 QUALIFICATIONS

A. Design piping system under direct supervision of a Professional Engineer licensed in the State of New York experienced in design of this work.

1.11 REQUIRED SITE MAERIALS

A. Provide two refrigeration oil test kits each containing everything required to conduct one test.

B. Provide two filter-dryer cartridges of each type.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Brazing Filler Metals: AWS A5.8, BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 deg F.

E. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
4. Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

2.2 REFRIGERANTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.
5. Or approved equal.

B. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines NPS 1-1/2 for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

B. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

3.3 VALVE AND SPECIALTY APPLICATIONS

A. Install as per manufacturer’s installation guidelines

3.4 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping and specialties in accordance with ASHRAE 15 and manufacturers instructions.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Refer to Division 23 Section 230900 "Instrumentation and Control for HVAC".

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Install piping to allow for expansion and contraction without stressing pipe, joints, or connects equipment.

M. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors if valves or equipment requiring maintenance is concealed behind finished surfaces.

N. Install refrigerant piping in protective conduit where installed belowground.

O. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

P. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.

3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

Q. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

R. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:

1. Shot blast the interior of piping.
2. Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.
3. Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4. Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5. Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6. Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.

S. Install pipe sleeves at penetrations in exterior walls and floor assemblies.

T. Seal penetrations through fire and smoke barriers according to Section 072700 “Firestopping/Smokeseals."

U. Insulate piping.

V. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.

W. Seal pipe penetrations through exterior walls according to Section 072700 “Firestopping/Smokeseals" for materials and methods.

X. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."

3.5 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

F. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.

H. Welded Joints: Construct joints according to AWS D10.12/D10.12M.

I. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.6 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Division 23 Section 230529 "Hangers and Supports for HVAC Piping and Equipment." Install in accordance with ASTM and M55.

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
3. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
4. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
5. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
6. NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.

D. Support multifloor vertical runs with riser clamps, at least at each floor.

E. Install hangers within 12 inches of each horizontal elbow.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.

    a. Fill system with nitrogen to the required test pressure.
    b. System shall maintain test pressure at the manifold gage throughout duration of test.
    c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    d. Remake leaking joints using new materials, and retest until satisfactory, no leakage, results are achieved.

3.8 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.9 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.

2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

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SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Double-wall rectangular ducts and fittings.
3. Single-wall round ducts and fittings.
4. Double-wall round ducts and fittings.
5. Sheet metal materials.
6. Duct liner.
7. Sealants and gaskets.
8. Hangers and supports.

B. Related Sections:
   1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
   2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Engineering Submittal: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.

1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
2. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.

3. Seismic Hazard Level C: Seismic force to weight ratio, 0.15.

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Seismic-restraint devices.

C. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

D. Engineering Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations for selecting hangers and supports.

E. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:

a. Lighting fixtures.
b. Air outlets and inlets.
c. Speakers.
d. Sprinklers.
e. Access panels.
f. Perimeter moldings.

F. Welding certificates.

G. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

E. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

F. Mockups:

1. Before installing duct systems, build mockups representing static-pressure classes in excess of 3-inch wg. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

a. Five transverse joints.
b. One access door(s).
c. Two typical branch connections, each with at least one elbow.
d. Two typical flexible duct or flexible-connector connections for each duct and apparatus.
e. One 90-degree turn(s) with turning vanes.
f. One fire damper(s).
g. Perform leakage tests specified in "Field Quality Control" Article. Revise mockup construction and perform additional tests as required to achieve specified minimum acceptable results.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 FLUSH FLAT SEAM RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class, except use sheet metal 2 gauge numbers heavier than required for classification with normal standing seam construction.

B. Transverse Joints: Fabricate joints in accordance with transverse joint detail shown on drawings. Provide all joints and seams, smooth, and alighted with no projections. In other aspects conform to SMACNA’s “HVAC Duct Construction Standards” for applicable sealing requirements, duct-support intervals and other provisions.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Install ducts with longitudinal seams at lop of ducts.

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Rectangular Duct Construction," for static-pressure class, applicable

sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Reinforcing: Install vertical stays for interval reinforcement at transverse joints and at 2 foot intervals along run of duct, as follows:

1. Ducts up to 60 inches wide: Provide 1 vertical stay at mid-point of duct.
2. Ducts 61 inches to 90 inches wide: Provide 2 vertical stays at third points of duct.
3. Ducts over 90 inches wide: Provide 3 vertical stays at quarter points of duct.
4. Vertical Stays: 10 USSG galvanized steel, free of burrs and rough edges, with both ends bent and fastened to the top and bottom of ducts.

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. PVC-Coated, Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Minimum Thickness for Factory-Applied PVC Coating: 4 mils (0.10 mm) thick on sheet metal surface of ducts and fittings exposed to corrosive conditions, and minimum 1 mil (0.025 mm) thick on opposite surface.
3. Coating Materials: Acceptable to the Commissioner for use on ducts listed and labeled by an NRTL for compliance with UL 181, Class 1.

D. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

E. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

F. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

G. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

H. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.4 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Product: Subject to compliance with requirements, provide product by one of the following:

a. CertainTeed Corporation; Insulation Group.
b. Johns Manville.
c. Knauf Insulation.
d. Owens Corning.
e. Or approved equal.

2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Maximum Thermal Conductivity:
a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F (0.039 W/m x K) at 75 deg F (24 deg C) mean temperature.
b. Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F (0.033 W/m x K) at 75 deg F (24 deg C) mean temperature.

B. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.

1. Product: Subject to compliance with product by one of the following:

a. Aeroflex USA Inc.
b. Armacell LLC.
c. Rubatex International, LLC
d. Or approved equal.

2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A (Standard for the Installation of Air-Conditioning and Ventilating Systems)

or NFPA 90B (Standard for the Installation of Warm Air Heating and Air-Conditioning Systems).

a. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Adhesive shall comply with the testing and product requirements of "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Natural-Fiber Duct Liner: 85 percent cotton, 10 percent borate, and 5 percent polybinding fibers, treated with a microbial growth inhibitor and complying with NFPA 90A or NFPA 90B.

1. Product: Subject to compliance with product by one of the following:

a. Bonded Logic, Inc.
b. Reflectix Inc.
c. The Green Products Company
d. Or approved equal

2. Maximum Thermal Conductivity: 0.24 Btu x in./h x sq. ft. x deg F (0.034 W/m x K) at 75 deg F (24 deg C) mean temperature when tested according to ASTM C 518.
3. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to ASTM E 84; certified by an NRTL.
4. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.

a. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- (3.5-mm-) diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

E. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.

4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm (12.7 m/s).
7. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm (12.7 m/s) or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

    a. Sheet Metal Inner Duct Perforations: 3/32-inch (2.4-mm) diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: As per manufacturer’s written instructions.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive or negative.
11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg (0.14 L/s per sq. m at 250 Pa) and shall be rated for 10-inch wg (2500-Pa) static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603 (Standard Specification for Metallic-Coated Steel Structural Wire Rope).

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492 (Standard Specification for Stainless Steel Rope Wire).

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.7 FIRE BARRIER DUCT WRAP

A. Fire Barrier Wrap: Comply with ASTM E2336 (Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems)

1. Product: Subject to compliance with product by one of the following:

a. Duct Wrap 615+, 3M.
b. Fyre Wrap Elite 1.5, Unifrax
c. Fire Master by Thermal Ceramics

d. Or approved equal

2. Installation shall be in strict accordance with the manufacturer's written instructions and as shown on contract documents. The duct wrap shall be high temperature fibrous thermal insulation blanket encapsulated in a fiber glass reinforced aluminized polyester foil. Duct wrap density shall be nominal 6 pcf and have a 1.5" nominal thickness. The blanket shall have a continuous use limit of 1832 F. The blanket thermal resistance at ambient temperature shall be minimum 6.3 F-ft^2 hr/BTU. Smoke developed index and flame spread index of the bare blanket, and of the foil encapsulated blanket shall be 0/0. The foil encapsulation shall be bonded to core blanket material.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.3 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Restore or replace damaged sections and finished work that does not comply with these requirements.

3.4 INSTALLATION OF DUCTS OUTDOORS

A. Ducts shall be made completely watertight.

B. Construct ducts as follows to assure water run-off.

1. Arrange standing seams so as not to act as dams.
2. Erect ducts with longitudinal seams at bottom of duct.
3. Slope entire top of duct down towards side.
4. Provide vertical struts within duct to bow tap panels of duct into convex shape.
5. Erect ducts with mastic sealant within sheet metal joints.

3.5 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.
4. Outdoor, Return-Air Ducts: Seal Class C.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class B.
6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class A.
7. Unconditioned Space, Exhaust Ducts: Seal Class C.
8. Unconditioned Space, Return-Air Ducts: Seal Class B.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.6 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099100 “Painting.”

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

   a. Ducts with a Pressure Class Higher Than 3-Inch wg (750 Pa): Test representative duct sections totaling no less than 25 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by the Commissioner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."

a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.9 DUCT CLEANING

A. Clean new and existing duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.10 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.11 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

B. Supply Ducts:

1. Ducts Connected to Constant-Volume Air-Handling Units:

a. Pressure Class: Positive 3-inch wg (750 Pa).
b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 12.

2. Ducts Connected to Variable-Air-Volume Air-Handling Units:

a. Pressure Class: Positive 4-inch wg (1000 Pa).
b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 6.

3. Ducts Connected to Equipment Not Listed Above:

a. Pressure Class: Positive 4-inch wg (1000 Pa).
b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 6.

C. Return Ducts:

1. Ducts Connected to Air-Handling Units:

a. Pressure Class: Positive or negative 3-inch wg (750 Pa).
b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 12.

2. Ducts Connected to Equipment Not Listed Above:

a. Pressure Class: Positive or negative 4-inch wg (1000 Pa).
b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 6.

D. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.
2. PVC-Coated Ducts:

a. Exposed to Airstream: Match duct material.
b. Not Exposed to Airstream: Match duct material.

3. Stainless-Steel Ducts:

a. Exposed to Airstream: Match duct material.
b. Not Exposed to Airstream: Match duct material.

4. Aluminum Ducts: Aluminum or galvanized sheet steel coated with zinc chromate.

E. Liner:

1. Supply Air Ducts: Fibrous glass, Type I, 1 inch (25 mm) thick.
2. Return Air Ducts: Fibrous glass, Type I, 1 inch (25 mm) thick.

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Velocity 1000 fpm (5 m/s) or Lower:

1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.

b. Velocity 1000 to 1500 fpm (5 to 7.6 m/s):

1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

c. Velocity 1500 fpm (7.6 m/s) or Higher:

1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Spin in.

END OF SECTION 233113

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SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Backdraft and pressure relief dampers.
2. Barometric relief dampers.
3. Manual volume dampers.
4. Control dampers.
5. Fire dampers.
6. Ceiling dampers.
7. Smoke dampers.
8. Combination fire and smoke dampers.
9. Flange connectors.
10. Turning vanes.
11. Duct-mounted access doors.
12. Flexible connectors.
13. Flexible ducts.
14. Duct accessory hardware.
15. Wire mesh grilles.
16. Louvers.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated.
   1. Performance: Show compliance with pressure drops or specific requirements noted.
   2. Provide manufacturer's installation instructions.
   3. For duct silencers/sound attenuators, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

C. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

a. Special fittings.
b. Manual volume damper installations.
c. Control damper installations.
d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
e. Duct security bars.
f. Wiring Diagrams: For power, signal, and control wiring.

2. Duct silencers/sound attenuators:

a. Connection details, manufacturer's installation instructions and installation requirements to maintain integrity of sound isolation.
b. Test reports indicating dynamic insertion loss and noise generation values of silencers/attenuators.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

E. Source quality-control reports.

F. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

C. Comply with AMCA 500-D (Laboratory Methods of Testing Dampers for Rating) testing for damper rating.

D. Demonstrate resetting of fire dampers to Commissioner.

E. Fire and smoke dampers shall be approved UL 555S.

1.5 REQUIRED SITE INVENTORY

A. Furnish required site materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Exposed-Surface Finish: Mill phosphatized.

C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and No. 2 finish for exposed ducts.

D. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

E. Extruded Aluminum: Comply with ASTM B 221 (ASTM B 221M), Alloy 6063, Temper T6.

F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

G. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 BACKDRAFT AND PRESSURE RELIEF DAMPERS

A. Description: Gravity balanced.

B. Maximum Air Velocity: 2000 fpm (10 m/s).

C. Maximum System Pressure: 2-inch wg (0.5 kPa).

D. Frame: 0.052-inch- (1.3-mm-) thick, galvanized sheet steel, with welded corners.

E. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch (150-mm) width, 0.025-inch- (0.6-mm-) thick, roll-formed aluminum with sealed edges.

F. Blade Action: Parallel.

G. Blade Seals: Neoprene, mechanically locked.

H. Blade Axles:

1. Material: Nonferrous metal.
2. Diameter: 0.20 inch (5 mm).

I. Tie Bars and Brackets: Aluminum.

J. Return Spring: Adjustable tension.

K. Bearings: Steel ball or synthetic pivot bushings.

L. Accessories:

1. Adjustment device to permit setting for varying differential static pressure.
2. Counterweights and spring-assist kits for vertical airflow installations.
3. Electric actuators.
4. Chain pulls.
5. Screen Mounting: Front mounted in sleeve.
    a. Sleeve Thickness: 20-gage (1.0-mm) minimum.
    b. Sleeve Length: 6 inches (152 mm) minimum.
6. Screen Mounting: Rear mounted.
7. Screen Material: Galvanized steel.
8. Screen Type: Bird.
9. 90-degree stops.

M. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. American Warming and Ventilating; a division of Mestek, Inc.
3. Duro Dyne Inc.
4. Greenheck Fan Corporation.
5. Ruskin Company.
6. Vent Products Company, Inc.
7. Pottorf.
8. Or approved equal.

2.3 BAROMETRIC RELIEF DAMPERS

A. Suitable for horizontal or vertical mounting.

B. Maximum Air Velocity: 2500 fpm (13 m/s).

C. Maximum System Pressure: 2-inch wg (0.5 kPa).

D. Frame: 0.064-inch- (1.6-mm-) thick, galvanized sheet steel, with welded corners.

E. Blades:

1. Multiple, 0.025-inch- (0.6-mm-) thick, roll-formed aluminum.
2. Maximum Width: 6 inches (150 mm).
3. Action: Parallel.
4. Balance: Gravity.
5. Eccentrically pivoted.

F. Blade Seals: Neoprene.

G. Blade Axles: Galvanized steel.

H. Tie Bars and Brackets:

1. Material: Aluminum.
2. Rattle free with 90-degree stop.

I. Return Spring: Adjustable tension.

J. Bearings: Synthetic.

K. Accessories:

1. Flange on intake.
2. Adjustment device to permit setting for varying differential static pressures.

L. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. American Warming and Ventilating; a division of Mestek, Inc.
3. Duro Dyne Inc.
4. Greenheck Fan Corporation.
5. Ruskin Company.
6. Vent Products Company, Inc.
7. Pottorf.
8. Or approved equal.

2.4 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Standard leakage rating, with linkage outside airstream.
2. Suitable for horizontal or vertical applications.
3. Frames:

a. Hat-shaped, galvanized-steel channels, 0.064-inch (1.62-mm) minimum thickness.
b. Mitered and welded corners.
c. Flanges for attaching to walls and flangeless frames for installing in ducts.

4. Blades:

a. Single blade up to 6 inches blade width; multiple blades for width over 6 inches.
b. Opposed-blade design for multiple blades dampers.
c. Round or oval ducts: butterfly type.
d. Stiffen damper blades for stability.
e. Galvanized-steel, 0.064 inch (1.62 mm) thick.

5. Blade Axles: Galvanized steel Stainless steel Nonferrous metal.
6. Bearings:

a. Molded synthetic.
b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

7. Tie Bars and Brackets: Galvanized steel.

8. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Air Balance Inc.; a division of Mestek, Inc.
b. American Warming and Ventilating; a division of Mestek, Inc.
c. McGill AirFlow LLC.
d. Ruskin Company.
e. Vent Products Company, Inc.
f. Pottorf.
g. Or approved equal.

B. Standard, Aluminum, Manual Volume Dampers:

1. Standard leakage rating, with linkage outside airstream.
2. Suitable for horizontal or vertical applications.
3. Frames: Hat-shaped, 0.10-inch- (2.5-mm-) thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
4. Blades:

a. Single blade up to 6 inches blade width; multiple blades for width over 6 inches.
b. Opposed-blade design for multiple blades dampers.
c. Stiffen damper blades for stability.
d. Roll-Formed Aluminum Blades: 0.10-inch- (2.5-mm-) thick aluminum sheet.
e. Extruded-Aluminum Blades: 0.050-inch- (1.2-mm-) thick extruded aluminum.

5. Blade Axles: Nonferrous metal.
6. Bearings:

a. Molded synthetic.

b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

7. Tie Bars and Brackets: Aluminum.

8. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Air Balance Inc.; a division of Mestek, Inc.
b. American Warming and Ventilating; a division of Mestek, Inc.
c. McGill AirFlow LLC.
d. Ruskin Company.
e. Vent Products Company, Inc.
f. Pottorf.
g. Or approved equal.

C. Low-Leakage, Steel, Manual Volume Dampers:

1. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
2. Suitable for horizontal or vertical applications.
3. Frames:

a. Hat shaped.
b. Galvanized-steel channels, 0.064 inch (1.62 mm) thick.
c. Mitered and welded corners.
d. Flanges for attaching to walls and flangeless frames for installing in ducts.

4. Blades:

a. Single blade up to 6 inches blade width; multiple blades for width over 6 inches.
b. Opposed-blade design for multiple blades dampers.
c. Stiffen damper blades for stability.
d. Galvanized, roll-formed steel, 0.064 inch (1.62 mm) thick.

5. Blade Axles: Nonferrous metal.
6. Bearings:

a. Molded synthetic.
b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

7. Blade Seals: Neoprene.
8. Jamb Seals: Cambered aluminum.
9. Tie Bars and Brackets: Galvanized steel.
10. Accessories:

a. Include locking device to hold dampers in a fixed position without vibration.

11. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Air Balance Inc.; a division of Mestek, Inc.
    b. American Warming and Ventilating; a division of Mestek, Inc.
    c. McGill AirFlow LLC.
    d. Ruskin Company.
    e. Vent Products Company, Inc.
    f. Or approved equal.

D. Low-Leakage, Aluminum, Manual Volume Dampers:

1. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
2. Suitable for horizontal or vertical applications.
3. Frames: Hat-shaped, 0.10-inch- (2.5-mm-) thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
4. Blades:

    a. Single blade up to 6 inches blade width; multiple blades for width over 6 inches.
    b. Opposed-blade design for multiple blades dampers.
    c. Roll-Formed Aluminum Blades: 0.10-inch- (2.5-mm-) thick aluminum sheet.
    d. Extruded-Aluminum Blades: 0.050-inch- (1.2-mm-) thick extruded aluminum.

5. Blade Axles: Galvanized steel.
6. Bearings:

    a. Molded synthetic.
    b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

7. Blade Seals: Neoprene.
8. Jamb Seals: Cambered stainless steel.
9. Tie Bars and Brackets: Galvanized steel.
10. Accessories:

    a. Include locking device to hold dampers in a fixed position without vibration.

11. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Air Balance Inc.; a division of Mestek, Inc.
    b. American Warming and Ventilating; a division of Mestek, Inc.
    c. McGill AirFlow LLC.
    d. Ruskin Company.
    e. Vent Products Company, Inc.
    f. Or approved equal.

E. Jackshaft:

1. Size: 1-inch (25-mm) diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

F. Damper Hardware:

1. Zinc-plated, die-cast core with quadrant and lever handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a lockscrew.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform to clear insulation for insulated duct mounting.

2.5 CONTROL DAMPERS

A. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

B. Frames:

1. Hat shaped.
2. Galvanized-steel channels, 0.064 inch (1.62 mm) thick.
3. Mitered and welded corners.

C. Blades:

1. Multiple blades with maximum blade width of 8 inches (200 mm).
2. Opposed-blade design.
3. Galvanized steel.
4. 0.064 inch (1.62 mm) thick.
5. Blade Edging: Closed-cell neoprene edging.
6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.

D. Blade Axles: 1/2-inch- (13-mm-) diameter; nonferrous metal; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.

1. Operating Temperature Range: From minus 40 to plus 200 deg F (minus 40 to plus 93 deg C).

E. Bearings:

1. Molded synthetic.
2. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
3. Thrust bearings at each end of every blade.

F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Warming and Ventilating; a division of Mestek, Inc.
2. Arrow United Industries; a division of Mestek, Inc.
3. Duro Dyne Inc.
4. McGill AirFlow LLC.
5. Ruskin Company.
6. Vent Products Company, Inc.
7. Young Regulator Company.
8. Pottorf.
9. Or approved equal.

2.6 FIRE DAMPERS

A. Type: Static and dynamic; UL listed and rated and labeled according to UL 555 by an NRTL. Conformance with NFPA 90A and applicable codes and standards of New York City Department of Buildings.

B. Closing rating in ducts up to 4-inch wg (1-kPa) static pressure class and minimum 4000-fpm (20-m/s) velocity.

C. Fire Rating: 1-1/2 hours.

D. Frame: Multiple-blade type; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.

E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.

1. Minimum Thickness: 0.052 or 0.138 inch (1.3 or 3.5 mm) thick, as indicated, and of length to suit application.
2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.

F. Mounting Orientation: Dynamic spring closure type, vertical or horizontal as indicated.

1. Horizontal ducts: May be gravity drop type.
2. Vertical ducts: Spring loaded type.

G. Blades: Roll-formed, interlocking, 0.034-inch- (0.85-mm-) thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- (0.85-mm-) thick, galvanized-steel blade connectors. Where installed in stainless steel or aluminum ductwork, use Type 304 stainless steel.

H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.

I. Heat-Responsive Device: Electric resettable link and switch package, factory installed, 165 deg F (74 deg C) rated.

J. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. Arrow United Industries; a division of Mestek, Inc.
3. McGill AirFlow LLC.
4. Pottorff; a division of PCI Industries, Inc.
5. Ruskin Company.
6. Or approved equal.

2.7 CEILING DAMPERS

A. General Requirements:

1. Labeled according to UL 555C by an NRTL.
2. Comply with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire Resistance Directory."

B. Frame: Galvanized sheet steel, round or rectangular, style to suit ceiling construction.

C. Blades: Galvanized sheet steel with refractory insulation.

D. Heat-Responsive Device: Replaceable, 165 deg F (74 deg C) rated, fusible links.

E. Fire Rating: 2 hours.

F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. Cesco Products; a division of Mestek, Inc.
3. Ruskin Company.
4. Vent Products Company, Inc.
5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
6. Pottorf.
7. Or approved equal.

2.8 SMOKE DAMPERS

A. General Requirements: Label according to UL 555S by an NRTL.

B. Smoke Detector: Integral, factory wired for single-point connection.

C. Frame: Multiple-blade type; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.

D. Blades: Roll-formed, horizontal, interlocking, 0.034-inch- (0.85-mm-) thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- (0.85-mm-) thick, galvanized-steel blade connectors.

E. Leakage: Class I.

F. Rated pressure and velocity to exceed design airflow conditions.

G. Mounting Sleeve: Factory-installed, 0.052-inch- (1.3-mm-) thick, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone calking.

H. Damper Motors: Modulating or two-position action.

I. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 23 Section 230900 "Instrumentation and Control for HVAC."
3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 150 in. x lbf (17 N x m).
5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F (minus 40 deg C).
6. Nonspring-Return Motors: For dampers larger than 25 sq. ft. (2.3 sq. m), size motor for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 300 in. x lbf (34 N x m).
7. Electrical Connection: 115 V, single phase, 60 Hz.

J. Accessories:
1. Test and reset switches, damper mounted.

K. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. Ruskin Company.
3. Pottorf.
4. Or approved equal.

2.9 COMBINATION FIRE AND SMOKE DAMPERS

A. Type: Static and dynamic; rated and labeled according to UL 555 and UL 555S by an NRTL.

B. Closing rating in ducts up to 4-inch wg (1-kPa) static pressure class and minimum 4000-fpm (20-m/s) velocity.

C. Fire Rating: 1-1/2 and 3 hours.

D. Frame: Multiple-blade type; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.

E. Heat-Responsive Device: Electric resettable link and switch package, factory installed, rated. Conform to NFPA 90A and NFPA 92A for fire and smoke dampers.

F. Smoke Detector: Integral, factory wired for single-point connection.

G. Blades: Roll-formed, horizontal, interlocking, 0.034-inch- (0.85-mm-) thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- (0.85-mm-) thick, galvanized-steel blade connectors.

H. Leakage: Minimum UL Class II metal to metal, non-degradable, seals rated to 850°F.

I. Rated pressure and velocity to exceed design airflow conditions.

J. Mounting Sleeve: Factory-installed, 0.052-inch- (1.3-mm-) thick, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone calking Operator located exterior of sleeve.

K. Master control panel for use in dynamic smoke-management systems.

L. Damper Motors: Modulating or two-position action.

M. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 230513 Section "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 23 Section 230900 "Instrumentation and Control for HVAC."
3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 150 in. x lbf (17 N x m).
5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F (minus 40 deg C).
6. Nonspring-Return Motors: For dampers larger than 25 sq. ft. (2.3 sq. m), size motor for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 300 in. x lbf (34 N x m).
7. Electrical Connection: 115 V, single phase, 60 Hz.
8. For outdoor dampers, provide damper with internal actuator. Contractor to increase the duct size to accommodate the reduction of the free area due to internal actuator.

N. Accessories:

1. Test and reset switches, damper mounted.

O. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:

1. Air Balance Inc.; a division of Mestek, Inc.
2. Ruskin Company.
3. Pottorf.
4. Or approved equal.

2.10 FLANGE CONNECTORS

A. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

B. Material: Galvanized steel or aluminum to match duct material.

C. Gage and Shape: Match connecting ductwork.

D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
3. Ductsox.
4. Or approved equal.

2.11 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. METALAIRE, Inc.
4. Or approved equal.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized steel, aluminum or stainless steel sheet, to match duct material; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; "Vanes and Vane Runners," and "Vane Support in Elbows."

E. Vane Construction: Double wall.

2.12 DUCT-MOUNTED ACCESS DOORS

A. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; "Duct Access Doors and Panels," and "Access Panels - Round Duct."

1. Door:

a. Double wall, rectangular.
b. Sheet metal, to match duct material, with insulation fill and thickness as indicated for duct pressure class.
c. Vision panel.
d. Hinges and Latches: 2-by-2-inch (50-by-50-mm) butt or piano hinge and cam latches.
e. Fabricate doors airtight and suitable for duct pressure class.
f. Size: Not less than 16 inches by 14 inches. Ducts less than 16 inches in height, install with one dimension 16 inches and other dimension 2 inches less than duct width. Install larger sized doors where required for access.

2. Frame: Same material as door, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:

a. Access Doors Less Than 12 Inches (300 mm) Square: No hinges and two sash locks.
b. Access Doors up to 18 Inches (460 mm) Square: Two hinges and two sash locks.
c. Access Doors up to 24 by 48 Inches (600 by 1200 mm): Three hinges and two compression latches.
d. Access Doors Larger Than 24 by 48 Inches (600 by 1200 mm): Four hinges and two compression latches with outside and inside handles.

B. Pressure Relief Access Door:

1. Door and Frame Material: Sheet steel, to match duct material.
2. Door: Double wall with insulation fill with metal thickness applicable for duct pressure class.
3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
4. Factory set at 10-inch wg (2500 Pa).
5. Doors close when pressures are within set-point range.
6. Hinge: Continuous piano.
7. Latches: Cam.
8. Seal: Neoprene or foam rubber.
9. Insulation Fill: 1-inch- (25-mm-) thick, fibrous-glass or polystyrene-foam board.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Warming and Ventilating; a division of Mestek, Inc.
2. Ductmate Industries, Inc.
3. McGill AirFlow LLC.
4. Pottorff; a division of PCI Industries, Inc.
5. Ventfabrics, Inc.
6. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
7. Or approved equal.

2.13 DUCT ACCESS PANEL ASSEMBLIES

A. Labeled according to UL 1978 by an NRTL.

B. Panel and Frame: Minimum thickness 0.0528-inch (1.3-mm) carbon steel.

C. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.

D. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F (1093 deg C).

E. Minimum Pressure Rating: 10-inch wg (2500 Pa), positive or negative.

F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Flame Gard, Inc.
3. 3M.
4. Or approved equal.

2.14 FLEXIBLE CONNECTORS

A. Materials: Flame-retardant or noncombustible fabrics.

B. Coatings and Adhesives: Comply with UL 181, Class 1.

C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches (89 mm) wide attached to 2 strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 30 oz./sq. yd. (880 g/sq. m).
2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.

3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 30 oz./sq. yd. (810 g/sq. m).
2. Tensile Strength: 530 lbf/inch (93 N/mm) in the warp and 440 lbf/inch (77 N/mm) in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F (Minus 45 to plus 121 deg C).

F. High-Temperature System, Flexible Connectors: Glass fabric coated with silicone rubber.

1. Minimum Weight: 16 oz./sq. yd. (542 g/sq. m).
2. Tensile Strength: 285 lbf/inch (50 N/mm) in the warp and 185 lbf/inch (32 N/mm) in the filling.
3. Service Temperature: Minus 67 to plus 500 deg F (Minus 55 to plus 260 deg C).

G. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.

1. Minimum Weight: 14 oz./sq. yd. (474 g/sq. m).
2. Tensile Strength: 450 lbf/inch (79 N/mm) in the warp and 340 lbf/inch (60 N/mm) in the filling.
3. Service Temperature: Minus 67 to plus 500 deg F (Minus 55 to plus 260 deg C).

H. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch (6-mm) movement at start and stop.

I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Ventfabrics, Inc.
4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
5. Or approved equal.

2.15 WIRE MESH GRILLES

A. Construction: 1/2 inch (12.5 mm) mesh screen with 1 inch (2.5 mm) sheet metal frame, bolted to flanged duct connection.

B. Materials:

1. Screen: Minimum 18 gauge galvanized steel.
2. Frame: Minimum 0.040 inch (1.02 mm) thick galvanized sheet steel.
3. Bolts and nuts: Indoors, galvanized steel; exposed to weather, stainless steel.

2.16 LOUVERS

A. Connect to louvers furnished under General Construction work.

B. Tested in accordance with AMCA Standard 500 and provided with AMCA Certified Rating Seal.

C. Material: Extruded aluminum; comply with ASTM B 221 (ASTM B 221M), Alloy 6063 T 5, with anodized finish.

D. Frame: Minimum 0.071 inch (1.8 mm) thick extruded aluminum, with welded corners and mounting flange. Mounting arrangement shall be suitable for installation in particular building construction.

E. Blades: 4 inch (100 mm) deep stationary blades, minimum 0.071 inch (1.8 mm) thick extruded aluminum, welded to frame for a complete welded assembly.

1. Set at 45° angle, with 50 percent free area.
2. Stormproof, double drainage type blade configuration.
3. Performance: Water penetration shall be not more than 0.01 oz/sq ft at 950 ft/min.

F. Screen: Aluminum wire, 0.5 inch (12.5 mm) mesh in a removable frame.

1. Bolted to interior face of louver.
2. Secured on interior of louver with 2 inch space.

G. Blank-off panels: Provide for unused portion of louvers.

1. Double wall construction. Inner and outer casing: 0.032 inch (0.8 mm) thick aluminum.
2. Internal insulation: 2 inch (50 mm) thick glass fiber, per SMACNA Duct Construction Standards.

H. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Airolite Co.
2. Arrow United Industries.
3. Carnes Co.

4. Ruskin Co.
5. Or approved equal.

2.17 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing the execution.

3.2 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts and as indicated. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install volume dampers at the following locations:

a. At all splits, except grease exhaust ducts.
b. In ducts serving single supply, return and exhaust outlets.
c. In open return ducts above ceiling.
d. In ducts connecting to a common plenum.
e. Where indicated on drawings and in details.
f. Where required for balancing.

2. Install remote damper operators for volume dampers above ceilings which are non-accessible or without access panels.

3. Install steel volume dampers in steel ducts.
4. Install aluminum volume dampers in aluminum ducts.
5. Do not install volume dampers in grease ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated and in ductwork where required for testing and adjusting.

G. Install fire and smoke dampers according to UL listing in ducts and openings in the following:

1. Shaft walls.
2. Floors and ceilings.
3. Fire walls.
4. Fire resistance partitions.
5. Fire rated ceilings.
6. Exit corridor walls.
7. Elsewhere as indicated on drawings.

H. Install duct security bars. Construct duct security bars from 0.164-inch (4.18-mm) steel sleeve, continuously welded at all joints and 1/2-inch- (13-mm-) diameter steel bars, 6 inches (150 mm) o.c. in each direction in center of sleeve. Weld each bar to steel sleeve and each crossing bar. Weld 2-1/2-by-2-1/2-by-1/4-inch (63-by-63-by-6-mm) steel angle to 4 sides and both ends of sleeve. Connect duct security bars to ducts with flexible connections. Provide 12-by-12-inch (300-by-300-mm) hinged access panel with cam lock in duct in each side of sleeve.

I. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. Upstreamand downstream from duct filters.
3. At outdoor-air intakes and mixed-air plenums.
4. At drain pans and seals.
5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
7. At each change in direction and at maximum 50-foot (15-m) spacing.
8. Upstream from turning vanes.
9. Upstream or downstream from duct silencers.
10. Control devices requiring inspection, including smoke detection heads.
11. At fan bearings enclosed in ducts.
12. Inlet side of each single width centrifugal fan.
13. At inlet and outlet sides of each in-line centrifugal and axial fan.
14. At duct humidifiers.

J. Install access doors with swing against duct static pressure.

K. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
2. Two-Hand Access: 12 by 6 inches (300 by 150 mm).
3. Head and Hand Access: 18 by 12 inches (460 by 300 mm).
4. Head and Shoulders Access: 21 by 14 inches (530 by 355 mm).
5. Body Access: 25 by 14 inches (635 by 355 mm).
6. Body plus Ladder Access: 25 by 17 inches (635 by 430 mm).

L. Label access doors according to Division 23 Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

M. Install flexible connectors at duct connections to equipment, at building expansion joints, at connections between ducts of dissimilar metals and at penetrations of mechanical equipment room walls.
1. Install flexible connections with 2 inches slack in fabric and minimum movement of 1 inch.

N. For fans developing static pressures of 5-inch wg (1250 Pa) and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

O. Connect terminal units to supply ducts directly or with maximum 12-inch (300-mm) lengths of flexible duct. Do not use flexible ducts to change directions.

P. Connect diffusers or light troffer boots to ducts directly or with maximum 18-inch (460-mm) lengths of flexible duct clamped or strapped in place.

Q. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws. Attach to supply air duct with low entrance lass, bellmouth type connector at air inlet end.

R. Install duct test holes where required for testing and balancing purposes.

S. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.

T. Install wire mesh screen grilles at return air ducts in hung ceilings and in other places where indicated. Bolt grilles to flanged connections or ducts at terminations.

U. Install louvers in building construction at locations where indicated. Coordinate mounting details with particular building construction and/or window framing details. Install blank-off panels at unused portions of louvers; secured with bolts and/or screws.

V. Air Flow Measuring Stations
1. Install air flow measuring stations where indicated, or as directed by Commissioner.
2. Install all interconnecting tubing between measuring station, companion meter and control systems, in accordance with the manufacturer’s printed instructions.

W. Install air blenders in accordance with the manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

3.4 MANUFACTURER'S FIELD SERVICES

A. Provide services of an AABC testing agency to take noise measurements. Use meters meeting requirements of ASA 47 (ANSI S1.4).

B. After start-up, and final corrections and balancing of systems, take octave band sound measurements over full audio frequency range in areas adjacent to mechanical equipment rooms, duct and pipe shafts, and other critical locations, as directed.

C. Provide one-third octave band measurements of artificial sound sources in areas indicated as having critical requirements.

D. Submit complete report of test results including sound curves.

END OF SECTION 233300

SECTION 23 34 23 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:
   1. Centrifugal roof ventilators.
   2. Axial roof ventilators.
   3. Upblast propeller roof exhaust fans.
   4. Centrifugal wall ventilators.
   5. Ceiling-mounting ventilators.
   6. In-line centrifugal fans.
   7. Propeller fans.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on actual Project site elevations.

B. Operating Limits: Classify according to AMCA 99.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:

   1. Certified fan performance curves with system operating conditions indicated.
   2. Certified fan sound-power ratings.
   3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
   4. Material thickness and finishes, including color charts.
   5. Dampers, including housings, linkages, and operators.
   6. Roof curbs.
   7. Fan speed controllers.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.
2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.

D. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Roof framing and support members relative to duct penetrations.
2. Ceiling suspension assembly members.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

E. System Effect calculations: Since all fans are tested in accordance with AMCA standards and data catalogued consists of fan capacity (CFM at external static pressure) while connected to straight inlet and discharge duct conditions, the vendor is responsible for calculating the "System Effect" pressure drop of inlet and discharge connections to the ducts shown on the drawings. This static pressure will be added to the external static pressure of the fan and the submitted fan, fan accessories and fan curve shall indicate the rpm, dfm, bhp, tip speed and other required capacity data to be corrected to account for the "System Effect" pressure drop and for a minimum 5% or higher belt drive losses based upon the size and number of V-belts required for the fan sheaves in the selection of the actual motor horse power to provide.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to The City of New York and marked for intended use.

C. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

D. AMCA Compliance: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, “Laboratory methods of Testing Fans for Rating.” Label fans with the AMCA Certified Ratings Seal..

E. American Society for Testing Materials (ASTM): Standard E84, Surface Burning Characteristics of Building Materials.

F. National Fire Protection Association (NFPA): Standard 255, Test Methods, Surface Burning Characteristics of Building Materials.

G. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

H. UL Standard: Power ventilators shall comply with UL 705.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.

B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

D. Protect motors, shafts, and bearings from weather and construction dust. Comply with manufacturer’s wheel and motor rotation schedule for extended storage.

1.7 COORDINATION

A. Coordinate size and location of structural-steel support members. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 03 00 50 “Concrete Work.”

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

1.8 REQUIRED MATERIALS

A. Furnish required materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Belts: One set(s) for each belt-driven unit.

PART 2 - PRODUCTS

2.1 General

A. Units furnished shall be complete with all components assembled. All features considered standard by the manufacturer and which are required to complete the system, and to make it functional, shall be included without respect to specific detailing in these specifications.

B. A specific configuration of the duct at each unit has been indicated on the drawings based on required discharge and intake requirements. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are scheduled units or a listed manufacturer), it shall be the Contractor's responsibility to modify duct, etc. as required to accommodate the actual configuration of units furnished on the project.

C. Low leakage motorized backdraft dampers: The fan manufacturer shall provide ultra low leakage type motorized backdraft dampers as indicated on the plans. Frames shall not be less than 0.093 inch (2.3 mm) thick stainless steel. Blades must not be over (8 inches) wide not less than stainless steel roll formed with edge seals. Bearing shall be ball bearing or nylon with ½" shafts. Side seals shall be stainless steel of the tight-seal spring type. Dampers and seals shall be suitable for temperature ranges of 40°F to 200°F. Dampers shall be minimum (ultra-low leakage) leakage type to conserve energy and the manufacturer shall submit leakage and flow characteristic data for all backdraft dampers with the fan manufacturer temperature control submitted. Maximum leakage shall be 0.07% at static pressure of 3 inches of WC.

D. Preview safety disconnects shall be mounted on the fans at the fan motor with flexible conduit and shall conform to requirements of Division 26. Roof mounted fans with three phase motors shall have NEMA-3R disconnects pre-wired.

E. Three phase motors 1 ½ hp and larger shall be TEFC premium plus high efficiency.

F. Furnish and install curb mounted outside air intake hoods, exhaust fan discharge air hoods, relief hoods, and curb mounted rook exhaust fans on roof curbs where indicated on the drawings.
   1. Openings in roof and supporting miscellaneous steel and structural framing as required for support of all roof mounted outside air intake hoods, roof mounted relief hoods, roof mounted discharge hoods for ceiling exhaust fans, and roof mounted exhaust fans shall be by the Contractor.
   2. HVAC Subcontractor must furnish to the Contractor exact curb outside dimensions, exact roof opening sizes and dimensioned location of roof curbs on roof.
   3. Roof curbs for aluminum fans shall be minimum 36 tall, factory pre-fabricated all welded aluminum construction, factory insulated with built in cant, 1 ½" by 1 ½" wolmanized and fire treated wooded nailer strip, 1 1/2" wide by 1/8" thick neoprene full perimeter curb gasket. Roof curbs shall be furnished with damper trays for ease of mounting damper and duct connection. Roof curbs for galvanized steel fans shall be same as for aluminum curbs, except factory pre-fabricated all welded galvanized construction.
   4. Where fans are installed on sloping roofs, the fan manufacturer shall provide a roof curb that matches the roof slop or curvature to allow the fan to be installed level and shall be responsible for coordination with Architectural drawings for exact roof slop and for flashing and sealing details.

5. Where fans are installed on standing seam metal sloping roofs, the standing seam metal roofing manufacturer shall provide the roof curb.
   a. The standing seam metal roofing manufacturer shall provide a 12" high insulated, welded, galvanized, steel roof curb with 1 ½" by 1 ½" wolmanized and fire treated wooden nailer strip for all roof mounted outside air intake goods, roof mounted discharge hoods for ceiling exhaust fans, roof mounted exhaust fans to match slope and roofing material corrugations and standing seam configuration. Roofing manufacturer must coordinate with Architectural drawings for exact roof slope and for flashing sealing details.
   b. Roofing manufacturer must coordinate with HVAC Subcontractor for exact curb outside dimensions, exact backdraft damper tray opening and dimensions, and exact roof opening size for fans furnished by the contractor.
   c. Contractor must install roof curbs in manner as recommended by standing seam metal roofing manufacturer furnished on the project and as detailed by the Commissioner.

2.2 CENTRIFUGAL ROOF VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Aerovent; a Twin City Fan Company.
   2. Carnes Company HVAC.
   3. Greenheck.
   4. Hartzell Fan, Inc.
   5. Jenco Fan; Div. of Breidert Air Products.
   6. Loren Cook Company.
   7. Penn Ventilation.
   8. Or Approved Equal

B. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.

   1. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.

C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

D. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:

   1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
   2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
   3. Fan and motor isolated from exhaust airstream.
   4. Pulleys: Cast-iron, adjustable-pitch motor pulley.
      a. Fan pulley: Fixed pitch diameter.
      b. Motor pulley: Variable pitch diameter for use with motors up to 5 hp; Fixed pitch diameter for larger motors and for fans with solid state speed controllers. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.

5. Belts: Oil resistant, non-sparking, non-static, notch grip construction; matched sets for multiple belt drives.

E. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside or outside fan housing, factory wired through an internal aluminum conduit.
3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
4. Dampers: Counterbalanced, rattle free, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
5. Motorized Dampers: Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.
6. Configuration: Built-in cant and mounting flange.
7. Overall Height: 36 inches.
8. Sound Curb: Curb with sound-absorbing insulation matrix.
9. Pitch Mounting: Manufacture curb for roof slope.
10. Metal Liner: Aluminum.
11. Mounting Pedestal: Galvanized steel with removable access panel.
12. Vented Curb: Unlined with louvered vents in vertical sides.

F. Characteristics:
1. Drive Arrangement: Direct or Belt drive, refer to fan schedules.
2. Damper: Yes.

2.3 UPBLAST PROPELLER ROOF EXHAUST FANS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Aerovent; a Twin City Fan Company.
2. Carnes Company HVAC.
3. Greenheck.
4. Hartzell Fan, Inc.
5. Industrial Air; a division of Lau Industries, Inc.
6. Jenco Fan; Div. of Breidert Air Products.
7. Loren Cook Company.
8. New York Blower Company (The).
9. Penn Ventilation.
10. Or Approved Equal

B. Description: Direct- or belt-driven propeller fans consisting of housing, wheel, butterfly-type discharge damper, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.

C. Wind Band, Fan Housing, and Base: Reinforced and braced aluminum, containing aluminum butterfly dampers and rain trough, motor and drive assembly, and fan wheel.

1. Damper Rods: Steel with bronze or nylon bearings.

2. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.

D. Fan Wheel: Replaceable, extruded-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.

E. Belt-Driven Drive Assembly: Resiliently mounted to housing; weatherproof housing of same material as fan housing with the following features:

1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
2. Shaft Bearings: Prelubricated and sealed, self-aligning, pillow-block-type ball bearings.
3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
   a. Fan pulley: Fixed pitch diameter.
   b. Motor pulley: Variable pitch diameter for use with motors up to 5 hp; Fixed pitch diameter for larger motors and for fans with solid state speed controllers. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
4. Belts: Oil resistant, non-sparking, non-static, notch grip construction; matches, etc. for multiple belt drives.
5. Motor Mount: On outside of fan cabinet, adjustable base for belt tensioning.

F. Roof Curbs: Aluminum; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls, damper tray and 1-1/2-inch woodnailer, and neoprene curb sealing gasket. Size as required to suit roof opening and fan base.

1. Configuration: Built-in cant and mounting flange.
2. Overall Height: 36 inches.
3. Sound Curb: Curb with sound-absorbing insulation matrix.
4. Pitch Mounting: Manufacture curb for roof slope.
5. Metal Liner: Galvanized steel.
6. Mounting Pedestal: Galvanized steel with removable access panel.

G. Characteristics:
1. Drive Arrangement: Direct or Belt drive.
2. Damper: Yes.

H. Special Applications:
1. Smoke Exhaust Fans:
   a. Up-blast type, all steel construction, with heat slinger wheel and seal.
   b. High temperature bearings and bearing grease.
   c. Motor and belt outside of air stream with insulated belt housing.
   d. Bifurcated housing for direct drive motor outside of air stream.
   e. U.L. 792 listed for high temperature operation and duration, i.e. 1,000°F (538°C) with minimum operation of 15 minutes and 500°F (260°C) with 4 hours minimum operation.
   f. Ultra-low leakage motorized back-draft damper.
   g. Inlet bell with debris screen.
   h. Flexible electrical connector with pre-wired NEMA 3R disconnect switch.

I. Comply with requirements in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

J. Enclosure Type: Totally enclosed, fan cooled.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install power ventilators level and plumb.

B. Vibration- and seismic-control devices are specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

1. Secure vibration and seismic controls to concrete bases using anchor bolts cast in concrete base.

C. Install floor-mounting units on concrete bases. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."

D. Install floor-mounting units on concrete bases designed to withstand, without damage to equipment, the seismic force required by code. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."

E. Secure roof-mounting fans to roof curbs with stainless steel hardware.
1. Contractor shall coordinate all required roof openings with the existing roof structure and shall provide a roof opening shop drawing with the required roof openings dimensioned and sized for the General Contractor to frame out and provide roof openings. Refer to structural plans for required roof opening framing.
2. Roof curbs shall be furnished and located by the Contractor.
3. Secure unit curb cap to roof curb with stainless steel or cadmium-plated screws a maximum of 12” on center minimum four per side.
4. All roof-mounted equipment must be properly secured to the building structure to withstand local Coastal Windstorm criteria, i.e., minimum 114 MPH hurricane force winds or required seismic criteria.

F. Support suspended units from structure using threaded steel rods. Vibration-control devices are specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC Piping and Equipment."

G. Install units with clearances for service and maintenance.

H. Label units according to requirements specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

3.3 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 33 00 "Air Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Adjust belt tension.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.
8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
10. Shut unit down and reconnect automatic temperature-control operators.
11. Remove and replace malfunctioning units and retest as specified above.

B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension and align motor belt drive sheaves with fan sheaves.

C. Refer to Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

D. Replace fan and motor pulleys as required to achieve design airflow.

E. Lubricate bearings.

END OF SECTION 233423

SECTION 23 36 00 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Constant volume single-duct air terminal units.
2. Variable air volume single-duct air terminal units.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated, include rated capacities, furnished specialties, sound-power ratings, and accessories.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, materials used in fabrication, method of field assembly, components, and location and size of each field connection.

1. Include a schedule showing unique model designation, room location, model number, size, and accessories furnished.
2. Wiring Diagrams: Power, signal, and control wiring and differentiate between factory-installed and field-installed wiring.
3. Include catalog performance ratings which indicate air flow, static pressure and NC designation.
4. Include a schedule listing discharge and radiated sound power levels, for each unit, of second to sixth octave band at inlet static pressure of 1 to 4 in. w.g. NC data alone will not be acceptable.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension assembly members.

2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

E. Operation and Maintenance Data: For air terminal units to include in emergency, operation, and maintenance manuals. In addition to items specified in DDC General Conditions, include the following:

1. Instructions for resetting minimum and maximum air volumes.
2. Instructions for adjusting software set points.
3. Directions for resetting constant volume regulators.
4. Parts list for each type of air terminal unit and troubleshooting maintenance guide.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of air terminal units and are based on the specific system indicated.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to the Commissioner, and marked for intended use.

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

E. NFPA Compliance: Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

F. Air terminal units shall be certified under AIR Standard 880-98 (Air Conditioning & Refrigeration Institute 1998 Standard for Air Terminals) certification program and carry the ARI seal.

G. Air terminal unit lining shall meet UL 181 and NFPA 90A standards.

1.5 COORDINATION

A. Coordinate layout and installation of air terminal units and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Air terminal units shall be equipped with pressure independent direct digital controls supplied by the Control Subcontractor and mounted at the factory by the terminal unit manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 CONSTANT VOLUME SINGLE DUCT AIR TERMINAL UNITS

A. Manufacturers:

   1. Anemostat; a Mestek Company.
   2. Carnes.
   3. Krueger.
   4. Titus.
   5. Trane co. (The); Worldwide Applied systems Group.
   6. Tuttle & Bailey.
   7. Or approved equal.

B. Configuration: Volume-damper assembly inside unit casing with control components located inside a protective metal enclosure.

C. Casing: 0.034-inch galvanized steel.

   1. Casing Lining 1-inch thick, coated, fibrous-glass duct liner complying with ASTM C 1071; secured with adhesive. Cover liner with nonporous foil and perforated metal.
   2. Air Inlets: Round stub connections of S-slip and drive connections for duct attachment.
   3. Air Outlet: S=slip and drive connections.
   4. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket.
   5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

D. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.

   1. Maximum Damper Leakage: ARI 880 rated, 2 percent of nominal airflow at 6-inch wg inlet static pressure.
   2. Damper Position: Normally open.

E. Electronic Controls: Bidirectional damper operator and microprocessor-based thermostat with integral airflow transducer and room sensor shall be compatible with temperature controls specified in Section 230900 “Instrumentation and Control for HVAC.” And shall have the following features:

   1. Damper Actuator: 24 V, powered closed.

2. Velocity Controller: Cross flow type factory calibrated to indicated air volumes, field adjustable. Shall maintain constant airflow within 5 percent of set point while compensating for inlet static-pressure variations up to 4-inch wg; and shall have a multipoint, velocity sensor. Locate velocity sensors in air inlet and air outlet.

F. Direct Digital Controls: Single-package unitary controller and actuator specified in Section 230900 "Instrumentation and Control for HVAC."

2.3 VARIABLE AIR VOLUME SINGLE DUCT AIR TERMINAL UNITS

A. Manufacturers:

1. Anemostat; a Mestek Company.
2. Carnes.
3. Krueger.
4. Titus.
5. Trane co. (The); Worldwide Applied systems Group.
6. Tuttle & Bailey.
7. Or approved equal.

B. Configuration: Volume-damper assembly inside unit casing with control components located inside a protective metal enclosure.

C. Casing: 0.034-inch galvanized steel.
1. Casing Lining: 1-inch thick, coated, fibrous-glass duct liner complying with ASTM C 1071; secured with adhesive. Cover liner with nonporous foil and perforated metal.
2. Air Inlets: Round stub connections of S-slip and drive connections for duct attachments.
3. Air Outlet: S-slip and drive connections.
4. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket.
5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

D. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.
1. Maximum Damper Leakage: ARI 880 rated, 2 percent of nominal airflow at 3-inch wg inlet static pressure.
2. Damper Position: Refer to control sequences

E. Electric Heating Coil: Slip-in-type, open-coil design with integral control box factory wired and installed. Include the following features:

F. Electronic Controls: Bidirectional damper operator and microprocessor-based thermostat with integral airflow transducer and room sensor shall be compatible with temperature controls specified in Section 030900 "Instrumentation and Control for HVAC." And shall have the following features:

1. Damper Actuator: 24 V.
2. Velocity controller: cross flow type, factory calibrated to minimum and maximum air volumes, field adjustable at thermostat; shall maintain constant airflow dictated by

thermostat within 5 percent of set point while compensating for inlet static-pressure variations up to 4-inch wg (1000 Pa); and shall have a multipoint velocity sensor. Locate velocity sensors in air inlet and air outlet.

3. Thermostat: Wall-mounting electronic type with the flowing features:

    a. Proportional, plus integral control of room temperature.
    b. Time-proportional reheat-coil control.
    c. Temperature set-point display in Fahrenheit and Celsius.
    d. Auxiliary switch shall energize heating control circuit.
    e. Changeover thermistor shall reverse action.

G. Direct Digital Controls: Bidirectional damper operators and microprocessor-based controller and room sensor shall be compatible with temperature controls specified in Section 230900 "Instrumentation and Control for HVAC" and shall have the following features:

1. Damper Actuator: 24 V.
2. Terminal Unit Controller: Pressure-independent, variable-air-volume controller with electronic airflow transducer with multipoint cross flow type velocity sensor at air inlet, factory calibrated to minimum and maximum air volumes, and having the following features:

    a. Proportional, plus integral control of room temperature.
    b. Time-proportional reheat-coil control.
    c. Occupied and unoccupied operating mode.
    d. Remote reset of airflow or temperature set points.
    e. Adjusting and monitoring with portable terminal.
    f. Communication with temperature-control system specified in Section 230900 "Instrumentation and Control for HVAC."

3. Room Sensor: Wall mounting, with temperature set-point adjustment and access for connection of portable operator terminal.

H. Control Sequence:

1. Suitable for operation with duct pressures between 0.25- and 3.0-inch wg (60- and 750-Pa) inlet static pressure.
2. Control modulating damper to maintain vary supply air flow to maintain room temperature.
3. Wall mounting thermostat with temperature set-point adjustment.

2.4 SOURCE QUALITY CONTROL

A. Identification: Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, coil type, and ARI certification seal.

B. Verification of Performance: Rate air terminal units according to ARI 880.

C. Noise Levels at noted capacities: Units tested in accordance with ASHRAE Standard 36B or ADC, with ratings tabulated for inlet pressure of 3 in, 1 3/4 in, 1 1/2 in, and minimum static pressure.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

B. Provide sound lining downstream of units for a minimum of 5 ft. or as recommended by unit manufacturer to maintain scheduled NC levels.

C. Maintain sufficient clearance for normal service and maintenance.

D. Coordinate access through ceilings with respective trades.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to air terminal units to allow service and maintenance.

C. Connect ducts to air terminal units according to Section 233113 "Metal Ducts."

D. Ground units with electric heating coils according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
2. Leak Test: After installation, fill water coils and test for leaks. Patch leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units, controls and equipment, and retest as specified above.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions and do the following:

a. Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.
b. Verify that controls and control enclosure are accessible.
c. Verify that control connections are complete.
d. Verify that nameplate and identification tag are visible.
e. Verify that controls respond to inputs as specified.

3.6 INSTRUCTION

A. Engage a factory-authorized service representative to instruct City of New York operating personnel to adjust, operate, and maintain air terminal units. Refer to DDC General Conditions.

END OF SECTION 233600

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SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffusers.
2. Fixed face registers and grilles.
3. Linear bar grilles.

B. Related Sections:

1. Division 23 Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

C. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

D. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

E. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.

F. Source quality-control reports.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Test and rate performance of air outlets and inlets in accordance with ASHRAE 70.

C. Install diffusers, registers, and grilles according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating System."

PART 2 - PRODUCTS

2.1 GENERAL

A. Manufacturer shall examine application of each air inlet and outlet and guarantee that each will provide comfort space conditions without drafts or noise at noted capacities.

B. Noise Level: Noise levels at rated capacities shall not exceed criteria specifies under 1.4 "Quality Assurance."

C. All outlets shall be suitable for operation at 5 percent more and at 25 percent less than noted capacities.

D. Air inlets and outlets for surface mounting shall have a concealed mounting frame, with no mounting screws visible in face frame of outlet and/or plastic frame, unless otherwise noted.

E. Scheduled air outlets shall be as manufactured by the listed manufacturer and shall, to the greatest extent possible, all be manufactured by the same manufacturer.

F. The contractor and vender shall be jointly responsible for all quantity and neck size take-offs and coordination of mounting details with the ceiling, wall, or floor mounting in which it is installed.

G. Air distribution devices shall have unit mounted opposed blade volume dampers operable from the face of the air distribution devices.

H. Diffusers in the same room shall all be the same size and type, except as otherwise indicated.

I. Contractor shall provide all required blank offs for directional pattern throws.

2.2 CEILING DIFFUSERS

A. Rectangular and Square Ceiling Diffusers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Anemostat Products; a Mestek company.
    b. Krueger.
    c. Nailor.
    d. Titus.
    e. Or approved equal.

2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel (unless indicated otherwise).
4. Finish: Baked enamel, white.
5. Face Size: 24 by 24 inches or 12 by 12 inches as indicated in schedules
6. Face Style: Plaque.
7. Mounting: Surface or T-bar (as coordinated with RCPs).
8. Pattern: Fixed.
9. Dampers: Radial opposed blade.
10. Accessories:

    a. Equalizing grid.
    b. Plaster ring.
    c. Safety chain.
    d. Wire guard.
    e. Sectorizing baffles.
    f. Operating rod extension.

2.3 REGISTERS AND GRILLES

A. Adjustable Bar Register & Grilles:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Anemostat Products; a Mestek company.
    b. Krueger.
    c. Nailor.
    d. Titus.
    e. Or approved equal.

2. Material: Steel, Aluminum or Stainless steel (as indicated in schedules).

3. Finish: Baked enamel, white, for steel or aluminum. Stainless steel shall not be painted.
4. Face Blade Arrangement: Horizontal spaced 3/4 inch apart.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
7. Frame: 1-1/4 inches wide.
8. Mounting: Countersunk screw.
9. Damper Type: Adjustable opposed blade.

2.4 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Commissioner for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

D. Carefully install all ceiling mounted air distribution devices back pan insulation and vapor barrier. Where pre-molded insulation and vapor barrier is not furnished as an accessory to the air distribution device by the manufacturer the Contractor is responsible for field installation of insulation and vapor barrier for ceiling air distribution device back pans.

E. All visible interior surfaces of all grilles and air device accessories and components visible through the face of the outlet shall be factory painted flat black.

F. Install a manual volume damper in the branch duct to the air distribution device or at the conical bell-mouth spin-in fitting for connection of round flexible duct to the rectangular duct for balancing purposes.

G. Provide all required blank off for directional pattern.

H. Diffusers Utilizing a Plenum Box: Provide plenum box fabricated of 24 USBG galvanized steel, with internal surfaces lined with minimum 1/2 inch thick duct liner as specified under Division 23 Section 233113 "Metal Ducts."

I. Install return and exhaust registers with blades oriented to prevent sight though outlets.

J. Transfer Grilles: Provide 2 grilles, one on each side of wall with connecting sheet metal collar.

K. Transfer Ducts: Provide 2 grilles, one at each end of duct.

L. Air Handling Type Lighting Fixtures:

1. Furnish, install, connect, and balance all air boots for lighting fixtures, as required.
2. Remove air slot covering strip before mounting air boots to lighting fixtures.
3. Install flexible duct connections from branch duct to fixture air boot.
4. Balance and adjust slot air pattern with directional control blades.

3.4 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

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SECTION 23 37 23 - HVAC GRAVITY VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following types of roof-mounting intake and relief ventilators:

1. Louver penthouses.

B. Related Sections include the following:
1. Specification 233423 "HVAC Power Ventilators" for roof-mounting exhaust fans.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Intake and relief ventilators shall be capable of withstanding the effects of gravity loads, wind loads, and thermal movements without permanent deformation of components, noise or metal fatigue, or permanent damage to fasteners and anchors.

B. Water Entrainment: Limit water penetration through unit to comply with ASHRAE 62.1-2004.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

C. Shop Drawings: For intake and relief ventilators. Include plans, elevations, sections, details, and ventilator attachments to curbs and curb attachments to roof structure.

D. Coordination Drawings: Roof framing plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members to which roof curbs and ventilators will be attached.
2. Sizes and locations of roof openings.

E. Samples for Verification: For each type of exposed finish required for intake and relief ventilators.

F. Welding certificates.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Source Limitations: Obtain ventilators through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

C. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of intake and relief ventilators and are based on the specific equipment indicated.

1. Do not modify intended aesthetic effects, as judged solely by Commissioner, except with Commissioner's approval. If modifications are proposed, submit comprehensive explanatory data to Commissioner for review.

E. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2, "Structural Welding Code--Aluminum."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 COORDINATION

A. Coordinate installation of roof curbs and roof penetrations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5 or T-52.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming or as otherwise recommended by metal producer for required finish.

C. Fasteners: Same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

1. Use types and sizes to suit unit installation conditions.
2. Use hex-head or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.

D. Post-Installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Factory or shop fabricate intake and relief ventilators to minimize field splicing and assembly. Disassemble units to the minimum extent as necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.

B. Fabricate frames, including integral bases, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

C. Fabricate units with closely fitted joints and exposed connections accurately located and secured.

D. Fabricate supports, anchorages, and accessories required for complete assembly.

E. Perform shop welding by AWS-certified procedures and personnel.

2.4 LOUVER PENTHOUSES

A. Manufacturers:

1. Acme Engineering & Mfg. Corp.
2. Aerovent; a Twin City Fan company.
3. Carnes.
4. Greenheck.
5. JencoFan.
6. Loren Cook Company.

7. Penn Ventilation.
8. Or approved equal

B. Construction: All-welded assembly with 4-inch -deep louvers, mitered corners, and 0.080-inch aluminum sheet roof.

C. Frame and Blade Material and Nominal Thickness: Extruded aluminum, of thickness required to comply with structural performance requirements, but not less than 0.080 inch for frames and 0.080 inch for blades.

1. Blade Spacing: as per manufacturer's design.
2. Blade Angle: as per manufacturer's design
3. Air Performance: Not more than 0.10-inch wg static pressure drop at 700-fpm free-area velocity.
4. AMCA Seal: Mark units with the AMCA Certified Ratings Seal.
5. Exterior Corners: Prefabricated corner units with mitered and welded blades and with mullions at corners.

D. Roof Curbs: Aluminum Sheet; with mitered and welded corners; 1-1/2-inch thick, rigid fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to fit roof opening and ventilator base.

1. Configuration: Built-in cant and mounting flange.
2. Overall Height: 36 inches.

E. Bird Screening: Aluminum, 1/2-inch square mesh, 0.063-inch wire.

F. Galvanized-Steel Sheet Finish:

1. Surface Preparation: Clean surfaces of dirt, grease, and other contaminants. Clean welds, mechanical connections, and abraded areas and repair galvanizing according to ASTM A 780. Apply a conversion coating suited to the organic coating to be applied over it.
2. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply an air-dried primer immediately after cleaning and pretreating.
3. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat and an overall minimum dry film thickness of 2 mils.

a. Color and Gloss: As indicated by manufacturer's designations.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install intake and relief ventilators level, plumb, and at indicated alignment with adjacent work; make necessary adjustments in position to confirm with architectural features, symmetry, and arrangement.

B. Secure intake and relief ventilators to roof curbs with cadmium-plated hardware. Use concealed anchorages where possible.

C. Install goosenecks on curb base where throat size exceeds 9 by 9 inches.

D. Install intake and relief ventilators with clearances for service and maintenance.

E. Install perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

F. Install concealed gaskets, flashings, joint fillers, and insulation as installation progresses. Comply with Section 079200 "Joint Sealants" for sealants applied during installation.

G. Label intake and relief ventilators according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

H. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

I. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

3.3 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.

END OF SECTION 233723

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SECTION 23 41 03 – CARBON MONOXIDE DETECTION SYSTEM WITH ALARM CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes transducers, system controllers, control wiring, and all accessories for a fully functioning carbon monoxide detection system.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Include sensing range in ppm, alarm outputs, display range, furnished specialties, installation requirements, and electric power requirements, and wiring diagrams.

C. Shop Drawings: Location and sizes of all field mounted components.

D. Operation and Maintenance Data: For carbon monoxide detection system to include in emergency, operation, and maintenance manuals. Include list and wiring diagrams.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to The City of New York and marked for intended use.

1.5 WARRANTY

A. The manufacturer shall warrant all equipment for 24 months (2 years) from date of manufacturer or manufacturer's representative's final report to the Commissioner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Kidde
   2. Mine Safety Appliances

3. Macurco.
4. Intec.
5. Or Approved Equal.

2.2 CARBON MONOXIDE DETECTION SYSTEM

A. Description: 2 physically distinct continuous carbon monoxide detection systems (one each for each garage) for monitoring the carbon monoxide levels in the area as noted and to notify the relevant BMS to activate and control the purge fans in the alarmed garage for air quality.

B. Carbon Monoxide Detectors: Maintenance free, solid state electronic carbon monoxide detectors. Each detector shall cover a maximum area of 5,000 square feet (465 square meters) and have a life expectancy of 7 to 10 years.

C. Sequence of Operation: Carbon monoxide detection systems shall integrate with the BMS installed in their respective garages, through BACnet/IP Protocol, to notify/alarm the relevant BMS to control operation of purge fans.
1. When carbon monoxide level rises to 50 ppm (adjustable), the CO detection system shall raise an alarm in the relevant BMS. The BMS shall start all of the purge fans in that garage and shall operate them until carbon monoxide levels drop below 35ppm (adjustable) for 10 minutes (adjustable).
2. A high priority alarm will be actuated in the CO detection system and in the relevant BMS in the event that carbon monoxide concentrations reach 150 ppm (adjustable), for more than 5 minutes (adjustable).

2.3 TRANSDUCERS

A. Carbon monoxide to voltage transducers: To measure the level of carbon monoxide and provide information to the system controllers in an analog mode. Voltage transducers shall mount in standard electrical boxes and operate on low voltage.

B. Power: 12 volt DC or 12 volt AC at 0.15 amps.

C. Output Level: 1.0 to 4.0 volts at 10 MA.

D. Sensors: Solid state, supervised.

2.4 SYSTEM CONTROLLERS

A. The system controllers for the CO detection systems' features shall include but not be limited to:
1. Alarm Control Range: 100 to 400 ppm. Maximum.
2. Programmable Alarm Delay: ¼ to 60 minutes.
3. Alarm Turn Off: Immediate.
4. BACnet/IP Protocol Integration (addresses for 2 controllers shall be separate, so the networks can be bridged at a future date. Coordinate addressing with BMS subcontractor)
5. Panels shall bear the UL and ETL Seal of Approval

B. Display: A series of colored LED lights on the panel to provide a continuous display of all system operations.
   1. Bright green: Proper sensor operation.
   2. Yellow flashing: Solid state 2 minute delay period before turning on; continuously when relay closes and fan starts.
   3. Red flashing: Programmed delay period before turning on; continuously when the relay closes and alarm sounds.

C. The system controller's printed circuit board shall allow easy programming of the alarm time delay. This, in conjunction with the alarm threshold control shall allow the controller to meet all standards for safe levels of carbon monoxide including the OSHA TWA and STEL Levels or the Uniform Building Code STEL Level that is satisfied by the 10 percent hemoglobin concentration curve.

D. Calibrated potentiometer inside the control panels shall allow setting of the alarm threshold for all systems sensors.

E. Provide BACnet/IP Protocol integration at indicated location.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install carbon monoxide detectors at strategically located points throughout parking area and at other points indicated on drawings.

B. Mount carbon monoxide sensors 5 feet above finished floors.

C. Electrical Connections: Comply with requirements in Division 26 sections for power wiring and switches.

D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

E. Provide all control and interlock wiring in accordance with manufacturer's instructions.

3.3 START-UP SERVICE

A. Manufacturer's factory-authorized representative shall review and test entire system after it is completed and operating and submit his full report to the Commissioner.

B. Manufacturer's factory-authorized representative shall work in conjunction with contractor to ensure complete operation of BMS alarming and fan control based on CO detection system integration

END OF SECTION 234103

SECTION 23 74 13 - PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes packaged, outdoor, central-station air-handling units (rooftop units) with the following components and accessories:

1. Direct-expansion cooling.
2. Hot-gas reheat.
3. Gas furnace.
4. Economizer outdoor- and return-air damper section.
5. Integral, space temperature controls.
6. Roof curbs.

1.3 DEFINITIONS

A. Refer to DDC General Conditions.

B. DDC: Direct-digital controls.

C. ECM: Electrically commutated motor.

D. Outdoor-Air Refrigerant Coil: Refrigerant coil in the outdoor-air stream to reject heat during cooling operations and to absorb heat during heating operations. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.

E. Outdoor-Air Refrigerant-Coil Fan: The outdoor-air refrigerant-coil fan in RTUs. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.

F. RTU: Rooftop unit. As used in this Section, this abbreviation means packaged, outdoor, central-station air-handling units. This abbreviation is used regardless of whether the unit is mounted on the roof or on a concrete base on ground.

G. Supply-Air Fan: The fan providing supply air to conditioned space. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.

H. Supply-Air Refrigerant Coil: Refrigerant coil in the supply-air stream to absorb heat (provide cooling) during cooling operations and to reject heat (provide heating) during heating operations. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.

I. VVT: Variable-air volume and temperature.

1.4 PERFORMANCE REQUIREMENTS

A. Engineering Services: Design RTU supports to comply with wind and seismic performance requirements, including comprehensive engineering analysis by a qualified professional engineer licensed in the state of New York, using performance requirements and design criteria indicated.

B. Wind-Restraint Performance:

1. Basic Wind Speed: 15 miles/hr.
2. Building Classification Category: III.
3. Minimum 10 lb/sq. ft multiplied by the maximum area of the mechanical component projected on a vertical plane that is normal to the wind direction, and 45 degrees either side of normal.

C. Seismic Performance: RTUs shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2. Equipment must have NYC, MEA approval.

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, safety, and control wiring.

D. Engineering Services Submittal: For RTU supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the state of New York responsible for their preparation.

1. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
2. Detail mounting, securing, and flashing of roof curb to roof structure. Indicate coordinating requirements with roof membrane system.
3. Wind- and Seismic-Restraint Details: Detail fabrication and attachment of wind and seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

E. Manufacturer Wind Loading Qualification Certification: Submit certification that specified equipment will withstand wind forces identified in "Performance Requirements" Article and in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculations.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of wind force and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Manufacturer Seismic Qualification Certification: Submit certification that RTUs, accessories, and components will withstand seismic forces defined in "Performance Requirements" Article and in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

G. Coordination Drawings: Plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Structural members to which RTUs will be attached.
2. Roof openings
3. Roof curbs and flashing.

H. Field quality-control test reports.

I. Operation and Maintenance Data: Including parts listing, for RTUs to include in emergency, operation, and maintenance manuals.

J. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. ARI Compliance:

1. Comply with ARI 210/240 and ARI 340/360 for testing and rating energy efficiencies for RTUs.
2. Comply with ARI 270 for testing and rating sound performance for RTUs.

C. ASHRAE Compliance:

1. Comply with ASHRAE 15 for refrigeration system safety.
2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
3. Comply with applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
4. Comply with ASHRAE 90A for energy conservation in new building design.

D. ASHRAE/IESNA 90.1 Latest Edition Compliance: Applicable requirements in the latest edition of ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

E. NFPA Compliance: Comply with NFPA 90A and NFPA 90B.

F. UL Compliance: Comply with UL 1995.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to The City of New York, and marked for intended use.

H. Refer to the New York City Energy Conservation Code for minimum efficiency requirements for HVAC equipment installed in new buildings New York City.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTUs that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
2. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than five years from date of Substantial Completion.
3. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three years from date of Substantial Completion.
4. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

1.8 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturers installation instructions for rigging, unloading and transporting units.

B. Protect units from physical damage. Leave factory shipping covers in place until installation.

PART 2 - PRODUCTS

2.1 ROOFTOP GAS HEATING UNITS

A. Manufacturers:

1. Trane.
2. Sterling.
3. Reznor.
4. Or approved equal.

B. Units:

1. Units shall be completely factory assembled, piped wired and test fired. All units must contain duct furnaces that are ETL certified and conform to the latest ANSI Standards for safe and efficient performance.
2. Units shall be mounted on metal rails with lifting and anchor holes and shall be suitable for slab or curb mounting.
3. Units shall be able to operate on either natural or LP (propane) gas.
4. Each furnace section firing rate shall be no more than 400 MBH and shall contain its own heat exchanger, flue collector, venting, burners, safety and ignition controls.
5. All units shall be UL certified for electrical safety in compliance with UL 1995 and CAS C22.2 No. 236 safety standard for heating, ventilating and cooling equipment. Standard socket relays shall be socket mounted with terminal block connections.
6. Outside air hoods shall be provide with moisture eliminators with a pressure switch.

C. Air Handling:

1. Centrifugal fan shall be belt driven, forward curved, statically and dynamically balanced with double inlet. The blower wheel shall be fixed on a keyed shaft, supported with in-shear vibration isolators, and ball bearing secured. 7-1/2 through 15 hp motors shall be equipped with pillow block bearing assembly on the drive side.
2. An access interlock switch shall be installed in the blower compartment and will disengage the blower upon removing the service panel. An override shall be incorporated into the interlock switch for serviceability.

D. Factory Installed VFD

1. A Variable Frequency Drive (VFD) shall be provided. The VFD shall be properly sized, factory mounted and wired to the fan motor. The VFD shall provide overload protection and soft start operation. The VFD shall be covered by UL 1995 Standards and manufactured with a NEMA 1 plenum rated enclosure.
2. 3 Speed VFD Relays Factory installed relays shall be provided to energize second and third speed settings. Relay coil will accept 24V, 115V and 230 V.

E. Casing and Jacketing:

1. Double wall cabinet construction shall be provided by the manufacturer on applicable filter / damper, blower, coil and plenum cabinets. Casing and trim pieces shall be

fabricated from 18-gauge steel and finished in air-dry enamel. The construction shall consist of a 24-gauge inner liner wall with 1" 1 1/2 LB density insulation. Insulation shall be fire resistant, odorless, matte faced 1" glass fiber material.

2. Access doors on the specified side will be hinged and of the same double wall design. Furnace sections shall be provided with standard construction.

F. Heat Exchanger:

1. Heat exchanger shall consist of tube sections not lighter than 20-gauge and connecting plates not lighter than 18 gauge. Heat exchanger shall be 100% welded. Material shall be type 409 stainless steel. Stainless steel drip pan shall be provided.
2. Each duct furnace shall have a low pressure drop across the heat exchanger, allowing higher air flow capacities and an 80% eff rating with delta T of 20-60F per furnace.

G. Draft Diverter/Flue Collector:

1. Draft diverter shall be no lighter than 20 gauge.
2. Draft diverter shall be corrosion resistant type 409 stainless steel.
3. Unit shall be provided with power venting. A power vent fan(s) for venting shall be provided. Outside air for combustion and products of combustion shall have individual air inlet and discharge grilles located in the upper section of a split burner service panel.

H. Burners:

1. Gas burner shall be atmospheric type with adjustable combustion air supply on LP units.
2. Burners shall be corrosion resistant type 409 stainless steel.
3. Service access to the burners shall be provided by a side access burner drawer that slides out from the side of the unit. The pilot must be accessible through a pilot access plate without removing the burner assembly.
4. Burners shall be individually removable for ease of inspection and servicing.
5. Gas Burner Safety Controls: Thermo-couple sensor prevents opening of solenoid gas valve until pilot flame is proven and stops gas flow on ignition failure.

I. Filters:

1. Filters shall be 2” pleated media type and shall be easily removable. Filter rack shall be constructed of galvanized steel with access through hinged access door.

J. Dampers:

1. Low leak dampers shall be of the opposed blade type, construction of galvanized steel with neoprene nylon bushings and vinyl blade edge seals, blades to be mechanically interlocked.
2. Rooftop units with 100 percent outdoor air shall contain:

    a. Outside air hood with moisture eliminators and two position spring return damper motor and controls. Motor shall power the damper full open when unit is on, and to full closed when the unit is shut down.

K. Controls:

1. All control wiring shall terminate at terminal strip and include an identifying marker corresponding to the wiring diagram. Control wiring shall be harnessed with terminal block wiring. Each furnace shall be provided with 24-volt transformer and high limit switch.
2. Electrical cabinet shall be isolated from the air stream with a non-removable access panel interior to the outer service panel. There shall be a provision in this cabinet for component mounting, wire routing and high voltage isolation.
3. High limit Control: Fixed stop at maximum permissible setting, de-energizes burner on high bonnet temperature and re-energizes when temperature drops to lower value.
4. Gas Valve:
    a. Unit shall be provided with a 24-volt combination automatic gas valve, including main operating valve and pilot safety shutoff, pressure regulator, manual main and pilot shutoff valve, and adjustable pilot valve.
    b. Gas valve shall be suitable to a maximum inlet pressure of 14-inch W.C. on natural gas.
    c. Unit shall be provided with a low voltage circuit breaker rated for 150% of the units normal 24 volt operating load.
    d. Unit shall be provided with a disconnect.
5. The unit shall be suitable for natural gas and provided with solid state ignition control system which ignites the intermittent pilot by spark during each cycle of operation. When pilot frame is proven, main burner valve opens to allow gas flow to burners. Pilot and burners are extinguished during the off cycle.
6. Fan Control: A fan time delay switch shall be provided and shall be controlled by a low voltage thermostat. The fan time delay relay shall delay the fan start until the heat exchanger reaches a predetermined temperature. It shall also allow the fan to operate burner shutdown, removing residual heat from the heat exchanger. Double and triple furnace units shall contain a reverse airflow interlock switch. The normally interlocked switch, when activated causes the gas valves to close and continue blower operation.

L. Operating Controls

1. Provided modulated heat output. An automatic valve in series with the modulating valve shall be provided to cycle the unit. Ignition is at full fire (100% input) and modulates the gas input from 100% to 40% rated input.

M. Programmable Thermostat

1. A seven-day programmable thermostat with 2 stage cooling and heating shall be provided. The thermostat shall have heat, off, cool, auto system switch, four-time periods per day for occupied and unoccupied modes with three-hour override of unoccupied mode. Automatic heat/cool changeover and battery backup. Includes fan and heating relays. Set point range 40.0 F to 90.0 F.
2. Provide universal guard for room thermostat.
3. Provide Energy Star Certified thermostat.

N. Accessories:

1. High gas line pressure regulator shall be supplied to accommodate a main gas line pressure of 2 psi.

2. Unit shall be provided with a 115-volt convenience outlet.
3. A unit mounted DDC (Direct Digital Controls) control station shall be provided. It shall be provided with 6 LED status lamps with System On/Off, Fan Auto/on, Heat Auto/off, Cool/Auto/off, Auxiliary On/Off switching and modulating damper potentiometer mounting.
4. Unit shall be provided with a firestat and smoke detector. Unit shall also be provided with a freezestat.
5. Unit shall be provided with status indicator lamps. Lamps shall include power on, blower on and one lamp per stage of heat mounted in the electrical cabinet.
6. Rooftop unit shall be provided with insulated 36" high roof curb
7. A clogged filter pressure switch with adjustable operating range and normally open switch shall be installed to sense increased suction pressure by the blower due to filter obstruction. Provision shall be provided for remote indication by terminal block connection points. lamp mounted status in the electrical cabinet shall be included.
8. A high pressure and a low-pressure interlock switch and shutoff valve shall be provided for each furnace section. High/low gas pressure limits disengage heating upon detecting either low line pressure or high manifold pressure.
9. Gas regulator shall be provided to reduce main gas line pressure to a minimum of 7" W.C. Pressure at the job site must be specified. The regulator is selected to accommodate that specific pressure.
10. Unit shall Include a factory mounted switch type fused disconnect and GFI convenience outlet mounted behind a hinged access door on the unit's blower section. Both items shall be accessible from the outside of the unit via a weatherproof hinged access door.

2.2 ROOFTOP PACKAGED AC UNIT WITH ERV AND GAS HEAT

A. Manufacturers:

1. Carrier Corporation.
2. Trane
3. Johnson Controls Inc
4. or approved equal

B. General Unit Description

1. Unit(s) furnished and installed shall be packaged outdoor air unit(s) as scheduled on contract documents and described in these specifications. Unit(s) shall be designed for dehumidification, cooling and/or heating of 100% Outdoor Air. For dehumidification and cooling modes the evaporator temperature shall be monitored, reported at unit controller. Compressor controls shall modulate capacity to maintain evaporator leaving set point for dehumidification mode. Hot Gas Bypass shall not be used to control compressor capacity. Compressor Hot Gas Reheat shall be factory installed. To prevent rehydration of evaporator condensate the reheat coil face shall be located a minimum of 6" downstream from the leaving face of the evaporator coil. Heating system shall include modulating controls. Compressor on-off only or primary heating on-off only controls shall not be acceptable control strategies.
2. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.

3. Unit discharge airflow configuration shall be:

    a. Horizontal discharge through side of unit.

C. Cabinet

1. Cabinet panels: 2” double-wall foamed panel with thermal break construction throughout the indoor section of unit to provide nonporous, cleanable interior surfaces. All interior seams exposed to airflow shall be sealed.
2. Insulation: 2” polyurethane foam metal encapsulated with no exposed edges. Initial R value of 6.6 per inch of thickness.
3. Cabinet base shall be double wall construction designed to prevent trapping or ponding of water within the unit base. Cabinet base pan shall be insulated with 2” thick polyurethane foam. Foam insulation shall be fully enclosed with galvanized steel insulation cover. Insulation shall not be applied to underside of unit base.
4. Cabinet Base Rails: Side and end base rails shall include openings for forklift and tie-down access. To protect unit base from fork damage side rails shall include removable heavy gauge fork pockets.
5. Shipping anchors attach to and/or through unit base rails. Straps over unit shall not be used to secure unit for shipping.
6. Cabinet material interior and base rails: shall be G-90 zinc-coated galvanized steel. Material gauge shall be a minimum of 14-gauge for base rails, 16-gauge for structural members and 22-gauge for access doors and cabinet panels.
7. Exterior Corrosion Protection: Exterior cabinet panels shall be a base coat of G-90 galvanized steel with both exterior and interior surfaces cleaned, phosphatized and finished with a weather-resistant baked enamel finish. Unit’s surface shall be in compliance with ASTM B45 salt spray testing at a minimum of 627 hour duration.
8. Cabinet construction shall provide hinged panels providing easy access for all parts requiring routine service.
9. Cabinet top cover shall be one piece construction or where seams exist, it shall be double-hemmed and gasket-sealed.
10. Hinged Access Panels: Water- and air-tight hinged access panels shall provide access to all areas requiring routine service including air filters, heating section, electrical and control cabinet sections, ERV and power exhaust fan section, supply air fan section, evaporator and reheat coil sections. Insulated doors shall be constructed to allow the access door to open in either direction or be removed without removal of a hinge.

    a. Hold-open devices shall be factory installed on all hinged access doors. Chains shall not be used as hold-open devices.
    b. Latches with locking hasp or tool operated closure devices shall be factory installed on all hinged access panels.
11. Drain Pan material shall be Type 304 Stainless steel drain and constructed to slope in two directions to ensure positive drainage with corners exposed to standing water and drain fittings welded liquid tight to prevent leaks. Pan shall have a minimum depth of 2”. Base of drain pan shall be insulated with 1” thick foam insulation minimum.
12. Provide openings either on side of unit or thru the base for power, control and gas connections.
13. Cabinet shall include interior liner constructed of Type 304 stainless steel with sealed seams.

14. Air inlet hood shall be factory installed and shall not require field assembly. Hood shall include 2" thick removable aluminum mesh mist eliminators sized for a velocity not to exceed 500 FPM at maximum unit rated airflow. Service access shall be hinged and held in place with thumb latches that shall not require tools for service access.
15. Unit shall be equipped with a 6" filter rack upstream of the evaporator. Frame shall be field-adjustable to match any filter combination specified in the following section.

D. Air Filters

1. Unit inlet hood shall include 2" thick aluminum mesh removable mist eliminators with hinged access cover. Inlet velocity shall not exceed 500 FPM.
2. Evaporator Inlet shall include a full complement of pleated media air filters. Filters shall be:

    a. 2" deep MERV 13

E. Dampers

1. Unit shall include a motor operated outdoor air damper constructed of galvanized steel.
2. Damper blades shall be v-groove design with rubber edge seals designed not to exceed a 4 CFM/SQ FT leakage rate exceeding ASHRAE 90.1 damper leakage requirements.
3. Damper actuator shall be factory mounted and wired sealed spring return and either two-position or fully modulating.
4. Dampers air velocity shall not exceed 2000 fpm.
5. Return Air damper shall be of same material, construction and leakage rate as outdoor air damper. Return air damper actuator shall be factory mounted and wired sealed spring fully modulating and operate based on outdoor air damper feedback signal to properly regulate RA airflow.

F. Dehumidification/Cooling

1. Compressors

    a. All units shall have direct-drive, scroll type compressors.
    b. Digital Scroll Compressor
    c. Circuit One
    d. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate voltage.
    e. Internal overloads shall be provided with the scroll compressors.
    f. Each compressor shall have a crankcase heater or equivalent to minimize the amount of liquid refrigerant present in the oil sump during off cycles.
    g. Each compressor shall be mounted on rubber vibration isolators, to reduce the transmission of noise.
    h. Provide each unit with hermetically sealed refrigerant circuit(s) factory-supplied completely piped with liquid line filter-drier, liquid line charging port, suction and liquid line pressure ports, sight glass, and thermal expansion valve.
    i. Provide each circuit with automatic reset high and low pressure and high temperature switches for safety control.

2. Coils

a. Evaporator, Condenser and Hot Gas Reheat coils shall be constructed with copper tubes mechanically bonded to configured aluminum plate fins.
b. Coils shall be factory leak tested in accordance ANSI/ASHRAE 15-1992 at a minimum pressure of 500 PSIG.
c. The condenser coil shall have a fin designed for ease of cleaning.
d. Evaporator coil shall include (six / four) rows of cooling interlaced for superior sensible and latent cooling with a maximum of 14 FPI for ease of cleaning.
e. Reheat coil shall be fully integrated into the supply airstream and be capable of delivering design supply air temperature.
f. To prevent re-hydration of condensate from evaporator coil, the evaporator coil face and the hot gas reheat coil face shall be separated by a minimum of six inches.
g. The unit(s) must comply per above - spray coatings not acceptable
h. Condenser coil hail guards shall be factory installed.

3. Condenser Section

a. Outdoor Fans: Shall be direct drive vertical discharge design with low-noise corrosion resistant glass reinforced polypropylene props, powder coated wire discharge guards and electro-plated motor mounting brackets.
b. Fans shall be statically and dynamically balanced.

4. Compressor Capacity Control

a. Electronic Control: Compressor output capacity shall be controlled by the Main Control Module.

G. Fans and Motors

1. Indoor fan shall be direct drive plenum fan, factory installed and wired to on-board Variable Frequency Drive and shall be equipped with slide out service access.
2. All fan motors shall be premium efficiency ODP and meet the New York City Energy Conservation Code.
3. All fan motors shall either be permanently lubricated and/or have internal thermal overload protection.
4. Outdoor fans shall be direct drive with premium efficiency motors, statically and dynamically balanced, draw through in the vertical discharge position.
5. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

H. Heating

1. Modulating Indirect Gas Fired Heating System

a. Completely assembled and factory installed heating system shall be located in the primary heating position located beneath the indoor fan assembly and be integral to unit and approved for use downstream from refrigerant cooling coils in units mounted outdoors. Threaded gas connection shall terminate at field provided manual shut-off valve. Provide capability for sidewall gas piping.

b. Heaters shall include high turn-down burners firing into individual stainless steel tubular heat exchangers. Heat exchangers shall be constructed of type 439 stainless steel and be a high efficiency dimpled tubular design capable of draining internal condensate. Units with multiple heaters shall include one fully modulating high turndown heater with additional on-off heater sections. Total heater turndown shall be based on heater gas input capacity 5:1 when ≤150 MBH or a minimum of 10:1 when >150 MBH.
c. Heater outdoor air inlet shall be hooded and include internal baffle system to prevent rain blow thru. To prevent recirculation of flue gas and to prevent flue gas condensate from draining onto and obstructing the heater air inlet the inlet shall be hooded and shall be located a minimum of 8" beneath the flue outlet. Inlet hood shall include bird screen.
d. Heater flue outlet(s) shall include hooded outlet with wire cloth all constructed of Type 430 stainless steel. Hooded outlet shall be sealed to prevent flue gas recirculation.
e. Gas Burner Safety Controls: Provide safety controls for the proving of combustion air prior to ignition, continuous air proving monitoring following ignition and continuous electronic flame supervision.
f. Unit controls shall monitor heat output and shall discontinue all heating attempts and or unit operation in the event the heating section fails to ignite or fails to maintain programmed supply air temperature/time.
g. Inducer fan shall be direct drive high pressure centrifugal type with two speeds and shall include built- in thermal overload protection.
h. Limit controls: High temperature automatic reset limits shall be located on blower wall and in indoor fan chamber to shut off gas flow in the event of excessive temperatures resulting from restricted indoor airflow, or loss of indoor airflow.
i. Flame roll-out safeties shall provide continuous monitoring of proper burner operation.

I. Electrical Ratings and Connections

1. All high voltage power components such as fuses, switches and contactors shall include a service personnel protection barrier or shall be a listed as touch-safe design.
2. Field wiring access to be provided thru unit base into isolated enclosure with removable cover.
3. Power wiring to be single point connection.
4. Wiring internal to the unit shall be colored and numbered for identification.
5. Unit shall be factory wired to field wiring terminal block mounted in isolated enclosure.
6. Factory wired main power disconnect and overcurrent device shall be rated for total unit connected power
7. Unit SCCR rating shall be a minimum of 65kA
8. Factory wired Voltage/Phase monitor shall be included as standard. In the event of any of the following, the units will be shut down and a fault code will be stored in the monitor for the most recent 25 faults. Upon correction of the fault condition the unit will reset and restart automatically.

    a. Phase Unbalance Protection: Factory set 2%
    b. Over/Under/Brown Out Voltage Protection: +/-10% of nameplate voltage
    c. Phase Loss/Reversal

9. Factory to mount and wire 120 volt convenience outlet. Field wiring of convenience outlet not acceptable.
10. All low voltage field wiring connections shall be made at factory installed low voltage terminal strip.

J. Unit Controls

1. Main Unit Controller (MCM) shall be a microprocessor-based controller with resident control logic. Controller program logic shall include

    a. Include single program with field selectable

        i. Discharge Air control with unit conditioning modes enabled based on outdoor air conditions and controlled to maintain discharge air setpoints.
        ii. Space control with unit conditioning modes enabled and controlled to maintain space setpoints.

    b. Multi-Zone Variable Air Volume Control (MZVAV) with unit conditioning modes enabled based on discharge air temperature setpoint and supply fan controlled within design minimum and maximum performance ratings to maintain a duct pressure setpoint monitored by the factory furnished, field installed duct pressure sensor.

2. MCM shall:

    a. Prevent simultaneous operation of any conditioning modes.
    b. Accept separate setpoints for Occupied and Unoccupied states.
    c. Call for Dehumidification based on dew point setpoints. When no call for Dehumidification is present MCM shall control calls for Cooling, Heating and Economizer modes based on sensible or enthalpy temperature setpoints. MCM shall have onboard clock and scheduling function for occupancy.
    d. Include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.
    e. Enable HGRH dehumidification and cooling modes and control modulation to maintain (discharge air temperature / space temperature).
    f. Unit shall include minimum discharge air control.

3. MCM Touch Screen shall include full color display and shall be (factory installed in unit control compartment / field mounted remote from unit and field wired up to a maximum of 300 ft.) and provide a full list of points included in the MCM. The display shall provide a list and history of all unit alarms.
4. System Sensors shall include: Factory installed and wired Outdoor Air Temperature, Outdoor Air Humidity and Evaporator Leaving Air Temperature and factory furnished, field installed Discharge Air Temperature.

    a. Space Control or Single Zone VAV: Factory shall furnish Space Temperature and Space Humidity sensor for field installation and connection to the unit
    b. Economizer includes Return Air Temperature and Humidity sensor
    c. ERV includes exhaust air leaving temperature sensor
    d. Powered Exhaust with Economizer includes duct pressure sensor to be field installed.

5. System controls shall include:

a. Anti-cycle timing.
b. Minimum compressor run/off-times.

6. Smoke Detectors to sense (Return Air / Discharge Air / Return and Discharge Air) stream(s) shall be factory installed and wired.

K. Power Exhaust – Barometric Relief

1. Provide a factory installed power exhaust assembly that shall be designed to ventilate return air to atmosphere.
2. Plenum mounted direct drive airfoil design exhaust wheel material shall be heavy gauge aluminum, welded construction and rated for up to Class III speed/pressure performance. Factory install and wire fan motor to on-board Variable Frequency Drive. Belt-drive and/or forward curve plenums fans shall not be used.
3. Exhaust to discharge through gravity dampers located on each side of unit cabinet.

a. powered isolation dampers in place of gravity dampers

L. Outdoor Air Section Energy Recovery (ERV)

1. The rotor media shall be made of aluminum, formed into a honeycomb structure to minimize pressure loss and avoid plugging. Paper, plastic or fibrous media are not acceptable. The rotor media must be coated to resist corrosion. All surfaces must be coated with a non-migrating desiccant layer to insure that adequate latent capacity is provided. The desiccant coating must be firmly bonded to the aluminum surface and will not be dislodged when challenged with high velocity air up to 5000 feet per minute. Products that lose desiccant when served with high velocity air are not acceptable. The cassette must be a slide out design for serviceability. The media shall be cleanable with low temperature steam, hot water or light detergent without degrading the latent recovery.
2. Sensible and latent recovery efficiencies must be clearly documented through a testing program conducted in accordance with ASHRAE Standard 84 and AHRI 1060. The testing must have been conducted by a qualified independent organization. The performance test reports must be provided for engineering review as part of the submittals for this project.
3. The rotor design shall ensure laminar airflow to minimize parasitic pressure loss and to optimize the operating efficiency of the system fans. The pressure loss across the media shall be no greater than the scheduled pressure loss values. The energy wheel shall operate effectively up to 180 degrees F.
4. The rotor media shall be permanent, with an anticipated life of 20 years. It must be tested in accordance with ASTM Standard E-84 and provide smoke and flame spread ratings of less than 25 and 50 as required by NFPA 90A and UL 1995. A copy of the ASTM E-84 test report confirming the method of test and results shall be provided with the submittal. Heat recovery wheels incorporating “throw-away” media and tested to UL900 for Class 2 filters are not acceptable.
5. The wheel manufacturer must have been producing energy recovery wheels for a minimum of three years.
6. The rotor shall be supplied with perimeter brush seals and face contact seals to minimize air leakage and wheel bypass.

7. The rotor media shall be supported by a structural aluminum hub and aluminum reinforcing spoke system. The rotor bearings must be greaseable and provide L10 life in excess of 20 years.
8. The cassette framework shall be made of galvanized steel to prevent corrosion.
9. The rotor must be driven by long-life polyurethane/polyester composite link belt system. The rotor/cassette shall be designed so that belt can be removed or serviced without the removal of the bearing. A 3 phase A/C gear motor shall be utilized to accommodate variable speed applications.

M. ROOF CURB

1. Contractor shall provide factory supplied 36" tall roof curb, 18 gauge perimeter made of zinc coated steel with supply and return air gasketing and wood nailer strips. Ship knocked down and provided with instructions for easy assembly.
2. Curb shall be manufactured in accordance with the National Roofing Contractors Association guidelines.

2.3 ROOF CURBS

A. Roof curbs with vibration isolators and wind or seismic restraints are specified in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."

1. Curb shall be manufactured in accordance with the National Roofing Contractors Associated guidelines for rooftop equipment support.
2. Ship curbs knocked down and provide instructions for easy assembly.

B. Materials: Galvanized steel, 0.08 inch (2.1 mm) thick, with corrosion-protection coating, watertight gaskets, baseplate, and factory-installed wood nailer; complying with NRCA standards.

1. Curb Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.

a. Materials: ASTM C 1071, Type I or II.
b. Thickness: 2 inches.

2. Application: Factory applied with adhesive and mechanical fasteners to the internal surface of curb.

a. Liner Adhesive: Comply with ASTM C 916, Type I.
b. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in cabinet.
c. Liner materials applied in this location shall have air-stream surface coated with a temperature-resistant coating or faced with a plain or coated fibrous mat or fabric depending on service air velocity.
d. Liner Adhesive: Comply with ASTM C 916, Type I.

C. Curb Height: 36 inches.

D. Wind and Seismic Restraints: Metal brackets compatible with the curb and casing, painted to match RTU, used to anchor unit to the curb, and designed for loads at Project site. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment" for wind-load requirements.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.

B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.

C. Examine roofs for suitable conditions where RTUs will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Reassemble factory fabricated components in field, at no additional cost, where units are shipped in sections.

B. Roof Curb: Install on roof structure or concrete base, level and secure, according to NRCA's (National Roofing Contractors Association) "Low-Slope Membrane Roofing Construction Details Manual," Illustration "Raised Curb Detail for Rooftop Air Handling Units and Ducts." Install RTUs on curbs and coordinate roof penetrations and flashing with the Commissioner. Secure RTUs to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.

C. Unit Support: Install unit level on structural curbs. Coordinate wall penetrations and flashing with wall construction. Secure RTUs to structural support with anchor bolts.

D. Install wind and seismic restraints according to manufacturer's written instructions.

3.4 CONNECTIONS

A. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.

B. Install piping adjacent to RTUs to allow service and maintenance.

1. Gas Piping: Comply with applicable requirements in Section 227000 "Natural Fuel Gas Systems." Connect gas piping to burner, full size of gas train inlet, and connect with union and shutoff valve with sufficient clearance for burner removal and service.

C. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:

1. Install ducts to termination at top of roof curb.
2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
3. Connect supply ducts to RTUs with flexible duct connectors specified in section 233300 "Air Duct Accessories."
4. Install return-air duct continuously through roof structure.
5. Install normal-weight, 3000-psi, compressive strength (28-day) concrete mix inside roof curb, 4 inches thick. Concrete, formwork, and reinforcement are specified in Division 03.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

3.6 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Complete installation and startup checks according to manufacturer's written instructions and do the following:

1. Inspect for visible damage to unit casing.
2. Inspect for visible damage to furnace combustion chamber.

3. Inspect for visible damage to compressor, coils, and fans.
4. Inspect internal insulation.
5. Verify that labels are clearly visible.
6. Verify that clearances have been provided for servicing.
7. Verify that controls are connected and operable.
8. Verify that filters are installed.
9. Clean condenser coil and inspect for construction debris.
10. Clean furnace flue and inspect for construction debris.
11. Connect and purge gas line.
12. Remove packing from vibration isolators.
13. Inspect operation of barometric relief dampers.
14. Verify lubrication on fan and motor bearings.
15. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
16. Adjust fan belts to proper alignment and tension.
17. Start unit according to manufacturer's written instructions.

    a. Start refrigeration system.
    b. Do not operate below recommended low-ambient temperature.
    c. Complete startup sheets and attach copy with Contractor's startup report.

18. Inspect and record performance of interlocks and protective devices; verify sequences.
19. Operate unit for an initial period as recommended or required by manufacturer.
20. Perform the following operations for both minimum and maximum firing. Adjust burner for peak efficiency.

    a. Measure gas pressure on manifold.
    b. Inspect operation of power vents.
    c. Measure combustion-air temperature at inlet to combustion chamber.
    d. Measure flue-gas temperature at furnace discharge.
    e. Perform flue-gas analysis. Measure and record flue-gas carbon dioxide and oxygen concentration.
    f. Measure supply-air temperature and volume when burner is at maximum firing rate and when burner is off. Calculate useful heat to supply air.

21. Calibrate thermostats.
22. Adjust and inspect high-temperature limits.
23. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
24. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:

    a. Coil leaving-air, dry- and wet-bulb temperatures.
    b. Coil entering-air, dry- and wet-bulb temperatures.
    c. Outdoor-air, dry-bulb temperature.
    d. Outdoor-air-coil, discharge-air, dry-bulb temperature.

25. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.

26. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.

    a. Supply-air volume.
    b. Return-air volume.
    c. Relief-air volume.
    d. Outdoor-air intake volume.

27. Simulate maximum cooling demand and inspect the following:

    a. Compressor refrigerant suction and hot-gas pressures.
    b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.

28. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:

    a. High-temperature limit on gas-fired heat exchanger.
    b. Low-temperature safety operation.
    c. Filter high-pressure differential alarm.
    d. Economizer to minimum outdoor-air changeover.
    e. Relief-air fan operation.
    f. Smoke and firestat alarms.

29. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

3.7 CLEANING AND ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site during other-than-normal occupancy hours for this purpose.

B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.8 INSTRUCTION

A. Engage a factory-authorized service representative to instruct Operating Personnel to adjust, operate, and maintain RTUs. Refer to DDC General Condition.

END OF SECTION 237413

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SECTION 23 81 36 - VARIABLE REFRIGERANT FLOW SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   (1) The Contract Drawings
   (2) The Specifications
   (3) The general conditions,
   (4) The Addendum
   (5) The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. The variable capacity, heat pump/heat recovery air conditioning system shall be a Variable Refrigerant Flow (VRF) System. The simultaneous heating and cooling with heat recovery, split system or heating and cooling split system heat pump as specified. The system shall consist of multiple evaporators, branch selector boxes, refrigeration distribution system using microprocessor control and condenser unit. The condenser shall be a direct expansion (DX), air-cooled heat recovery, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant. All zones are each capable of operating separately with individual temperature control. A dedicated hot gas pipe shall be required to ensure optimum heating operation performance.

B. Operation of the system shall permit either individual cooling or heating of each indoor unit simultaneously or all of the indoor units associated with each branch of the cool/heat selector box. Each indoor unit or group of indoor units and outdoor units shall be able to provide set temperature independently via a local remote controller connected (networked) to a central controller provided by the VRF manufacturer and interconnected via BACNet to the Building Management System (BMS).

C. Each branch of the branch selector box shall be provided with required electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the box and main processor and between the box and indoor units. The branch selector box shall control the operational mode of the subordinate indoor units.

D. System shall provide outside air capability.

E. Unit shall meet NYC Energy Conservation Code.

F. All distribution piping including number of pipes, size and arrangement, pipe fittings, wiring, and controls shall be per manufacturer’s written recommendations and shall be incorporated by the mechanical subcontractor to achieve the design intent.

G. Related Sections:

   1. Section 232300 “Refrigerant Piping.”

2. Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.
3. Section 230900 “Instrumentation and Control for HVAC.”

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Action Submittals:

1. Product Data: Submit manufacturer’s standard technical product data indicating conformance to the stipulated reference specifications, construction materials, dimensions, construction details, and test and operating pressures. Include rated capacities, dimensions, connections for piping and electric, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics. Submit manufacturer’s product data on the following:

a. Outdoor units, indoor units and unit components.
b. Refrigerant type.
c. Valves: Submit schedule listing type make and model number, size and service for valves, motorized valve operators, fittings, and equipment. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.
d. Unit microprocessor controls. Submit complete list of "Read-Write" points, functions and alarms available to BMS via BACNet integration protocol.
e. Hydronic specialties: Submit schedule listing type, make and model number, size and service for all hydronic specialties.
f. Provide complete wiring diagram including all indoor units networked to a central controller with touch screen display interface. Diagram should differentiate between factory and field wiring. All field power connections and control equipment power usage to be shown on wiring diagram.

C. Closeout Submittals:

1. Operation and Maintenance Data: For all devices, including normal and emergency operation, and maintenance manuals.

D. Shop Drawings: Power, signal, and control wiring diagrams, Cooling and heating capacity, operating temperatures (ambient and indoor), Power supply, refrigerant type/charge, Number of Indoor units, Sound pressure level at 3 ft.(dBA), weight, dimensions, etc. for each equipment.

E. Samples for Initial Selection: For units with factory-applied color finishes.

F. Field quality-control test reports.

G. Provide written start-up report.

H. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. The contractor or subcontractor that will perform the specific areas of work specified above must, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to DDC General Conditions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to the Commissioner, and marked for intended use.

E. ASHRAE Compliance: Applicable requirements in the latest edition of ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

F. ASHRAE/IESNA 90.1 Latest Edition Compliance: Applicable requirements in the latest edition of ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning.

G. Listings: The unit shall be UL listed or tested and listed according to UL by Electrical.

H. All wiring shall be in accordance with the NYC Electrical Code (NYCEC).

I. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

J. A full charge of R-410A for the condensing unit only shall be provided in the condensing unit.

K. All indoor units concealed above ceilings shall be rated for plenum use.

1.5 COORDINATION

A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 030000 “Concrete”.

1.6 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to restore or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Eighteen (18) months from date of substantial completion.

2. Compressor Warranty: Six (6) years from date of substantial completion.

1.7 DELIVERY AND STORAGE

A. Deliver products to site and store and protect products until installation.

B. Protect finished cabinets from physical damage by leaving factory packing cases in place before installation and by providing temporary covers after installation.

C. Protect internal parts against rust and corrosion.

D. Store equipment indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store equipment off the ground in watertight enclosures.

1.8 REQUIRED MATERIALS

A. Furnish required materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set of filters for each unit.

2. Fan Belts: One set of belts for each unit.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Source Limitations: Obtain each type of equipment from single source from single manufacturer.

B. Furnish the system standards as defined by the base bid model numbers, model families or as otherwise specified herein or on the design documents. In any event, the contractor shall be responsible for all specified items and intents of this document. This includes verification and calculations of circuiting, capacities and considerations of line length restrictions.

2.2 MANUFACTURERS

A. Manufacturers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. LG.
b. Mitsubishi Electronics America, Inc.; HVAC Division.
c. Samsung.

d. Or approved equal.

2.3 MINI 4-WAY CEILING CASSETTE WITH GRILLE, INDOOR UNIT

A. General:

1. The indoor unit shall be a mini 4-way cassette style indoor unit that recesses into the ceiling with a ceiling grille and shall have a modulating linear expansion device. The mini 4-way cassette shall be compatible with heat recovery outdoor units and mode change unit or heat pump outdoor units. The mini 4-way cassette shall support individual control using control systems.

2. Each system shall perform in accordance to the required ratings shown in the contract documents. Performance shall be based on nominal cooling conditions of 75°F DB, 62°F WB for the indoor unit and 95°F DB, 74°F WB for the outdoor unit, and nominal heating conditions of 72°F DB for the indoor unit and 13°F DB for the outdoor unit.

B. Indoor Unit:

1. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air (nitrogen gas) before shipment from the factory.

C. Unit Cabinet:

1. The cabinet shall be space-saving ceiling-recessed cassette.

2. Construction shall be insulated high impact polystyrene (HIPS) chassis and fascia panel certified to UL94 V0.

3. The cabinet panel shall have provisions for a field installed, filtered, outside air intake. A booster fan is necessary. A 12V DC relay terminal is available to control the booster fan (with separate PCB connector).

4. The compact cabinet size can be installed in one standard ceiling tile (24” x 24”).

D. Fan:

1. The indoor fan assembly shall be direct driven fans by a single motor.

2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.

3. The indoor fan shall consist of three (3) speeds: Low, Medium, and High.

4. The auto air swing vanes (4) shall be capable of automatically swinging up and down for uniform air distribution.

E. Filter:

1. Return air shall be filtered by means of an easily removable, washable filter or 1 inch thick, in fiberboard frames with ASHRAE 52.2 MERV rating of 8 or higher.

2. Supplemental antibacterial and anti-odor filters shall be included.

F. Coil:

1. The indoor coil shall be staggered copper tubing, with mechanically bonded aluminum fins, complying with ARI 210/240.

2. The tubing shall have inner grooves for high efficiency heat exchange.

3. All tube joints shall be brazed with phos-copper or silver alloy.

4. The coils shall be pressure tested at the factory.

5. A condensate pan and drain outlet shall be provided under the coil. Drain pan and drain connection shall comply with the latest edition of ASHRAE 62.1. The insulated drain pan shall be provided with condensate pump.

6. The coil fins are coated with hydrophilic paints.

7. The condensate lift mechanism shall be able to raise drain water 29 inches above the condensate pan with float switch.

8. Both refrigerant lines from outdoor units to the mini four-way cassette indoor units shall be insulated.

G. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

3. The control circuit between the indoor units, MCU (mode change unit) and the outdoor unit shall be 0.5VDC - 7VDC completed using stranded, annealed copper conductor, two-core, 16 AWG, shielded cable to provide total integration of the system.

4. The indoor unit shall have a thermal fuse under high-voltage terminal block to disable unit in the event of overheating due to electrical malfunction/poor connection.

H. Controls:

1. This unit shall use microprocessor based factory mounted controls to perform functions necessary to operate the system.

2.4 HIGH STATIC PRESSURE, CEILING-CONCEALED, DUCTED, INDOOR UNIT

A. General:

1. The indoor unit shall be a high-performance, high static pressure capable, concealed ducted indoor fan coil that mounts above the ceiling with a fixed horizontal discharge supply and shall have a modulating linear expansion device (gear type). The high static pressure capable, concealed ducted indoor unit shall be compatible with heat recovery outdoor units and mode change unit or heat pump outdoor units. The high static pressure capable, concealed ducted indoor unit shall support individual control using control systems.

2. Each system shall perform in accordance to the required ratings shown in the design documents. Performance shall be based on nominal cooling conditions of 75°F DB, 62°F WB for the indoor unit and 95°F DB, 74°F WB for the outdoor unit, and nominal heating conditions of 72°F DB for the indoor unit and 13°F DB for the outdoor unit.

B. Indoor Unit:

1. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air (nitrogen gas) before shipment from the factory.

C. Unit Cabinet:

1. The cabinet shall be space saving, ceiling-concealed ducted.

2. The cabinet shall be constructed of insulated galvanized steel.

D. Fan:

1. The indoor unit fan assembly shall have two direct driven fans by a single motor.

2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.

3. The indoor fan shall consist of three (3) speeds: High, Medium, and Low.

4. The indoor unit shall have field provided ducted air outlet system and ducted return air system.

5. The fan speed shall be adjustable by remote controller or by control software which shall vary the fan speed according to external static pressure.

E. Filter:

1. Return air shall be filtered by means of an easily removable, washable filters or 1 inch thick, in fiberboard frames with ASHRAE 52.2 MERV rating of 8 or higher.

2. Supplemental antibacterial and anti-odor filters shall be included.

F. Coil:

1. The indoor coil shall be staggered copper tubing, with mechanically bonded aluminum fins, complying with ARI 210/240.

2. The tubing shall have inner grooves for high efficiency heat exchanger.

3. All tube joints shall be brazed with phos-copper or silver alloy.

4. The coils shall be pressure tested at the factory.

5. A condensate pan and drain shall be provided under the coil. Drain pan and drain connection shall comply with the latest edition of ASHRAE 62.1. The insulated drain pan shall be provided with condensate pump.

6. Condensate shall be gravity drained. Provide condensate pumps as required.

7. Both refrigerant lines from outdoor units to the ceiling-concealed ducted indoor unit shall be insulated.

8. The coil fins are coated with hydrophilic paint.

G. Condensate Pump

1. The manufacturer shall provide the most suitable condensate pump to match the indoor unit models.

H. Electrical:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.

2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

3. The control circuit between the indoor units, mode change unit and the outdoor unit shall be 0.5VDC - 7VDC completed using stranded, annealed copper conductor, two-core, 16 AWG, shielded cable to provide total integration of the system.

4. The indoor unit shall have a thermal fuse under high-voltage terminal block to disable unit in the event of overheating due to electrical malfunction/poor connection.

I. Controls:

1. This unit shall use microprocessor based controls to perform functions necessary to operate the system.

2.5 CONCEALED CEILING EVAPORATOR-FAN COMPONENTS

A. General: Indoor unit shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, direct-drive DC (ECM) and multi-speed type fan with CFM adjustment, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It shall be a horizontal discharge air with horizontal return air configuration. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature. Included as standard equipment, a condensate drain pan and drain pump kit that pumps to 18-3/8" from the drain pipe opening.

B. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel. Vertical or horizontal type as noted.

1. Insulation: Faced, glass-fiber duct liner.

2. Drain pans: Galvanized steel, with connection for drain; insulated And condensate pump.

3. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in the latest edition of ASHRAE 62.1.

C. Refrigerant Coil: Staggered copper tubing, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve. Refrigerant lines shall be insulated from the outdoor unit.

D. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

E. Fan Motors: Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Special Motor Features: Multi-tapped, multispeed and ECM type with internal thermal protection and permanent lubrication.

F. Disposable Filters: 1 inch thick, in fiberboard frames with ASHRAE 52.2 MERV rating of 8 or higher.

G. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.6 HEAT RECOVERY OUTDOOR UNIT

A. General:

1. The heat recovery outdoor unit shall consist of the outdoor unit, mode change unit, indoor units and control systems. The outdoor units shall be equipped with multiple circuit boards that interface to the control systems and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

2. The heat recovery system shall have the ability of simultaneous heating and cooling operation modes on all indoor units.

3. The heat recovery system shall have the ability to change operation mode (MAIN heating /MAIN cooling) without turning off the compressors allowing for constant heating and cooling operation.

4. The heat recovery modular system shall have rotational defrost capability to perform defrost operations while still providing heat to indoor units (operation and conditions restrictions exist).

5. The sum of connected capacity of all indoor air handlers shall range from 50% to 130% of outdoor rated capacity.

6. The heat recovery system shall have optional snow blowing settings to prevent snow accumulation on top of unit.

7. The heat recovery system shall have optional night quite modes to reduce unit sound in evenings (4 level settings).

8. The heat recovery system shall have current control to limit current (50% - 100% of design current) adjustable at outdoor unit or central control devices.

9. The heat recovery system compressors shall be hermetically sealed, inverter driven, direct vapor injected, asymmetric, DC scroll type. No fixed capacity compressors will be present in the refrigerant system.

10. Outdoor unit (individual modules) shall have a sound rating no higher than 62 dB(A).

11. All three refrigerant lines from the outdoor unit to the heat recovery mode change unit (MCU) shall be insulated.

12. The heat recovery system shall have the ability to adjust cooling and heating temperature/pressure compensation values depending on project conditions thus saving energy.

13. The heat recovery outdoor unit shall have an accumulator with heater and controls.

14. The heat recovery outdoor unit shall have a high pressure safety switch, high voltage fuses, over-current protection, phase detection protection, thermal fan protection, low pressure protection, compressor over current protection, fan motor voltage protection, current transformer(s), crank case heaters, and intelligent logic to ensure proper operation within unit design limitations and operational parameters.

15. The inverter compressor shall be cooled with liquid refrigerant circuit(s) to operate at optimal temperatures and to prevent failure due to overheating. No compressor inverter will be cooled by air over heat sink.

16. The heat recovery outdoor unit shall have the ability to operate with a maximum height difference of 163 feet with the condensing unit installed higher than the indoor units or

131 feet with the condensers installed lower than the indoor units and have total refrigerant tubing length of 3,281 feet. The greatest length is not to exceed 656 (722 equivalent) feet between outdoor unit and the farthest indoor unit.

17. The heat recovery outdoor unit shall be capable of operating in heat mode between -4°F ~ 75°F ambient temperatures.

18. The heat recovery outdoor unit shall be capable of operating in cool mode between 23°F to 120°F ambient temperatures as standard.

19. The heat recovery outdoor unit shall have high efficiency, individual oil separator(s) for each compressor plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

20. The heat recovery outdoor unit shall have a flat-plate type subcooler to subcool liquid refrigerant further to increase capacity and performance with long pipe lengths and to decrease refrigerant sounds at indoor equipment.

21. The compressors shall have vapor injection capability to increase performance in both heating and cooling modes. This will be automatically enabled by the outdoor unit(s) by forcing saturated refrigerant vapor into the scroll compression cycle increasing mass flow and overall system capacity.

B. Unit Cabinet:

1. The chassis shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

C. Fan:

1. The heat recovery outdoor unit shall be furnished with the required number of fans based on the system capacity.

2. General:

a. All fan motors shall be Brushless DC (BLDC) type.
b. All fan motors shall have inherent protection, thermal protection, and have permanently lubricated bearings, and be completely variable speed.
c. All fan motors shall be mounted for quiet operation.
d. All fans shall be provided with a raised guard to prevent contact with moving parts.
e. The heat recovery outdoor unit shall have vertical discharge airflow.
f. The heat recovery outdoor units shall have the capability for ducting of discharge air up to 0.31” WC static pressure with factory provided dimensional design drawings.

D. Refrigerant:

1. R410A refrigerant shall be required for the heat recovery outdoor systems.

2. Provide additional refrigerant based on installed liquid refrigerant pipe diameters and lengths.

3. Provide modular systems outdoor refrigerant kits for module connection. Manufacturer shall be responsible to provide appropriate type and number of required modules to meet the requirement. Provide outdoor Tee's as approved by the unit manufacturer.

E. Coil:

1. The outdoor coil shall be copper tubing, with mechanically bonded aluminum fins, complying with ARI 210/240.

2. The coil shall be protected with an integral metal guard.

3. Refrigerant flow from the outdoor unit shall be controlled by means of capacity modulation capable, vapor injected, DC inverter, scroll compressor.

F. Compressor:

1. The 208/230 VAC and/or 460 VAC heat recovery system shall be provided with the required number of compressors. All compressors shall be modulation capable, direct vapor injected, DC inverter, scroll type.

2. General:

a. Crankcase heaters shall be factory mounted on the compressors.
b. The outdoor unit compressor shall have variable modulation technology to modulate capacity. System capacity shall be completely variable down to 7,513 Btu/h.
c. The outdoor unit compressor(s) shall have vapor injection technology which can increase the mass flow rate of refrigerant and offset refrigerant condensing temperatures resulting in a capacity and performance improvement in heating and cooling modes.
d. The compressor(s) will be equipped with an internal thermal overload.
e. The compressor(s) shall be mounted to avoid the transmission of vibration.

G. Electrical:

1. The outdoor unit electrical power shall be 208/230 volts, 3 phase, 60 hertz or 460 Volts, 3 phase, 60 hertz.

2. The 208/230 VAC outdoor unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).

3. The outdoor unit shall be controlled by integral factory mounted microprocessor based controls.

4. The control circuit between the indoor units, mode change unit (MCU) and the outdoor unit shall be 0.5VDC - 7VDC completed using stranded, annealed copper conductor, two-core, 16 AWG, shielded cable to provide total integration of the system (F1/F2).

2.7 MODE CHANGE UNIT (MCU) FOR HEAT RECOVERY OUTDOOR UNIT

A. General:

1. The MCU shall be used with the outdoor units. These units shall be equipped with a circuit board that interfaces to the Control systems and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The MCU shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. The unit shall be mounted indoors. The sum of connected capacity of indoor units shall range from 7,000 – 152,000 btu/h capacity at one MCU. The outdoor unit shall connect multiple MCUs, up to 16 total per system.

2. The selection of MCU shall be based on number of connectable Indoor units and sum of Indoor unit capacity.

B. Mode Change Unit Cabinet:

1. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

2. Each cabinet shall house multiple refrigeration control solenoid valves and electronic expansion valves.

3. Each cabinet shall house required tube-in-tube sub cooling device with electronic expansion valve and temperature sensors to maintain design refrigerant temperatures (sub cooling).

C. Refrigerant:

1. R410A refrigerant shall be provided for MCUs.

D. Refrigerant Valves:

1. The unit shall be furnished with multiple two position solenoid valves.

2. When connecting a large indoor unit section, two adjacent branch circuits shall be joined together at the branch controller to deliver an appropriate amount of refrigerant. The two refrigerant valves shall operate simultaneously. The MCU shall include the Y-joints necessary to connect 2 circuits or ports.

3. Linear electronic expansion valves and solenoid valves shall be used to control the variable refrigerant flow inside each MCU.

4. When cooling down to 5°F outside ambient temperatures, all indoor units must connect to 2 outlet ports on mode change unit(s) with included Y-connectors. This will allow adequate refrigerant volumes in low ambient conditions.

E. Integral drain pan:

1. An integral condensate pan and drain shall be provided. Drain termination is required upon installation with an appropriate termination.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.

2. The unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).

3. The MCU shall be controlled by integral microprocessors.

4. The control circuit between the indoor units, MCU and the outdoor unit shall be 0.5VDC - 7VDC completed using stranded, annealed copper conductor, two conductor, 16 AWG, shielded cable to provide total integration of the system.

2.8 ACCESSORIES

A. Branch selector boxes provided for heat recovery function.

1. Electronic refrigerant valves for refrigerant flow direction control, brazed type.

2. Units require no condensate removal.

B. All evaporator units shall be provided with a hard wired room thermostat by equipment manufacturer. Wireless remote control not acceptable.

C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

1. Minimum Insulation Thickness: Minimum 1 inch thick.

2.9 VRF CONTROLS

A. The VRF Controls Network is made up of local remote controllers, multi-zone controllers, advanced multi-zone controllers, and open protocol network devices that transmit information via the communication bus. The VRF Controls Network shall also have the ability to be accessed via a networked PC. The VRF Controls Network supports operation monitoring, scheduling, error e-mail distribution, general user software, tenant billing, maintenance support, and integration with Building Management Systems (BMS) using open protocol via BACNet, Modbus, Lon Works, or approved equal interface; all of which blend to provide the optimal control strategy for the best HVAC comfort solution.

B. Local controllers are compatible with all VRF indoor units. The remote controller wiring consists of a non-polar two-wire connection to the indoor unit. The local remote controllers may be wall-mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s). Set temperatures can be adjusted in increments of 1°F. In the cases where a

system or unit error may occur, the VRF controllers will display a two-digit error code and the unit address. The local remote controllers do not require addressing.

C. The VRF advanced multi-zone controllers are compatible with all VRF indoor units with the use of manufacturer provided adapter. The advanced multi-zone controller wiring consists of a non-polar two-wire connection to the outdoor unit. The advanced multi-zone controllers may be wall-mounted and can be adjusted to maintain the optimal operation of up to 64 connected indoor unit groups and 128 indoor units. Set temperatures can be adjusted in increments of 1°F. In the cases where a system or unit error may occur, the VRF controllers will display a two-digit error code and the unit address.

D. The intelligent system shall be equipped with two RJ-45 Ethernet ports to support interconnection with a network PC via the Internet, Local Area Network (LAN), or connection with a non-networked PC after completed installation. Web access functions shall be available so that facility staff can securely log into each controller via the PC's web browser to support monitoring, scheduling, error email, and general user functions.

E. Software functions of Power Proportional Distribution tenant billing and Energy Navigator shall also be available.

F. Control equipment is specified in Section 230900 "Instrumentation and Control for HVAC."

G. Basic Operation:

1. Capable of controlling by Area(s) or Group(s).

2. Controller shall control the following group operations:

a. On/Off
b. Operation Mode (Cool, Heat, Fan, Dry, and Auto)
c. Setpoint for current mode in the occupied period
d. Controller shall be able to limit the user adjustable setpoint ranges individually for cooling and heating based upon the Area or Group configurations.
e. Relative Setup (Cooling) and Setback (Heating) setpoints in the unoccupied mode adjustable to 2 - 12^0F**.**

1) The high and low relative setback setpoints.
2) Setup and setback setpoints can be set inside or outside of the occupied setpoint range.
3) The recovery differential shall be 4^oF (default) and adjustable between 2 – 10^oF.
4) Settings shall be applied based upon the area or group configurations.

f. Fan Speed:

1) Up to 3 speeds (dependent upon indoor unit type).

g. Louver direction (dependent upon indoor unit type):

1) 5 fixed positions or swing position.

h. Remote controller permit/prohibit of On/Off, Mode, and Setpoint.

i. Lock out setting for Intelligent Touch Manager display.

j. Indoor unit Group/Area assignment.

3. Capable of providing battery backup power for the clock at least 1 year when no AC power is applied.

a. The battery can last at least 13 years when AC power is applied.

b. Settings stored in non-volatile memory.

H. Programmability:

1. Controller shall support weekly schedule settings.

a. 7 day weekly pattern.

b. The schedule shall have the capabilities of being enabled or disabled.

c. 100 independent schedules configurable with up to 20 events settable for each day's schedule:

1) Each scheduled event shall specify time and target area or group.

2) Each scheduled event shall include On/Off, Operation Mode, Occupied Setpoint, Pre-Cool, Pre-Heat, Setback High, Setback Low, Remote Controller On/Off Prohibit, Remote Controller Mode Prohibit, Remote Controller Setpoint Prohibit, Timer Extension Setting, Fan Speed, and Setpoint Range Limit:

a) Setpoint when unit is on (occupied).

b) Configurable Setup (Cooling) and Setback (Heating) setpoints when unit is off (unoccupied).

3) Time setting in 1-minute increments.

4) Timer Extension shall be used for a timed override (settable from 30 – 180 minutes) to allow indoor unit operation during the unoccupied period.

d. A maximum of 40 exception days can be schedule on the yearly schedule (repeats yearly):

1) Exception days shall be used to override specified days on the weekly schedule based upon irregular occupied/unoccupied conditions.

2) Exception days can be configured on a set date (Jan 1) or floating date (1st Monday in September).

2. Controller shall support auto-changeover:

    a. Auto-change shall provide Fixed, Operating, and Averaging changeover methods for both heat pump and heat recovery systems based upon the changeover group configuration. This will allow for the optimal room temperature to be maintained by automatically switching the indoor unit's mode between Cool and Heat in accordance with the room temperature and setpoint.

    b. When selecting the Auto-changeover method the Differential should also be set (default value 4°F, adjustable between 0 – 13°F). The (Thermal) Differential is the tolerance for the indoor unit's setpoint.

        1) When the difference between the representative room temperature and the representative indoor unit setpoint exceed the thermal differential, the operation mode is changed

    c. When the mode is changed from Cool to Heat, the setpoint will be decreased by the thermal differential set in the Auto-changeover configuration (i.e., If the mode is Cool with a 74°F setpoint and a changeover differential of 4°F, when switched from Cool to Heat the new setpoint for heating will be 70°F).

    d. When the mode is changed from Heat to Cool, the setpoint will be increased by the thermal differential set in the Auto Changeover configuration (i.e., If the mode is Heat with a 72°F setpoint and a changeover differential of 4°F, when switched from Heat to Cool the new setpoint for cooling will be 76°F).

3. Fixed Method:

    a. Changeover evaluated by room temperature and setpoint of the representative indoor unit (first registered indoor unit in group) in the changeover group even when it is not operating (must be in Cool, Heat, or Auto mode).

4. Operating Method:

    a. Changeover evaluated by searching for an indoor unit group that is operating in Cool, Heat, or Auto mode and uses the indoor unit room temperature and setpoint as the representative room temperature and setpoint.

    b. The order of the search is based upon the order each indoor unit group is assigned to the intelligent Touch Manager within the changeover group.

    c. If none of the indoor units in the group meet the above requirements, the fixed method of changeover will be applied.

5. Average Method:

    a. Changeover evaluated by the average of all indoor unit group's room temperatures and setpoints operating in Cool, Heat, or Auto mode in the changeover group list.

b. If none of the indoor units in the group meet the above requirements, the fixed method of changeover will be applied.

c. If the average room temperature ≤ average setpoint, the indoor units will be placed in Heat mode.

d. If the average room temperature ≥ average setpoint, the indoor units will be placed in Cool mode.

6. Changeover shall change the operation mode of the indoor unit that is set as the Changeover Master. The Changeover Master indoor unit shall then change the operation mode of all indoor unit groups daisy chained to the same outdoor unit in the heat pump system or branch selector box in the heat recovery system.

7. Changeover from Heat to Cool mode shall occur when the room temperature is greater than or equal to the heating setpoint, plus the setting of the thermal difference (0 – 13°F) with a safety allowance if necessary is established.

8. Changeover from Cool to Heating mode shall occur when room temperature is less than or equal to the cooling setpoint, minus the setting of the thermal difference (0 – 13°F) with a safety allowance if necessary is established.

9. 30 Minute Guard Timer:

a. Upon changeover, guard timer will prevent another changeover during this period.

b. Guard timer is ignored by a change of setpoint manually from either intelligent Touch Manger or Remote Controller or by schedule.

I. Controller Shall Support Interlock:

1. Interlock feature for use with 3rd party equipment (DOAS, dampers, occupancy sensing, window switch, etc.) to automatically control groups or areas corresponding to the change of the operation status or the On/Off status of any group.

2. WAGO I/O unit – Di, Do, Ai:

a. On/Off based monitoring and control of equipment
b. Manual or scheduled operation of equipment
c. Operation based upon interlock with indoor unit group(s)
d. Monitor equipment error/alarm status

3. Digital Input/Output Unit or Digital Input Unit:

a. On/Off based monitoring and control of equipment
b. Manual or scheduled operation of equipment
c. Operation based upon interlock with indoor unit group(s)
d. Monitor equipment error/alarm status

J. Controller shall support force shutdown of associated indoor unit groups.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install units level and plumb. Coordinate installation of units with architectural, mechanical and electrical work.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on 4-inch thick, reinforced concrete base; 6 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Section 030000 "Concrete." Coordinate anchor installation with concrete base.

D. Install ground-mounting, compressor-condenser components on polyethylene mounting base.

E. Install seismic restraints.

F. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch. Refer to Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."

G. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.3 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Electrical Connections: Comply with requirements in Sections 262726 “Wiring Devices” for power wiring, switches, and motor controls.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Correct leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.6 INSTRUCTION

A. Engage a factory-authorized service representative to instruct City of New York’s operating maintenance personnel to adjust, operate, and maintain units. Provide a minimum of four (4) hours instructional session.

END OF SECTION 238136

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:

1. The Contract Drawings
2. The Specifications
3. The general conditions,
4. The Addendum
5. The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section covers and applies to all work specified in Division 26.

B. Work Included: Materials, equipment, fabrication, installation and tests for fully operational and safe systems, including all necessary materials, appurtenances and features whether specified or shown on drawings or not for the following:

1. Electrical work specified in all sections within Division 26 of these specifications, including:

a. Short circuit analysis and protective device coordination study.
b. Lighting and power distribution facilities, including distribution boards, panelboards with feeders, branch circuit wiring, connections to outlets, and wiring devices.
c. Lighting fixtures and lamps.
d. Motor and other power-consuming equipment connections from distribution apparatus to equipment.
e. Control, alarm and interlock wiring for mechanical equipment, where indicated.
f. Electrical grounding system.
g. Emergency power and lighting system.
h. Cutting and patching for the Electrical Work.
i. Adjustment and testing of the Electrical Work.
j. Lighting control system.
k. Examine the drawings and specifications of other Divisions and provide electrical service for all equipment, devices and controls noted therein, unless work specifically is not included.

1.3 DESCRIPTION OF BID DOCUMENTS

A. Drawings:

1. Electrical layouts are generally diagrammatic and, although size and location of equipment is drawn to scale wherever possible, Contractor shall make use of all data in Contract Documents and verify this information at building site.
2. Locations of items on the drawings may be distorted for purposes of clearness and legibility. Actual locations of architectural and mechanical items are shown on architectural and mechanical drawings.
3. Contractor shall adjust locations of light fixtures in mechanical rooms to compensate for changes in duct routing, to provide reasonably uniform lighting in work areas.
4. Outlets shall be located in accordance with architectural design, and specific locations may be determined by the Commissioner at jobsite prior to installation.
5. Outlets located on architectural plans by dimension shall be held. Additional outlets may be shown on electrical plans and shall be installed as close as practical to the location shown.
6. Manufacturers' drawings and instructions shall be followed in all cases where the makers of devices and equipment furnish directions, where details are not shown on the drawings, or where described in the specifications.
7. Work installed in a manner contrary to that shown in the contract documents shall be removed and reinstalled when so directed by the Commissioner. Discrepancies and questionable points shall be immediately reported to the Commissioner for clarification.
8. The City of New York and the Commissioner reserve the right to make reasonable changes in outlet locations in each area prior to roughing-in at no additional cost to the City of New York.

B. If any part of specifications or drawings appears unclear or contradictory, apply to Commissioner for his interpretation and decision as early as possible. Do not proceed with such work without the Commissioner’s decision.

1.4 JOB CONDITIONS

A. Examine all drawings and specifications in a manner to be fully cognizant of all work required under this Division.

B. Adjoining work of other Divisions shall be examined for interferences and conditions affecting this Division.

C. Examine site related work and surfaces before starting work of any Section.
1. Report to the Commissioner, in writing, conditions which will prevent proper provision of this work.
2. Beginning work of any Section without reporting unsuitable conditions to the Commissioner constitutes acceptance of conditions by Contractor.
3. Perform any required removal, restore or replacement of this work caused by unsuitable conditions at no additional cost to the City of New York.

D. Connections to existing work:

1. The intent of the work is shown on the drawings and described herein, and no consideration will be granted by reason of lack of familiarity on the part of the contractor with actual physical conditions, requirements, and practices at the site.
2. Install new work and connect to existing work with minimum interference to existing facilities.
3. Temporary shutdowns of existing services: At times not to interfere with normal operation of existing facilities and only with written approval of the Commissioner at no additional charges.
4. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work. Do not interrupt alarm and emergency systems.
5. Connect new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity as required.

E. Removal and Relocation of Existing Work:
1. Disconnect, remove or relocate electrical material, equipment and other work noted and required by removal or changes in existing construction.
2. Provide new material and equipment required for relocated equipment.
3. Disconnect load and supply end of conductors feeding existing equipment.
4. Remove conductors from existing raceways to be rewired.
5. Tape both ends of abandoned conductors. Cap outlets and abandoned raceways.
6. Cut and cap abandoned floor raceways flush with concrete floor or behind walls and ceilings.
7. Dispose of removed raceways and wire.
8. Dispose of removed electrical equipment as directed.

F. If asbestos insulation is found when working in existing areas, immediately stop work and notify the Commissioner. Do not restart work until advised in writing by the Commissioner that it is safe to do so following abatement, encapsulation, etc.

1.5 DEFINITIONS

A. Refer to DDC General Conditions

B. "Wiring": Raceway, fittings, wire, boxes and related items.

C. "Concealed": Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

D. "Exposed": Not installed underground or "concealed" as defined above.

E. "Indicated" "Shown" or "Noted": As indicated, shown or noted on drawings or specifications.

F. "Equal": Equal in quality, workmanship, materials, weight, size, design and efficiency of specified product, conforming with "Manufacturers".

G. "Reviewed," "Satisfactory," "Accepted," or "Directed": As reviewed, satisfactory, accepted or directed by or to the Commissioner.

H. "Motor Controllers": Manual or magnetic starters (with or without switches), individual pushbuttons, or hand-off-automatic (HOA) switches controlling the operation of motors.

I. "Control Devices": Automatic sensing and switching devices such as thermostats, pressure, float, electro-pneumatic switches and electrodes controlling operation of equipment.

1.6 UTILITY CONNECTIONS

A. Finalize electrical service arrangements including verification of locations and details with the Con Edison Electric Company.

B. In addition to the requirements shown on the drawings and stated herein, the work shall comply with the following:

1. Construction Standards and Service Requirements of the respective utilities including any supplementary drawings issued by the utilities.
2. Be subjected to inspection approval of these utilities.

1.7 ELECTRICAL SYSTEM CHARACTERISTICS

A. Service: 208 volts, 3 phase, 4 wire with ground conductor.

B. High efficiency LED lighting: 120 volts.

C. Motors ½ horsepower and above: 208 volts, 3 phase.

D. Fractional horsepower motors less than ½ horsepower: 120 volts single phase.

E. General receptacles will be supplied at 120 volts.

1.8 MOUNTING HEIGHTS

A. Mounting heights of devices and equipment shown on the architectural drawings shall govern, but in the absence of such indications, the following centerline heights above the finished floor shall be maintained.

1.	Wall switches	3 feet - 6 inches (or as directed by Commissioner).
2.	Wall lights (interior)	7 feet - 0 inches (or as directed by the Commissioner).

3.	Pendant or chain hung fixture	10 feet - 0 inches (or as directed by the Commissioner).
4.	Convenience receptacles	1 foot - 3 inches except in Toilets and over cabinets or -counters where devices shall be mounted at 4 feet - 0 inches (9 inches above counter).
5.	Fire alarm stations	4 feet - 0 inches.
6.	Telephone and communication outlets	1 foot - 3 inches.
7.	Clock outlets	1 foot - 6 inches below finished ceiling.
8.	Panelboard cabinets	Shall be installed with the top 6 feet - 6 inches above the floor for cabinets more than 2 feet - 6 inches high and 6 feet - 0 inches for cabinets less than 2 feet - 6 inches high.
9.	Motor controllers	5 feet-0 inches.

1.9 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Submit shop drawings, product data, samples and certificates of compliance required by contract documents.

C. Layout Shop Drawings Required:

1. Prepare and submit following coordinated layout shop drawings on 1/4" scale:

   a. Mechanical equipment rooms containing motor control center and/or transformers.
   b. All electrical rooms and closets with equipment dimensions.
   c. Areas requiring deviations from design documents. Such deviations shall be clearly identified.

2. Layout drawings not varying from design documents shall not be submitted and will not be reviewed.

D. Operating Instructions, Maintenance Manuals and Parts Lists.

1. Before requesting acceptance of work submit one set for review by the Commissioner.
2. After review, furnish five printed and bound sets.
3. Include:

    a. Manufacturer's name, model number, service manual, spare-parts list, and descriptive literature for all components, cross referenced and numbered on Reference Drawings.
    b. Maintenance instructions.
    c. Listing of possible breakdown and repairs.
    d. Instruction for starting, operation and programming.
    e. Detailed and simplified one line and wiring diagrams.
    f. Field test report.
    g. Name, address and phone number of contractors, equipment suppliers and service agencies.
    h. Assemble manufacturer's equipment manuals in chronological order following the specification alpha-numeric system in heavy duty three-ring binders clearly titled on the spine and front cover.

1.10 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

1.11 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

    1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
    2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
    3. To allow right of way for piping and conduit installed at required slope.
    4. So that connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Section 072700 "Firestopping/Smokeseals."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.
e. Or approved equal.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

F. Layout and installation of electrical work shall be coordinated with the overall construction schedule and work schedules of various trades, to prevent delay in completion of the Project.

1. Complete drawings and specifications for the entire project will be available at the Project site.

2. It shall be obligatory to thoroughly check these drawings before organizing the electrical work schedule, or installing material and equipment.

G. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Division of Work. Be prepared to promptly furnish dimensions and information regarding electrical Work to other trades and cooperate with them to secure harmony and the best progress of the Project.

H. The drawings do not show off-sets, bends, and special fittings, or junction or pull boxes necessary to meet job conditions. These items shall be provided as required at no additional cost to the City of New York.

I. Accessibility and Clearance:

1. Electrical equipment, outlets, junction and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.

2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

J. Scaffolds and staging for installation of electrical work shall be provided under the work of this Division.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079000 " Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Section 072700 "Firestopping/Smokeseals."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Section 072700 "Firestopping/Smokeseals."

3.6 WEATHERPROOF EQUIPMENT

A. Electrical devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosure shall comply with NEMA Type 3R requirements.

B. Surface mounted outlet boxes shall be cast metal with threaded hubs. Pull or junction boxes shall be cast metal with bolted and gasketed covers.

C. Outlet box covers shall be of a suitable weatherproof type with gaskets, packing glands, weatherproof doors, or other required means to prevent entry of moisture.

D. Lighting fixtures shall be installed with suitable gasket, and UL labeled for location.

3.7 HOUSEKEEPING PADS AND FOUNDATIONS

A. Concrete work required for housekeeping pads and foundations will be provided by General Construction Work. Comply with the requirement for concrete base specified in Division 03 section.
   1. Use 3000-psi 28-day compressive-strength concrete and reinforcement as specified in Section 030000 "Concrete"
   2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
   3. Install epoxy-coated anchor bolts for anchoring equipment to the concrete base.
   4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

5. Bolt equipment to channel-iron sills embedded in concrete bases. Install sills level and grout flush with floor or base.
6. Refinish damaged or scratched surfaces.
7. Provide 24 inch wide insulating mat in front of operable electrical equipment and in front and rear of free standing ones.
8. Tighten all bolted connections prior to energizing.

B. Furnish required dimensional drawings and specify locations. Minimum height of housekeeping pads shall be 4 inches and shall extend out 6 inches from the footprint of the equipment.

C. Furnish anchor bolts and sleeves, and verify accuracy of installation.

D. Provide for:

1. Switchboards.
2. Pumps.
3. All other floor mounted equipment.

END OF SECTION 26 05 00

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SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

B. Related Sections include the following:
1. Specification 26 05 29 "Hangers and Supports for Electrical Systems."
2. Specification 26 05 53 "Identification for Electrical Systems."
3. Specification 07 90 00 "Joint Sealars."
4. Specification 07 27 00 "Firestopping/Smokeseals"

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. EPDM: Ethylene-propylene-diene terpolymer rubber.

C. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each type of product indicated.

C. Qualification Data: For testing agency.

D. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to The City of New York.

1. Testing Agency's Field Supervisor: the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to The City of New York, and marked for intended use.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Okonite Company, The.
4. Southwire Wire and Cable Company.
5. Southwest Wire and Cable.
6. Or approved equal.

B. Copper Conductors: Comply with NEMA WC 70.

C. The design is based on copper conductors.

D. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XPLE.

E. Multiconductor Cable: Comply with NEMA WC 70 for armored cable, Type AC and metal-clad cable, Type MC with ground wire.

2.2 PHOTOVOLTAIC CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. General Cable Corporation.
2. Okonite Company, The.
3. Southwire Wire and Cable Company.
4. Or approved equal.

B. Copper Conductors: Comply with UL 4703 & RPVU90.

C. The design is based on copper conductors.

D. Conductor Insulation: Comply with UL 4703 & RPVU90 for XPLE.

2.3 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hubbell Power Systems, Inc.
2. O-Z/Gedney; EGS Electrical Group LLC.
3. 3M; Electrical Products Division.
4. Tyco Electronics Corp.
5. Or approved equal.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.4 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified 07 27 00 "Firestopping/Smokeseals"

2.5 SLEEVE SEALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Carbon steel or Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating or Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Minimum size No. 12 AWG up to 100 feet at 120V; lengths exceeding 100 feet, use No. 10. For 277V, over 220 feet, use No. 10 minimum.

3.3 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway, Type SE or USE multiconductor cable or as require by the Electrical Utility company Con Edison.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway or as require by the Electrical Utility company Con Edison.

E. Feeders in Cable Tray: Type THHN-THWN, single conductors in raceway.

F. Exposed Branch Circuits: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Armored cable, Type AC or Metal-clad cable, Type MC.

H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

I. Branch Circuits in Cable Tray: Type THHN-THWN, single conductors in raceway and Metal-clad cable, Type MC.

J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

K. Photovoltaic wire in Cable Tray or Wiring Gutter: Type XLPE single conductor in Cable Tray or Wiring Gutter UV and Sunlight Resistant.

L. Class 1 Control Circuits: Type THHN-THWN, in raceway.

M. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

E. Support cables according to Specification 26 05 29 "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Specification 26 05 53 "Identification for Electrical Systems."

G. Not more than three lighting or convenience outlet circuits in one conduit unless otherwise indicated.

H. Pull no thermoplastic wires at temperatures lower than 32°F.

I. Unless specifically indicated, separate raceways for conductors of 120/208 and 277/480 volt systems, except 480 volt motor branch circuit wiring and related 120 volt control wiring. Separate raceways for emergency system conductors.

J. Separate raceways for Photovoltaic systems cable and control wiring.

K. Individual raceways for two pole ungrounded circuits.

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Terminations, splices and taps:

1. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation rating than unspliced conductor.
2. Copper conductors No. 10 and smaller: Compression type or twist-on spring loaded connectors and clear nylon insulated covering.
3. Copper conductors No. 8 and larger: Mechanical bolted pressure or hydraulic compression type using manufacturers recommended tooling.
4. Cable lugs and connectors: Compression type of same metal as conductor to match cables with marking indicating size and type.
5. For copper lug connection to bus bars provide anti-seize compound.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Specification 07 27 00 "Firestopping/ Smokeseals"

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls. Comply with requirements in Specification 26 05 44 “Sleeves and Sleeve Seals for Electrical Raceways and Cabling”.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both wall surfaces.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Specification 07 90 00 “Joint Sealers."

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Specification 07 27 00 " Firestopping/smokeseals"

L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work. Obtain written approval from roofing contractor for actual materials being used and methods of installation.

M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.7 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Specification 07 27 00 "firestopping/ smokeseals."

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections and prepare test reports.

C. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.

   a. New Electrical Service board

   b. New Electrical Switchboard

   c. New Photovoltaic inverter equipment

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Perform scans when the facility is operational and at highest peak of electrical load as possible. Remove box and equipment covers so splices are accessible to portable scanner.

   a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
   b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
   c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

D. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 26 05 23 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. UTP cabling.
2. Low-voltage control cabling.
3. Control-circuit conductors.
4. Identification products.

1.3 DEFINITIONS

A. Refer to DDC General Conditions.

B. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.

C. BICSI: Building Industry Consulting Service International

D. BICSI TDMM: Telecommunications Distribution Methods Manual

E. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel section.

F. EIA: Electronic Industries Alliance

G. EMI: Electromagnetic interference.

H. IDC: Insulation displacement connector.

I. ICEA S-90-661: Category 3, 5, & 5e individually unshielded twisted pair indoor cables(with or without and overall shield) for use in general purpose and LAN communication wiring systems technical requirements.

J. ITSIM: Information Technology Systems Installation Methods

K. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).

L. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

M. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).

N. RCDD: Registered Communications Distribution Designer.

O. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal side rails, and a bottom without ventilation openings.

P. Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.

Q. TIA/EIA 568: Commercial Building Telecommunications Cabling Standard

R. TIA/EIA-569-A: Commercial Building Standards for Telecommunications Pathways and Spaces

S. UTP: Unshielded twisted pair.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Shop Drawings: For cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:

1. Vertical and horizontal offsets and transitions.
2. Clearances for access above and to side of cable trays.
3. Vertical elevation of cable trays above the floor or bottom of ceiling structure.
4. Load calculations to show dead and live loads as not exceeding manufacturer's rating for tray and its support elements.

C. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

D. Source quality-control reports.

E. Field quality-control reports.

F. Maintenance Data: For wire and cable to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.
1. Test each pair of UTP cable for open and short circuits.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install UTP and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PATHWAYS

A. Support of Open Cabling: NRTL labeled for support of Category 5e or Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. Lacing bars, spools, J-hooks, and D-rings.
3. Straps and other devices.

B. Cable Trays:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:

a. Cable Management Solutions, Inc.
b. Cablofil Inc.
c. Cooper B-Line, Inc.
d. Cope - Tyco/Allied Tube & Conduit.

e. GS Metals Corp.
f. Or approved equal.

2. Cable Tray Materials: Metal, suitable for indoors and protected against corrosion by hot-dip galvanizing, complying with ASTM A 123/A 123M, Grade 0.55, not less than 0.002165 inch (0.055 mm) thick.
   a. Ladder Cable Trays: Nominally 18 inches wide, and a rung spacing of 12 inches.

C. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."Flexible metal conduit shall not be used.

1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

2.2 BACKBOARDS

A. Description: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches. Comply with requirements for plywood backing panels in Division 06 Section "Rough Carpentry."

2.3 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belden CDT Inc.; Electronics Division.
2. Berk-Tek; a Nexans company.
3. CommScope, Inc.
4. Draka USA.
5. Genesis Cable Products; Honeywell International, Inc.
6. KRONE Incorporated.
7. Mohawk; a division of Belden CDT.
8. Nordex/CDT; a subsidiary of Cable Design Technologies.
9. Superior Essex Inc.
10. SYSTIMAX Solutions; a CommScope, Inc. brand.
11. 3M.
12. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
13. Or approved equal.

B. Description: 100-ohm, four-pair UTP, formed into 25-pair binder groups covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 5e and Category 6.
4. Listed and labeled by an NRTL acceptable to Commissioner as complying with UL 444 and NFPA 70 for the following types:

   a. Communications, General Purpose: Type CM or Type CMG.

b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
c. Communications, Riser Rated: Type CMR; complying with UL 1666.
d. Multipurpose: Type MP or Type MPG.
e. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
f. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

2.4 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:

1. American Technology Systems Industries, Inc.
2. Dynacom Corporation.
3. Hubbell Premise Wiring.
4. KRONE Incorporated.
5. Leviton Voice & Data Division.
6. Molex Premise Networks; a division of Molex, Inc.
7. Nordex/CDT; a subsidiary of Cable Design Technologies.
8. Panduit Corp.
9. Siemon Co. (The).
10. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
11. Or approved Equal.

B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.

C. Connecting Blocks: 110 style for Category 5e and 110 style for Category 6. Provide blocks for the number of cables terminated on the block; integral with connector bodies, including plugs and jacks where indicated.

2.5 LOW-VOLTAGE CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

C. Paired Cable: NFPA 70, Type CMG.

1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

D. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Plastic jacket.
5. Flame Resistance: NFPA 262, Flame Test.

2.6 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN and Type XHHN, in raceway, complying with UL 83 and UL 44.

B. Class 2 Control Circuits: Stranded copper, Type XHHN, in raceway, complying with UL 44.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or Type TF, complying with UL 83.

2.7 IDENTIFICATION PRODUCTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, the following:

1. Brady Corporation.
2. HellermannTyton.
3. Kroy LLC.
4. Panduit Corp.
5. Or approved equal.

B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

C. Comply with requirements in Specification 260553 "Identification for Electrical Systems."

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A(Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant) and TIA/EIA-568-B.3.

E. Cable will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.

B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

C. Comply with requirements in Specification 260533 "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

D. Install manufactured conduit sweeps and long-radius elbows if possible.

E. Pathway Installation in Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed or in the corner of room if multiple sheets of plywood are installed around perimeter walls of room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard if entering room from overhead.
4. Extend conduits 3 inches above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:

1. Comply with TIA/EIA-568-B.2.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

D. Installation of Control-Circuit Conductors:

1. Install wiring in raceways. Comply with requirements specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM (Telecommunications Distribution Methods Manual) and TIA/EIA-569-A (Commercial Building Standards for Telecommunications Pathways and Spaces) recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables.

3.5 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No 14 AWG.
2. Class 2 low-energy, remote-control, and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm, and signal circuits, No 12 AWG.

3.6 FIRESTOPPING

A. Comply with requirements in Specification 072700 "Firestopping/ Smokeseals"

B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.7 GROUNDING

A. For data communication wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. For low-voltage wiring and cabling, comply with requirements in Specification 260526 "Grounding and Bonding for Electrical Systems."

3.8 IDENTIFICATION

A. Identify system components, wiring, and cabling according to TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Visually inspect UTP materials for UL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not after cross connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 26 05 23

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
   1. Underground distribution grounding.
   2. Common ground bonding with lightning protection system.
   3. Foundation steel electrodes

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

   1. Test wells.
   2. Ground rods.
   3. Ground rings.
   4. Grounding arrangements and connections for separately derived systems.

C. Qualification Data: For testing agency and testing agency's field supervisor.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals. In addition to items specified in DDC General Conditions, include the following:

   1. Instructions for periodic testing and inspection of grounding features at test wells and ground rings based on NETA MTS and NFPA 70B.

      a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.

b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to Commissioner.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to Commissioner, and marked for intended use.

D. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. Heary Bros. Inc.
3. Fushi Copperweld Inc.
4. O-Z/Gedney; a brand of Emerson Industrial Automation.
5. Thomas & Betts Corporation, a Member of the ABB Group.
6. Or approved equal.

2.2 SYSTEM DESCRIPTIONS

A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise indicated.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned conductor: ASTM B33.

4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:

1. No. 4 AWG minimum, soft-drawn copper.
2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 4 inches in cross section, drilled and tapped with 3/8" coarse thread (2 rows at 2" centers), unless otherwise indicated; with insulators. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600V. Lexan or PVC, impulse tested at 5000V.

E. Signal Reference Grid for sensitive electronic equipment unless otherwise shown on the drawings. Provide 2” x 26 gage copper strips under the revised floor space 2’ on center, factory welded at each crossover furnished in sections with widths from 4 ft. to 18 ft.; the grid shall be connected to main grounding system via #2 STR cable.

2.4 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to Commissioner for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors to Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze solderless compression-type wire terminals and long-barrel two-bolt connection to ground bus-bar.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper- clad steel, suitable for adding multiple sections, minimum 10 feet long, ¾ inch diameter.

B. Chemical-Enhanced Grounding Electrodes: Copper tube, straight or L-shaped, charged with nonhazardous electrolytic chemical salts.

1. Termination: Factory-attached No. 4/0 AWG bare conductor at least 48 inches long.
2. Backfill Material: Electrode manufacturer's recommended material.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation. For concrete encased duct banks, provide #4/0 bare copper conductor in concrete 1" above top duct.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone/telecommunication equipment rooms, in rooms housing service equipment, and all other low-voltage equipment rooms and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.3 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended in written instructions by manufacturer of splicing and termination kits.

D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.5 GROUNDING SEPARATELY DERIVED SYSTEMS

A. Generator, transformer and other systems as defined by NFPA 70.

B. Install grounding electrode(s) at the system location. The electrode shall be connected to the equipment grounding conductor and to the frame of the separately derived system.

3.6 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.

4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
10. Photovoltaic Equipment and Components: Install insulated equipment grounding conductor in Photovoltaic equipment circuits.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-36-inch grounding bus.
3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.7 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 (standard for the Installation of Lightning Protection Systems) and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Specification 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to street side ahead of the water meter main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of the building.

1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
2. Bury ground ring not less than 24 inches from building foundation.
3. Where roof drip line varies from above locations, install conductor at roofing drip lines.

J. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

K. Exothermic Connectors: Welds shall be made in accordance with kit recommendations. Damp materials shall not be used. Puffed up or connections that are not fully formed or where material is missing, shall be replaced.

3.8 LABELING

A. Comply with requirements in 260553 "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.

1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.9 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal at ground test wells. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural

drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report to Commissioner, in a separate document, measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Substations and Pad-Mounted Equipment: 5 ohms.
4. Manhole Grounds: 10 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify the Commissioner promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

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SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. Refer to DDC General Conditions.

B. EMT: Electrical metallic tubing

C. IMC: Intermediate metal conduit.

D. NECA 1: Standard for Good Workmanship in Electrical Construction

E. NECA 101: Standard for Installing Steel Conduits

F. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Engineering Services: Contractor shall provide all required support, seismic bracing (based on structural assigned zone) and anchor bolts. Drawings signed by a Professional structural engineer licensed in the state of New York to be retained by the Contractor. Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.
3. The drawings provided by the contractor shall be submitted in a shop drawing format for Commissioner for review and comment.

C. Shop Drawings: professional engineer licensed in the state of New York. Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

D. Welding certificates.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Specification 075216 "SBS Modified Bituminous Roofing"

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Allied Tube & Conduit.
      b. Cooper B-Line, Inc.; a division of Cooper Industries.
      c. ERICO International Corporation.
      d. GS Metals Corp.
      e. Thomas & Betts Corporation.
      f. Unistrut; Tyco International, Ltd.
      g. Wesanco, Inc.
      h. Or approved equal.
   2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
   3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
   4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
   5. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Allied Tube & Conduit.
      b. Cooper B-Line, Inc.; a division of Cooper Industries.
      c. Fabco Plastics Wholesale Limited.
      d. Seasafe, Inc.
      e. Or approved equal.
   2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
   3. Fitting and Accessory Materials: Same as channels and angles**,** except metal items may be stainless steel.
   4. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
      5) Or approved equal.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.
      6) Or approved equal.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.3 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise required:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.4 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Specification 051210 "Structural Steel" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.5 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in 030000 Section "Concrete"

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.6 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

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SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:
   1. Specification 260500 "Common Work Results for Electrical."
   2. Specification 033000 “Cast-In-Place Concrete”
   3. Specification 312333 “Trenching, Backfilling, and Compacting”

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. AASHTO: American Association of State Highway and Transportation Officials

C. ACI: American Concrete Institute

D. EMT: Electrical metallic tubing.

E. EPDM: Ethylene-propylene-diene terpolymer rubber.

F. FMC: Flexible metal conduit.

G. IMC: Intermediate metal conduit.

H. LFMC: Liquidtight flexible metal conduit.

I. LFNC: Liquidtight flexible nonmetallic conduit.

J. NBR: Acrylonitrile-butadiene rubber.

K. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

C. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For handholes and boxes for underground wiring, including the following:

a. Duct entry provisions, including locations and duct sizes.
b. Frame and cover design.
c. Grounding details.
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
e. Joint details.

D. Samples for Initial Selection: For wireways and surface raceways with factory-applied texture and color finishes.

1. Size: 12”

E. Samples for Verification: For each type of exposed finish required for wireways and surface raceways, prepared on Samples of size indicated below.

1. Size: 12”

F. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members in the paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

G. Qualification Data: For professional engineer licensed in the State of New York and testing agency.

H. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to The City of New York, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.
10. Or approved equal.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: ANSI C80.5.

D. IMC: ANSI C80.6.

E. EMT: ANSI C80.3.

F. FMC: Zinc-coated steel or aluminum.

G. LFMC: Flexible steel conduit with PVC jacket.

H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: compression type.

I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.

2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.
13. Or approved Equal.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

C. LFNC: UL 1660.

D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

E. Fittings for LFNC: UL 514B.

2.3 COMMUNICATIONS CABLE RACEWAY AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.
5. Or approved Equal.

B. Description: Inner duct system shall comply with UL 2024 (Standard for Cable Routing Assemblies and Communications Raceways); flexible type, approved for plenum installation.

2.4 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.
4. Or approved equal.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 3R, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Flanged-and-gasketed type.

E. Finish: Manufacturer's standard enamel finish.

2.5 NONMETALLIC WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hoffman.
2. Lamson & Sessions; Carlon Electrical Products.
3. CANTEX Inc
4. Or approved equal.

B. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.

C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.6 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by the Commissioner.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Thomas & Betts Corporation.
b. Walker Systems, Inc.; Wiremold Company (The).
c. Wiremold Company (The); Electrical Sales Division.
d. Or approved equal.

B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by the Commissioner from manufacturer's standard colors.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following

a. Butler Manufacturing Company; Walker Division.
b. Enduro Systems, Inc.; Composite Products Division.
c. Hubbell Incorporated; Wiring Device-Kellems Division.
d. Lamson & Sessions; Carlon Electrical Products.
e. Panduit Corp.
f. Walker Systems, Inc.; Wiremold Company (The).
g. Wiremold Company (The); Electrical Sales Division.
h. Or approved equal.

2.7 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
14. Or approved equal.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2 (Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports).

E. Nonmetallic Floor Boxes: Nonadjustable, round.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1 (Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports).

G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

2. Nonmetallic Enclosures: Plastic.

I. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

J. Underground Precast Handholes and Pull Boxes
1. Handholes and pull boxes are defined as boxes up to a size of 17"x30".
2. Construct the box using precast concrete or polymer concrete with an open bottom unless noted otherwise on the drawings.
3. The box shall be rated for incidental traffic. It shall be suitable for AASHTO H-20 loading in off-street locations that are not subject to high density traffic.
4. Engrave the cover to indicate the contents such as “ELECTRIC,” “COMM,” “LIGHTING,” “SIGNALS,” or as noted on the drawings.
5. The cover shall be a non-skid surface, include lift or pull slots, and be capable of being secured to the body with fasteners.
6. The manufacturer’s name and model number shall be permanently indicated to an interior wall face.
7. Manufacturers:
   a. Oldcastle
   b. Christy
   c. Hanson
   d. Hubbell
   e. Approved equal

K. Precast Concrete Vaults/Manholes
1. Vaults are defined as boxes larger than 17"x30".
2. Vaults shall be precast concrete, solid bottom with a knocked-out sump to allow for drainage, embedded galvanized channels in each wall, a 1-inch diameter ground rod knockout in the floor, and galvanized pull/lift irons in each corner. Vaults shall have an opening in the bottom to allow drainage.
3. Construct vaults using concrete that has a minimum 4,000 psi strength at 28 days.
4. The vault/manhole is to be meet the following requirements:
   a. Tops and walls of structures shall comply with AASHTO H-20 highway loading, with 30 percent loading added for impact.
   b. Precast structures shall be in accordance with AASHTO Specification for Highway Bridges. Concrete and reinforcing shall be in accordance with ACI Code 318. Precast units shall conform to ASTM C478.
   c. Walls shall withstand all soil pressures, taking into consideration the soil to be encountered and groundwater level present at the site. Assume ground water level is at ground surface unless a lower water table is indicated in the boring logs.
   d. Precast vaults shall be built and constructed not to float.

e. Assembled sections shall have mating edges with tongue-and-groove joints. Joints shall firmly interlock adjoining components, and provide waterproof junctions. Joints shall be sealed watertight using preformed plastic strips installed in accordance with the manufacturer's instructions.
f. Slope floor 2 percent in all directions to the sump.
g. Steel components other than reinforced steel shall be hot-dip galvanized after fabrication.
h. Identify vaults using the manufacturer's name embedded in, or otherwise permanently attached to, an interior wall face.

5. Vaults located in roadways shall be provided with round high-density H-20 rated traffic covers. Other areas such as sidewalks, parking lots, and landscape areas shall be provided with galvanized steel hatches unless otherwise noted on the drawings.
   a. High density traffic areas shall be provided with H-20 rated cast iron manhole covers. These covers shall be a minimum of 30-inch diameter, with lift holes and provisions to secure into the vault top with fasteners. Round vault covers and frames shall be Class 30B grey cast iron in accordance with ASTM A48.
   b. Sidewalks, parking lots, and landscape areas shall be provided with traffic rated galvanized steel hatches unless noted otherwise on the drawings. Include a locking latch, a recessed lift handle, and a hinging system that allows the cover to open a full 180 degrees. Communication vaults containing fiber optic back bone cables shall be provided with a pad-lock compartment in the cover.
6. Permanently label all vaults with vault numbers. Vault designations shall be visible from the surface. Communication vaults will be designated "CVLT-xxxx" and electrical vaults designated "EVLT-xxxx," where xxxx is a vault number assigned by the City of New York. Cast covers shall have the designation cast into the cover at the casting foundry. If casting the designation into the cover is not an option, the Contractor shall propose other means to permanently label the vault. Galvanized steel hatches shall include the bead welded designation onto the cover. If the cover cannot be bead welded, the Contractor shall propose other permanent marking options.
7. Conduit entries through vertical vault walls shall be through cast-in-place molded plastic duct connections.
8. Cable Racks
   a. Cable racks shall be installed in all manholes to properly support cables.
   b. 1/2-inch threaded inserts shall be cast-in walls for cable rack connections with a horizontal spacing no greater than 24 inches on-center.
   c. Concrete inserts for cable rack bolts and all accessories to be hot-dipped galvanized.
9. Pull-in Irons
   a. Each wall of each manhole will have at least one 1" hot-dipped galvanized pull-in iron.
   b. A pull-in irons shall be installed directly across from each set of duct bank terminators, and new and future duct bank openings.
10. Ground Rods
    a. All electric and communication manholes shall have a minimum of two (2) 5/8" x 8'0" copper-clad steel ground rods, installed outside and adjacent to the manhole, one each where the duct banks enters the manholes. The top of the ground rods shall be at the same elevation as the duct banks.

b. A 4/0 THW copper ground cable shall be connected to each ground rod and brought into the manhole along with the ground cable from the adjacent duct bank.
c. Inside the manholes, all the ground cables shall be connected together along with the ground cables in the adjacent manhole with a 4/0 copper THW ground cable.
d. Ground cables shall be neatly laid vertical and horizontal, and clamped to the manhole walls.
e. All connections shall be made using the exothermic weld method.

2.8 CONDUIT EXPANSION/DEFLECTION FITTINGS

A. Conduit expansion/deflection fittings in embedded runs shall be rated for indoor use, outdoor use, buried underground, or embedded in concrete in non-hazardous areas.

B. Fittings shall allow axial expansion or contraction up to 3/4 inch and angular misalignment of the axes of the coupled runs in any direction to 30 degrees. Inner sleeves shall maintain constant inside diameter in any position and provide smooth insulated wireway for protection of wire insulation.

C. Fittings shall have a watertight flexible neoprene outer jacket and tinned copper flexible braid grounding strap.

D. Use with galvanized rigid steel conduit or PVC Schedule 40 conduit utilizing rigid metal conduit nipples and rigid metal to PVC adapters.

E. Manufacturers:
1. Crouse-Hinds Cooper
2. O-Z/Gedney
3. Carlon Electrical Products
4. Or approved equal.

2.9 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77 (Specification for Underground Enclosure Integrity). Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by a independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A licensed professional engineer in the state of New York shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: Rigid steel conduit or EMT.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
4. Underground Service Conduit: Fiber Glass Conduit meeting the Con Edison Electric standards.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
7. Application of Handholes and Boxes for Underground Wiring:

    a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT or RNC.
2. Exposed, Not Subject to Severe Physical Damage, in office space only: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
    d. Garage area.
    e. Machine shops, storage and equipment areas.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: Rigid steel conduit.
7. Raceways for Communications Cable in Spaces Used for Environmental Air: EMT.
8. Raceways for Communications Cable Risers in Vertical Shafts: EMT.
9. Raceways for Concealed General Purpose Distribution of Communications Cable: EMT.
10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel or nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.3 INSTALLATION

A. Comply with NECA 1 (Standard for Good Workmanship in Electrical Construction) for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Specification 260529 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Raceways for Communications Cable: Install raceways, metallic and nonmetallic, rigid inner duct and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.4 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Specification 310000 Section "Earthwork" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Specification 310000 Section "Earthwork."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Specification 310000 Section "Earthwork."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

3.5 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes and boxes with bottom below the frost line, 36” below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.6 UTILITY WARNING TAPE AND LOCATE WIRE

A. Place a continuous strip of utility warning tape approximately 12 inches above ducts or conduits before backfilling trenches. See Section 31 23 33, Trenching, Backfilling, and Compacting, for tape description and installation requirements.

B. Provide warning tape as described in Section 330597.23 Underground Utility Warning Tape.

C. Extend locate wire to near vault top and secure with an additional 2 feet of spare loop. Additional conductor length allows equipment used by locators to be positioned outside the vault, thereby eliminating a confined space entry.

3.7 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 26 05 44 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Specification 072700 "Firestopping/smokeseals" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

F. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advance Products & Systems, Inc.
b. Calipco, Inc.
c. Metraflex Company (The).
d. Pipeline Seal and Insulator, Inc.
e. Proco Products, Inc.
f. Or approved equal.

2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel.
4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating or Stainless steel of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

a. Presealed Systems.
b. Link-seal
c. Flexicraft Pipeseal
d. Or approved Equal.

2.4 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Specification 079000 Section "Joint Sealants."
b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

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SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Identification for raceway and metal-clad cable.
2. Identification for power conductors and communication and control cable.
3. Underground-line warning tape.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each electrical identification product indicated.

C. Identification Schedule: An index of nomenclature of electrical cables, equipment and system components used in identification signs and labels.

D. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Comply with ANSI A13.1 and ANSI C2 and IEEE C2.

C. Comply with NFPA 70.

D. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

E. Comply with NFPA 70E (Standard for Electrical Safety in the Workplace).

F. Comply with OSHA requirements for electrical labeling.

G. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

C. Colors for Raceways Carrying Circuits at More Than 600 V:

1. Black letters on an orange field.
2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch-high letters on 20-inch centers.

D. Self-Adhesive Vinyl Labels for raceways carrying circuits 600V or less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

E. Snap-Around Labels for raceways carrying circuits 600V or less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Snap-Around, Color-Coding Bands for raceways carrying circuits 600V or less: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

G. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch wide black stripes on 10-inch centers diagonally over orange background that extends full length of raceway or duct and is 12 inches wide. Stop stripes at legends.

H. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

I. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Colors for Raceways Carrying Circuits at 600 V and Less:

   1. Black letters on an orange field.
   2. Legend: Indicate voltage and system or service type.

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.4 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

F. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.5 FLOOR MARKING TAPE

A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.6 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

C. Tag: Type II:

1. Multilayer laminate consisting of high-density polyethylene scrim coated with pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Thickness: 12 mils.
3. Weight: 36.1 lb/1000 sq. ft.
4. 3-Inch Tensile According to ASTM D 882: 400 lbf, and 11,500 psi.

D. Tag: Type IID:

1. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Overall Thickness: 8 mils.
3. Foil Core Thickness: 0.35 mil.
4. Weight: 34 lb/1000 sq. ft.
5. 3-Inch Tensile According to ASTM D 882: 300 lbf, and 12,500 psi.

2.7 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch-thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.

D. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking nylon tie fastener.

E. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.8 WARNING LABELS AND SIGNS

A. Comply with NFPA 70, NFPA 70E and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

C. Baked-Enamel Warning Signs:
1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:
1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.9 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.10 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and ultraviolet-resistant seal for label.

C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.11 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.12 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb, minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.

1. Exterior Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):

a. Semigloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Exterior concrete and masonry primer.
2) Finish Coats: Exterior semigloss acrylic enamel.

2. Exterior Concrete Unit Masonry:

a. Semigloss Acrylic-Enamel Finish: Two finish coat(s) over a block filler.

1) Block Filler: Concrete unit masonry block filler.
2) Finish Coats: Exterior semigloss acrylic enamel.

3. Exterior Ferrous Metal:

a. Semigloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Exterior ferrous-metal primer.
2) Finish Coats: Exterior semigloss alkyd enamel.

4. Exterior Zinc-Coated Metal (except Raceways):

a. Semigloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Exterior zinc-coated metal primer.
2) Finish Coats: Exterior semigloss alkyd enamel.

5. Interior Concrete and Masonry (Other Than Concrete Unit Masonry):

a. Semigloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Interior concrete and masonry primer.
2) Finish Coats: Interior semigloss alkyd enamel.

6. Interior Concrete Unit Masonry:

a. Semigloss Acrylic-Enamel Finish: Two finish coat(s) over a block filler.

1) Block Filler: Concrete unit masonry block filler.
2) Finish Coats: Interior semigloss acrylic enamel.

7. Interior Gypsum Board:

a. Semigloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Interior gypsum board primer.
2) Finish Coats: Interior semigloss acrylic enamel.

8. Interior Ferrous Metal:

a. Semigloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Interior ferrous-metal primer.
2) Finish Coats: Interior semigloss acrylic enamel.

9. Interior Zinc-Coated Metal (except Raceways):

a. Clean/pickle bare metal with white vinegar.
b. Semigloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.

1) Primer: Interior zinc-coated metal primer.
2) Finish Coats: Interior semigloss acrylic enamel.

C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 APPLICATION

A. Raceways and Duct Banks More Than 600 V Concealed within Buildings: 4-inch wide black stripes on 10-inch centers over orange background that extends full length of raceway or duct

and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch high black letters on 20-inch centers. Stop stripes at legends. Apply to the following finished surfaces:

1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
2. Wall surfaces directly external to raceways concealed within wall.
3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

B. Accessible Raceways and Metal-Clad Cables More Than 600 V: Identify with "DANGER-HIGH VOLTAGE" in black letters at least 2 inches high, with snap-around labels. Repeat legend at 10-foot maximum intervals.

C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label self-adhesive vinyl tape applied in bands.

D. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, snap-around, color-coding bands:

1. Fire Alarm System: Red.
2. Fire-Suppression Supervisory and Control System: Red and yellow.
3. Combined Fire Alarm and Security System: Red and blue.
4. Mechanical and Electrical Supervisory System: Green and blue.
5. Control Wiring: Green and red.

E. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use metal tags. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

F. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use write-on tags. Identify each ungrounded conductor according to source and circuit number.

G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

H. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.

I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply metal-backed, butyrate warning signs. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including the following:

   a. Power transfer switches.
   b. Controls with external control power connections.
   c. PV Inverter, collector and combiners systems.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

J. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch high letters for emergency instructions at equipment used for PV system.

K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

   a. Indoor and Outdoor Equipment: Screwed-on engraved white laminated plastic sheet with minimum 3/8 inch to 3/4 inch black lettering for normal systems and red laminated plastic sheet with lettering for energy systems.
   b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

   a. Panelboards, electrical cabinets, and enclosures.
   b. Access doors and panels for concealed electrical items.
   c. Electrical switchgear and switchboards.
   d. Transformers.
   e. Electrical substations.
   f. Emergency system boxes and enclosures.

g. Motor-control centers.
h. Disconnect switches.
i. Enclosed circuit breakers.
j. Motor starters.
k. Push-button stations.
l. Power transfer equipment.
m. Contactors.
n. Remote-controlled switches, dimmer modules, and control devices.
o. Power-generating units.
p. Intercommunication and call system master and staff stations.

q. Fire-alarm control panel and annunciators.
r. Monitoring and control equipment.
s. Uninterruptible power supply equipment.
t. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.

3.3 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use

multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

J. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.4 IDENTIFICATION SCHEDULE

A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- wide black stripes on 10-inch centers over orange background that extends full length of raceway or duct and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- high black letters on 20-inch centers. Stop stripes at legends. Apply to the following finished surfaces:

1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
2. Wall surfaces directly external to raceways concealed within wall.
3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

B. Accessible Raceways, Armored and Metal-Clad Cables, More Than 600 V: Snap-around labels. Install labels at 10-foot maximum intervals.

C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30A, and 120V to ground: Identify with self-adhesive vinyl tape applied in bands. Install labels at 10-foot maximum intervals.

D. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

1. Emergency Power.
2. Power.
3. PV System.

E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

F. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

G. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 10 to 12 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

H. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

I. Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic plastic tag holder with adhesive-backed phase tags, and a separate tag with the circuit designation.

J. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

K. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.

L. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

M. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

N. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

O. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including the following:

    a. Power transfer switches.
    b. Controls with external control power connections.
    c. PV System.

P. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

Q. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for PV System operations.

R. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

    a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
    b. Outdoor Equipment: Stenciled legend 4 inches high.
    c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.
d. Switchgear.
e. Switchboards.
f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
g. Substations.
h. Emergency system boxes and enclosures.
i. Motor-control centers.
j. Enclosed switches.
k. Enclosed circuit breakers.
l. Enclosed controllers.
m. Variable-speed controllers.
n. Push-button stations.
o. Power transfer equipment.
p. Contactors.
q. Remote-controlled switches, dimmer modules, and control devices.
r. Power-generating units.
s. Monitoring and control equipment.
t. PV Inverter System, Collectors and combiners.

END OF SECTION 26 05 53

SECTION 26 05 72 - OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

B. Related Sections:

1. Section 26 05 73 “Overcurrent Protective Device Coordination Study.”

C. DEFINITIONS

1. Refer to DDC General Conditions
2. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
3. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
4. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
5. SCCR: Short-circuit current rating.
6. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For computer software program to be used for studies.

C. Product Certificates: Fault-current study computer software programs, certifying compliance with IEEE 399 (Recommended Practice for Industrial and Commercial Power Systems Analysis).

D. Qualification Data: For short circuit-study specialist.

E. Other Submittals: Submit the following prior to submittal of electrical service and distribution equipment. Submittals shall be in digital form.

1. Short-circuit study input data, including completed computer program input data sheets.
2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a licensed professional engineer in the state of New York.

a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Commissioner for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
b. Revised single-line diagram, reflecting results of short-circuit study and field investigation results.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

C. Short-Circuit Study Specialist Qualifications: Professional Engineer Licensed in the state of New York in charge of performing the study and documenting recommendations. All elements of the study shall be performed under the direct supervision and control of this professional engineer. The Professional Engineer shall have a minimum of three years of experience in performance power systems studies. All overcurrent protective device studies (short circuit, coordination and arc flash) shall be performed by the same qualified specialist.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to Commissioner and the City of New York.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE

A. Computer Software: Subject to compliance with requirements, provide products by one of the following:
1. SKM Systems Analytics, Inc.
2. ESA Inc.
3. Operation Technology, Inc.
4. Power Analytics Corporation.
5. Or approved equal

B. Comply with IEEE 399 and IEEE 551.

C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Cable size and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, and panelboard designations.

D. Comments and recommendations for system improvements, where needed.

E. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data: As described in "Power System Data" Article in the Evaluations.

G. Short-Circuit Study Output:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated fault-current magnitude and angle.

c. Fault-point X/R ratio.
d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. Calculated asymmetrical fault currents:

1) Based on fault-point X/R ratio.
2) Based on calculated symmetrical value multiplied by 1.6.
3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. No AC Decrement (NACD) ratio.
e. Equivalent impedance.
f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Obtain all data necessary for the conduct of the study.

1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Commissioner.
2. For equipment provided that is Work of this Project, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
3. For new equipment and existing to remain equipment, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.

B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study.

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Obtain electrical power utility impedance at the service.
3. Power sources and ties.
4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
9. Motor horsepower and NEMA MG 1 code letter designation.
10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.3 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Begin short-circuit current analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.
2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.
3. Photovoltaic System including inverters.
4. New electrical building service.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each of the following:

1. Electric utility's supply termination point.
2. Incoming switchboard.
3. Unit substation primary and secondary terminals.
4. Motor-control centers.
5. Control panels.
6. Distribution panelboards.
7. Branch circuit panelboards.
8. Disconnect switches.
9. Variable frequency drives.
10. Lighting and dimming control panels.
11. Photovoltaic System including inverters.
12. New electrical building service.

3.4 ADJUSTING

A. Make modifications to equipment as required to accomplish compliance with short-circuit study.

3.5 INSTRUCTION

A. Instruct City of New York's operating and maintenance personnel in the use of study results.

END OF SECTION 26 05 72

SECTION 26 05 73 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1. Series-rated devices are not permitted unless specifically indicated on drawings.

B. Related Sections:

1. Section 26 05 72 “Overcurrent Protective Device Short Circuit Study.”

C. Definitions:
1. Refer to DDC General Conditions
2. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
3. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
4. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
5. SCCR: Short-circuit current rating.
6. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.3 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For computer software program to be used for studies.

C. Product Certificates: For coordination study and fault current study computer software program, certifying compliance with IEEE 399.

D. Qualification Data: For coordination study specialist.

E. Other Submittals: Submit the following prior to submittal of electrical service and distribution equipment. Submittals shall be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.
2. Study and equipment evaluation reports.
3. Report indicating variances.
4. Recommendations.
5. Overcurrent protective device coordination study report; signed, dated, and sealed by a Professional Engineer licensed in the State of New York.

a. Submit study report prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from commissioner for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:

a. The following parts from the Protective Device Coordination Study Report:

1) One-line diagram.
2) Protective device coordination study.
3) Time-current coordination curves.

b. Power system data.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

C. Coordination Study Specialist Qualifications: Professional Engineer Licensed in the State of New York in charge of performing the study and documenting recommendations. All elements of the study shall be performed under the direct supervision and control of this professional engineer. The Professional Engineer shall have a minimum of three years experience in

performance power system studies. All overcurrent protective device studies (short circuit, coordination and arc-flash) shall be performed by the same qualified specialist.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to Commissioner and City of New York.

E. De-energize equipment prior to any work to be done. If work must be performed live, obtain written approval from Commissioner and conform with OSHA Title 29.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE

A. Computer Software Developers: Subject to compliance with requirements, provide products by one of the following:

1. SKM Systems Analysis, Inc.
2. ESA Inc.
3. Operation Technology, Inc.
4. Power Analytics, Corporation.
5. Or approved equal

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

a. Arcing faults.
b. Simultaneous faults.
c. Explicit negative sequence.
d. Mutual coupling in zero sequence.

2.2 PROTECTIVE DEVICE COORDINATION STUDY REPORT CONTENTS

A. Executive summary.

B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Cable size and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, and panelboard designations.
6. Photovoltaic system and inverter equipment
7. New Building electrical service

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output: As specified in "Short-Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."

F. Protective Device Coordination Study: Prepare written report indicating the following results of coordination study.

1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

a. Phase and Ground Relays:

1) Device tag.
2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
3) Recommendations on improved relaying systems, if applicable.

b. Circuit Breakers:

1) Adjustable pickups and time delays (long time, short time, ground).
2) Adjustable time-current characteristic.
3) Adjustable instantaneous pickup.
4) Recommendations on improved trip systems, if applicable.

c. Fuses: Show current rating, voltage, and class.

G. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
4. Plot the following listed characteristic curves, as applicable:

    a. Power utility's overcurrent protective device.
    b. Low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
    c. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
    d. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
    e. Cables and conductors damage curves.
    f. Ground-fault protective devices.
    g. Motor-starting characteristics and motor damage points.
    h. The largest feeder circuit breaker in panelboard.

5. Series rating on equipment allows the application of two series interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Both devices share in the interruption of the fault and selectivity is sacrificed at high fault levels. Maintain selectivity for tripping currents caused by overloads.
6. Provide adequate time margins between device characteristics such that selective operation is achieved.
7. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.3 PROTECTIVE DEVICE COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. The study shall be based on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.
b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

H. Motor Protection:

1. Select protection for motors served at voltages more than 600 V according to IEEE 620.

I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

J. Generator Protection: Select protection according to manufacturer's written recommendations and to IEEE 242.

K. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase

ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:

1. Electric utility's supply termination point.
2. Incoming Switchboard.
3. Control panels.
4. Distribution panelboards.
5. Branch circuit panelboards.
6. Disconnect switches.
7. Variable frequency drives.
8. Photovoltaic system and inverter equipment
9. New Building electrical service

M. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.
3. Any application of series-rated devices shall be recertified, complying with requirements in NFPA 70.

3.4 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Commissioner.
2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
3. For existing equipment, whether or not relocated obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.

B. Gather and tabulate the following input data to support coordination study. The list below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study.

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags

that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Electrical power utility impedance at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus, three phase and line-to-ground.
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Maximum demands from service meters.
13. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
14. Motor horsepower and NEMA MG 1 code letter designation.
15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
16. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.
17. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.
    e. Ratings, types, and settings of utility company's overcurrent protective devices.
    f. Special overcurrent protective device settings or types stipulated by utility company.
    g. Time-current-characteristic curves of devices indicated to be coordinated.
    h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    j. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.

k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.5 FIELD ADJUSTING

A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.

B. Make modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.

C. Testing and adjusting shall be by a licensed electrician and a manufacturer's representative.

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Provide test report with parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.6 INSTRUCTION

A. Engage the Coordination Study Specialist to instruct the City of New York's maintenance personnel in the following:

1. Acquaint personnel in the fundamentals of operating the power system in normal and emergency modes.
2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.
3. Adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION 26 05 73

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SECTION 26 08 00 - COMMISSIONING OF ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract]

1.2 SUMMARY

A. This section includes commissioning process requirements for Electrical systems, assemblies, and equipment.

B. Related Sections:

1. DDC General Conditions Section 019113 “General Commissioning Requirements for MEP Systems" for general commissioning process requirements.

1.3 DESCRIPTION

A. Commissioning is a systematic process of confirming that all building systems perform interactively according to the Owner’s Project Requirements and the Basis of Design and continuing through construction, acceptance and the warranty period with actual verification of performance.

B. The Commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.

C. The CxA directs and coordinates the commissioning activities and reports to the Commissioner. All members in the construction process work together to fulfill their contracted responsibilities and meet the objectives of the Owner’s Project Requirement’s as detailed in the Contract Documents.

1.4 DEFINITIONS

A. Refer to DDC General Conditions for definitions.

1.5 SUBMITTALS

A. The CxA will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the

Contractor, or Commissioner as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

B. The CxA will receive a copy of the final approved submittals.

C. In addition, the Contractor is to provide the following:

1. Certificates of readiness

2. Certificates of completion of installation, prestart, and startup activities.

3. O&M manuals

4. Test reports

D. Refer to DDC General Conditions Section 013300 Submittal Procedures and Section 019113 "General Commissioning Requirements for MEP Systems" for general commissioning submittal requirements.

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Commissioning Kick-Off Meeting – Construction Team: The Contractor will attend a meeting of the Commissioning Team, chaired by the CxA, to review the scope of commissioning process activities and the Commissioning Plan with discussions on milestones, activities, and assignments of responsibilities. The flow and type of documents and the amount of submittal data given to the CxA will be determined. Meeting minutes will then be distributed to all parties by the CxA.

B. Commissioning Meetings: The Contractor will attend coordination meetings with the Commissioning Team, chaired by the CxA, to review progress on the Commissioning Plan, construction deficiencies, scheduling conflicts, and to discuss strategies and processes for upcoming commissioning process activities.

C. Miscellaneous Construction Meetings: The CxA attends selected planning and job-site meetings in order to remain informed on construction progress and to update parties involved in the commissioning process.

D. Pre-testing Meetings: The Contractor will attend pretest meetings with the Commissioning Team, chaired by the CxA, to review startup reports, pre-test inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized ser-

vice representative services for each system, subsystem, equipment, and component to be tested.

E. Testing: The Contractor will coordinate with testing personnel and agencies for timing and access for CxA to witness test.

F. Manufacturers' Inspection and Startup Services: The Contractor will coordinate services of manufacturers' inspection and startup services.

G. Testing, Adjusting and Balancing: The Contractor will coordinate with plan and schedule for testing, adjusting and balancing for timing and access for CxA to witness process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the Contractor shall ultimately be responsible for all standard testing equipment for the electrical systems and controls systems in Division 26. A sufficient quantity of two-way radios shall be provided by the Contractor.

B. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the City of New York's personnel upon completion of the commissioning process.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With the assistance from the Contractor and the CxA will prepare Pre-Functional Checklists for all commissioned components, equipment, and systems.

B. Red-lined Drawings (As-Builts): The Contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start

of Functional Performance Testing. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings. The Contractor will create the as-built drawings.

C. Operation and Maintenance Data: Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems. The CxA will review the O&M literature once for conformance to project requirements. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

D. Demonstration and Orientation: Contractor will provide demonstration and orientation as required by the specifications. A complete orientation plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any orientation. An orientation agenda for each orientation session must be submitted to the CxA one (1) week prior the orientation session.

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Refer to DDC General Conditions Section 019113 “General Commissioning Requirements for MEP Systems” for general Contractor’s responsibilities.

B. Attend construction phase controls coordination meetings.

C. Provide information requested by the CxA for final commissioning documentation.

D. Prepare preliminary schedule for electrical system orientations and inspections, operation and maintenance manual submissions, orientation sessions, equipment start-up and task completion for the City of New York. Distribute preliminary schedule to commissioning team members.

E. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

F. Provide detailed startup procedures.

G. Provide a written list of all user adjustable set-points and reset schedules with a brief discussion of the purpose of each and the range of reasonable adjustments with energy implications.

H. Provide a written schedule frequency to review the various set-points and reset schedules to ensure they are current relevant and efficient values.

I. Respond to provided new deficiencies and/or responses within five (5) business days.

J. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the Contract Documents. Submit to CxA 45 days after submittal acceptance.

K. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

L. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

M. Provide written notification to the Commissioner and CxA that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
1. Electrical equipment including switchgear, panel boards, motor control centers, lighting, receptacles, dimmers and all other equipment furnished under this Division.
2. Photovoltaic system including switchboard, inverter panels and solar panels.
3. Fire alarm system.

N. The equipment suppliers shall document the performance of their equipment.

O. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

P. Contractor responsibilities to be completed by Equipment Suppliers:
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the City of New York's personnel, to keep warranties in force.
2. Assist in equipment testing.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

3.3 CxA'S RESPONSIBILITIES

A. Roles and Responsibilities

1. Refer to the DDC General Conditions Section 019113 "General Commissioning Requirements for MEP Systems" for general CxA responsibilities.

3.4 TESTING PREPARATION

A. Certify in writing to the CxA that Electrical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.5 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Electrical testing shall include the entire Electrical installation, from the incoming power equipment throughout the distribution system. Testing shall include measuring, but not be limited to resistance, voltage, and amperage of system(s) and devices.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Contractor shall prepare detailed testing plans, procedures, and checklists for Electrical systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Electrical system, document the deficiency and report it to the Commissioner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.6 ELECTRICAL SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 26 sections. Provide submittals, test data, inspector record, infrared camera and certifications to the CA.

B. Electrical Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 26 Sections "Instrumentation and Control" and "Sequence of Operations" Assist the CxA with preparation of testing plans.

C. Fire Detection and Alarm System Testing: Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA.

The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

D. Electrical Distribution System Testing: Provide technicians, load banks, infrared cameras, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested

E. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

F. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. Commissioning shall be performed on equipment and systems including but not limited to the following:

1. Distribution Panels
2. Power Panels
3. Motor Control Centers
4. Solar Panels

3.7 DEFICIENCIES/NON-CONFORMANCE, FAILURE DUE TO MANUFACTURER DEFECT

A. Deficiencies/Non-Conformance

1. The CxA will record the results of the functional test on the test form. All deficiencies or non-conformance items shall be noted and reported to the Commissioner and Contractors on a standardized form.
2. The Contractor shall respond to new deficiencies within five (5) business days. The response shall either indicate the issue will be corrected with anticipated date of completion indicated or the response should clearly indicate why the Contractor disputes the claim while referencing the Contract Document in dispute or request further information to clarify the concern.
3. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA.
4. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
5. As tests progress and a deficiency is identified, the CxA discusses the issue with the Contractor.
6. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it, the CxA documents the deficiency and the Contractor's response and intentions or corrections. The CxA and Contractor then proceed to another test or sequence. Once the Contractor corrects the deficiency, the test is rescheduled and repeated in the anticipation of correct operation or function
7. When there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible, the CxA documents the deficiency and the Contractor's response. The deficiency is then forwarded to parties assumed to be responsible for the deficiency. Resolutions are made at the lowest management level possible. Other parties are brought into the discussion as needed. Final interpretive authority is with the Commissioner. Final acceptance authority is with the Commissioner and CxA. The CxA will then document the resolution process. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency. The CxA then reschedules the test as stated in the section above.

B. Failure due to Manufacturer Defect

1. If 10% or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA and the Commissioner. In such case, the Contractor shall provide the Commissioner with the following.

   i. Within one week of notification from the Contractor the manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the Commissioner within two weeks of the original notice.
   ii. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
   iii. The Commissioner will determine whether a replacement of all identical units or a repair is acceptable.
   iv. Two examples of the proposed solution will be installed by the Contractor and the Contractor will be allowed to test the installations for up to one week, upon which the Commissioner will decide whether to accept the solution.
   v. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

3.8 APPROVAL

A. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA. The CxA recommends acceptance of each test to the Commissioner using a standard form.

3.9 SEASONAL TESTING

A. Seasonal Testing – During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the Contractor, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and record documents due to seasonal testing will be made by the Contractor.

3.10 OPERATION AND MAINTENANCE MANUALS

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in the DDC General Conditions Section 017839 Contract Record Documents and Section 019113 General Commissioning Requirements for MEP Systems.

B. The specific content and format requirements for the standard O&M manuals are detailed in the DDC General Conditions Section 017839 Contract Record Documents and Section 019113 General Commissioning Requirements for MEP Systems. Special requirements for the controls subcontractor and TAB subcontractor are found in Division 26.

C. CxA Review and Approval – Prior to substantial completion, the CxA shall review the O&M manuals, documentation and record documents for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the Contractor, or Commissioner, as requested. Upon a successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the Commissioner. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated.

3.11 INSTRUCTION OF NEW YORK CITY PERSONNEL

A. The Contractor shall be responsible for instruction coordination, scheduling, and ultimately for ensuring that instruction is completed.

B. The CxA shall oversee the instruction of the City of New York's personnel for commissioned equipment and systems.

1. The CxA shall interview the City of New York's personnel to determine the special needs and areas where instruction will be most valuable. The Commissioner and CxA shall decide how rigorous the instruction should be for each piece of commissioned equipment. The CxA shall communicate the results to the Contractor who will ensure participation of the Subcontractor.

2. In addition to these general requirements, the specific instruction requirements of the City of New York's personnel by the Contractor who will ensure the subcontractors and vendors are specified in the individual sections listed in DDC's General Conditions Section 017900 Demonstration and Owners' Pre-Acceptance Orientation.

3. The Contractor shall ensure that each Subcontractor and vendor responsible for instruction will submit a written instruction plan to the Contractor for review and approval prior to instruction. The Contractor will submit one comprehensive instruction plan to the CxA and the Commissioner.

4. The plan will be reviewed by the CxA and the Commissioner. Comments pertaining to its deficiencies will be forwarded to the Contractor. The instruction plan will be rewritten until approved by the CxA and the Commissioner. The final approved instruction plan will cover the following elements:
    a. Equipment (included in instruction)
    b. Intended audience
    c. Location of instruction
    d. Objectives
    e. Subjects covered (description, duration of discussion, special methods, etc.)
    f. Duration of instruction on each subject
    g. Qualified instructor for each subject
    h. Instructor qualifications
    i. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)

5. For the primary equipment, the Contractor will ensure the controls subcontractor provides a discussion of the control of the equipment during the instruction conducted by each subcontractor or vendor.

6. Instruction documentation shall include the following items:
    a. Copy of the instruction plan, including schedule, syllabus, and agenda.
    b. Copy of the Owner's Project Requirements.
    c. Copy of the Basis of Design.
    d. Compiled operations manuals.
    e. Compiled maintenance manuals.
    f. Completed manufacturer instruction manuals.
    g. Red-lined drawings.

7. The CxA develops criteria for determining that the instruction was satisfactorily completed, including attending the instruction, etc. The CxA recommends approval of the instruction to the Commissioner using a standard form. The Commissioner signs the approval form/letter template.

8. At one of the instruction sessions, the CxA presents a presentation discussing the use of the blank functional test forms for re-commissioning equipment

9. Video recording of the instruction sessions will be verified by the CxA in electrical format, at the discretion of the Commissioner.

END OF SECTION 260800

SECTION 26 22 00 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:

1. Distribution transformers.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Qualification Data: For testing agency.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to the City of New York.

1. Testing Agency's Field Supervisor: Currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.

D. Source Limitations: Obtain each transformer type through one source from a single manufacturer.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to the City of New York and marked for intended use.

F. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Products.
2. ABB, Electrification Product Division.
3. Square D; Schneider Electric.

4. Hammond Power Solutions.
5. Or approved equal.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Enclosure: Ventilated, NEMA 250, Type 2.

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

D. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: Gray

E. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.

F. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.

G. Energy Efficiency for Transformers Rated 15 kVA and Larger:

1. Comply with 10 CFR 431 (DOE2016) efficiency levels.
2. Marked as compliant with DOE 2016 efficiency levels by an NRTL.

H. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for nonsinusoidal load current-handling capability to the degree defined by designated K-factor.

1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor, without exceeding the indicated insulation class in a 40 deg C maximum ambient and a 24-hour average ambient of 30 deg C.
2. Indicate value of K-factor on transformer nameplate.

3. Unit shall comply with requirements of DOE 2016 efficiency levels when tested according to NEMA TP 2 with K-factor equal to one.

I. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.

1. Arrange coil leads and terminal strips to minimize capacitive coupling between input and output terminals.
2. Include special terminal for grounding the shield.

J. Neutral: Rated 200 percent of full load current for K-factor-rated transformers.

2.4 IDENTIFICATION DEVICES

A. Nameplates: Engraved, metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section 260553 "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Verify that ground connections are in place and requirements in Division 26 Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions.

3.3 CONNECTIONS

A. Ground equipment according to Division 26 Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Division 26 Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

D. Remove and replace units that do not pass tests or inspections and retest as specified above.

E. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. Perform 2 follow-up infrared scans of transformers, one at 4 months and the other at 11 months after Substantial Completion.
3. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

F. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.

C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 26 22 00

SECTION 26 24 13 - SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Surge protection devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.
7. Identification.
8. Mimic bus.

B. Related Sections:
1. Division 26 05 72 “Overcurrent Protective Device Coordination Study.”
2. Division 26 05 19 “Low-Voltage Electrical Power Conductors and Cables.”
3. Division 26 05 26 “Grounding and Bonding for Electrical Systems.”
4. Division 26 05 53 “Identification for Electrical Systems.”
5. Division 26 28 16 “Enclosed Switches and Circuit Breakers.”

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Switchboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event"

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each switchboard, overcurrent protective device, surge protection device, ground-fault protector, accessory, and component.

1. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

C. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Detail utility company's metering provisions with indication of approval by utility company.
7. Include evidence of NRTL listing for series rating of installed devices.
8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
10. Include diagram and details of proposed mimic bus.
11. Include schematic and wiring diagrams for power, signal, and control wiring.

D. Samples: Representative portion of mimic bus with specified material and finish, for color selection.

E. Qualification Data: For Installer.

F. Seismic Qualification Certificates: For switchboards, overcurrent protective devices, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

G. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

H. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in DDC General Conditions, include the following:

a. Routine maintenance requirements for switchboards and all installed components.
b. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
c. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

1.5 REQUIRED MATERIALS

A. Furnish required materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Potential Transformer Fuses: Equal to 10 percent of quantity installed for each size and type but no fewer than two of each size and type.
2. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
3. Fuses and Fusible Devices for Fused Circuit Breakers: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
4. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
5. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
6. Indicating Lights: Equal to 10 percent of quantity installed for each size and type but no less than one of each size and type.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and instructed in electrical safety as required by NFPA 70E.

C. Testing Agency Qualifications: Member Company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

D. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

E. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Comply with NEMA PB 2.

H. Comply with NFPA 70.

I. Comply with UL 489 and UL 891.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and install temporary electric heating (250 W per section) to prevent condensation.

C. Handle and prepare switchboards for installation according to NEMA PB 2.1.

1.8 PROJECT CONDITIONS

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

B. Environmental Limitations:

1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

    a. Ambient Temperature: Not exceeding 104 deg F.
    b. Altitude: Not exceeding 6600 feet.

C. Unusual Service Conditions: NEMA PB 2, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by the City of New York unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify the Commissioner no fewer than 14 days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.

3. Do not proceed with interruption of electric service without commissioners written permission.
4. Comply with NFPA 70E.

1.9 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace switchboard enclosures, buswork, overcurrent protective devices, accessories, and factory installed interconnection wiring that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

B. Manufacturer's Warranty: Manufacturer's agrees to repair or replace surge protection devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SWITCHBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Eaton.
2. Schneider Electric.
3. Siemens Power Transmission & Distribution, Inc.
4. Or approved equal.

B. Front-Connected, Front-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel mounted.
3. Sections front and rear aligned.

C. Front- and Side-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel mounted.
3. Section Alignment: Front and Rear aligned.

D. Front- and Rear-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel and fixed, individually mounted.
3. Sections front and rear aligned.

E. Nominal System Voltage: 480Y/277 V & 208Y/120 V.

F. Main-Bus Continuous: 4000 & 2000A or as shown on drawings.

G. Seismic Requirements: Fabricate and test switchboards according to IEEE 344 to withstand seismic forces as per ASCE 7-10 with the following parameters:
1. Building Occupancy Category: II
2. Seismic Design Category: B
3. Site Class: D (assumed)
4. Risk Level: II.
5. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

H. Indoor Enclosures: Steel, NEMA 250, Type 1.

I. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.

J. Barriers: Between adjacent switchboard sections.

K. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.

L. Space Heaters: Factory-installed electric space heaters of sufficient wattage in each vertical section to maintain enclosure temperature above expected dew point.

1. Space-Heater Control: Thermostats to maintain temperature of each section above expected dew point.
2. Space-Heater Power Source: Transformer, factory installed in switchboard.

M. Service Entrance Rating: Switchboards intended for use as service entrance equipment shall contain from one to six service disconnecting means with overcurrent protection, a neutral bus with disconnecting link, a grounding electrode conductor terminal, and a main bonding jumper.

N. Utility Metering Compartment: Barrier compartment and section complying with utility company's requirements; hinged sealable door; buses provisioned for mounting utility company's current transformers and potential transformers or potential taps as required by utility company. If separate vertical section is required for utility metering, match and align with basic switchboard. Provide service entrance label and necessary applicable service entrance features.

O. Customer Metering Compartment: A separate customer metering compartment and section with front hinged door, and section with front hinged door, for indicated metering, and current transformers for each meter. Current transformer secondary wiring shall be terminated on shorting-type terminal blocks. Include potential transformers having primary and secondary fuses with disconnecting means and secondary wiring terminated on terminal blocks.

P. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

Q. Removable, Hinged Rear Doors and Compartment Covers: Secured by standard bolts, for access to rear interior of switchboard.

R. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

S. Pull Box on Top of Switchboard:

1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
2. Set back from front to clear circuit-breaker removal mechanism.
3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
4. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
5. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.

T. Buses and Connections: Three phase, four wire unless otherwise indicated.

1. Provide phase bus arrangement A, B, C from front to back, top to bottom, and left to right when viewed from the front of the switchboard.
2. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity, silver-plated.
3. Phase- and Neutral-Bus Material: Tin-plated, high-strength, electrical-grade aluminum alloy with tin-plated aluminum circuit-breaker line connections.
4. Copper feeder circuit-breaker line connections.
5. Tin-plated aluminum feeder circuit-breaker line connections.
6. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with mechanical connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full-ampere rating of circuit-breaker position.
7. Ground Bus: 1/4-by-2-inch- or Minimum-size required by UL 891, hard-drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder and branch-circuit ground conductors.

8. Main-Phase Buses and Equipment-Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
9. Disconnect Links:

    a. Isolate neutral bus from incoming neutral conductors.
    b. Bond neutral bus to equipment-ground bus for switchboards utilized as service equipment or separately derived systems.
10. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
11. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.

U. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

V. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.

W. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components including instruments and instrument transformers.

2.2 SURGE PROTECTION DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products as manufactured by one of the following:

1. Advanced Protection Technologies Inc. (APT).
2. Eaton.
3. General Electric Company.
4. Siemens Power Transmission & Distribution, Inc.
5. Approved Equal

B. SPDs: Comply with UL 1449, Type 1.

C. SPDs: Listed and labeled by an NRTL acceptable to Commissioner and the City of New York as complying with UL 1449, Type 1.

1. SPDs with the following features and accessories:

    a. Integral disconnect switch.
    b. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
    c. Indicator light display for protection status.
    d. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status.
    e. Surge counter.

D. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 200 kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

E. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V and 208Y/120 V, three-phase, four-wire circuits shall not exceed the following:

1. Line to Neutral: 1200 V for 480Y/277 V & 700 V for 208Y/120 V.
2. Line to Ground: 1200 V for 480Y/277 V & 1200 V for 208Y/120 V.
3. Line to Line: 2000 V for 480Y/277 V &1000 V for 208Y/120 V.

F. SCCR: Equal or exceed 200 kA.

G. Nominal Rating: 20 kA.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Breaker types shown below (B1, 2, 3, 4, 5 and C) and ratings shall be as indicated on drawings.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 400A
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers 800A with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

   a. 100% rated
   b. Instantaneous trip.
   c. Long- and short-time pickup levels.
   d. Long and short time adjustments.
   e. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: 400A let-through ratings less than NEMA FU 1, RK-5.
5. Integrally Fused Circuit Breakers: 800A Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
6. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
7. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
8. MCCB Features and Accessories:

   a. Standard frame sizes, trip ratings, and number of poles.

b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
e. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
h. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

C. Insulated-Case Circuit Breaker (ICCB): 100 percent rated, sealed, insulated-case power circuit breaker with interrupting capacity rating to meet available fault current.

1. Fixed or Drawout circuit-breaker mounting.
2. Two-step, stored-energy closing.
3. Standard-function, microprocessor-based trip units with interchangeable rating plug, trip indicators, and the following field-adjustable settings:

a. Instantaneous trip.
b. Time adjustments for long- and short-time pickup.
c. Ground-fault pickup level, time delay, and I^2t response.

4. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
5. Remote trip indication and control.
6. Control Voltage: 120-V ac.

D. Bolted-Pressure Contact Switch: Operating mechanism uses rotary-mechanical-bolting action to produce and maintain high clamping pressure on the switch blade after it engages the stationary contacts.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Boltswitch, Inc.
b. Eaton.
c. Siemens Industry, Inc.
d. Or approved equal

2. Main-Contact Interrupting Capability: Minimum of 12 times the switch current rating.

3. Operating Mechanism: Manual handle operation to close switch; stores energy in mechanism for opening and closing.

a. Electrical Trip: Operation of lever or push-button trip switch, or trip signal from ground-fault relay or remote-control device, causes switch to open.
b. Mechanical Trip: Operation of mechanical lever, push button, or other device causes switch to open.

4. Auxiliary Switches: Factory installed, SPDT, with leads connected to terminal block, and including one set more than quantity required for functional performance indicated.
5. Service-Rated Switches: Labeled for use as service equipment.
6. Ground-Fault Relay: Comply with UL 1053; self-powered type with mechanical ground-fault indicator, test function, tripping relay with internal memory, and three-phase current transformer/sensor.

a. Configuration: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
b. Internal Memory: Integrates the cumulative value of intermittent arcing ground-fault currents and uses the effect to initiate tripping.
c. No-Trip Relay Test: Permits ground-fault simulation test without tripping switch.
d. Test Control: Simulates ground fault to test relay and switch (or relay only if "no-trip" mode is selected).

7. Open-Fuse Trip Device: Arranged to trip switch open if a phase fuse opens.

E. High-Pressure, Butt-Type Contact Switch: Operating mechanism uses butt-type contacts and a spring-charged mechanism to produce and maintain high-pressure contact when switch is closed.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Boltswitch, Inc.
b. Eaton.
c. Siemens Industry, Inc.
d. Or approved equal

2. Main-Contact Interrupting Capability: Minimum of 12 times the switch current rating.

3. Operating Mechanism: Manual handle operation to close switch; stores energy in mechanism for opening and closing.

a. Electrical Trip: Operation of lever or push-button trip switch, or trip signal from ground-fault relay or remote-control device, causes switch to open.
b. Mechanical Trip: Operation of mechanical lever, push button, or other device causes switch to open.

4. Auxiliary Switches: Factory installed, SPDT, with leads connected to terminal block, and including one set more than quantity required for functional performance indicated.
5. Service-Rated Switches: Labeled for use as service equipment.
6. Ground-Fault Relay: Comply with UL 1053; self-powered type with mechanical ground-fault indicator, test function, tripping relay with internal memory, and three-phase current transformer/sensor.

a. Configuration: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
b. Internal Memory: Integrates the cumulative value of intermittent arcing ground-fault currents and uses the effect to initiate tripping.
c. No-Trip Relay Test: Permits ground-fault simulation test without tripping switch.
d. Test Control: Simulates ground fault to test relay and switch (or relay only if "no-trip" mode is selected).

7. Open-Fuse Trip Device: Arranged to trip switch open if a phase fuse opens.

F. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

G. Fuses are specified in Section 26 28 13 "Fuses."

2.4 INSTRUMENTATION

A. Instrument Transformers: NEMA EI 21.1, and the following:

1. Potential Transformers: NEMA EI 21.1; 120 V, 60 Hz, double secondary; disconnecting type with integral fuse mountings. Burden and accuracy shall be consistent with connected metering and relay devices.
2. Current Transformers: NEMA EI 21.1; 5 A, 60 Hz, secondary; bushing type; double secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.
3. Control-Power Transformers: Dry type, mounted in separate compartments for units larger than 3 kVA.
4. Current Transformers for Neutral and Ground-Fault Current Sensing: Connect secondary wiring to ground overcurrent relays, via shorting terminals, to provide selective tripping of main and tie circuit breaker. Coordinate with feeder circuit-breaker, ground-fault protection.

B. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems and with the following features:

1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:

a. Phase Currents, Each Phase: Plus or minus 0.5 percent.
b. Phase-to-Phase Voltages, Three Phase: Plus or minus 0.5 percent.
c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 0.5 percent.
d. Megawatts: Plus or minus 1 percent.
e. Megavars: Plus or minus 1 percent.
f. Power Factor: Plus or minus 1 percent.
g. Frequency: Plus or minus 0.1 percent.
h. Accumulated Energy, Megawatt Hours: Plus or minus 1 percent; accumulated values unaffected by power outages up to 72 hours.
i. Megawatt Demand: Plus or minus 1 percent; demand interval programmable from five to 60 minutes.
j. Contact devices to operate remote impulse-totalizing demand meter.

2. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.

C. Voltmeters: Cover an expanded-scale range of nominal voltage plus 10 percent.

D. Instrument Switches: Rotary type with off position.

1. Voltmeter Switches: Permit reading of all phase-to-phase voltages and, where a neutral is indicated, phase-to-neutral voltages.
2. Ammeter Switches: Permit reading of current in each phase and maintain current-transformer secondaries in a closed-circuit condition at all times.

E. Ammeters: 2-1/2-inch minimum size with 90- or 120-degree scale. Meter and transfer device with off position, located on overcurrent device door for indicated feeder circuits only.

F. Watt-Hour Meters and Wattmeters:

1. Comply with ANSI C12.1.
2. Three-phase induction type with two stators, each with current and potential coil, rated 5 A, 120 V, 60 Hz.
3. Suitable for connection to three- and four-wire circuits.
4. Potential indicating lamps.
5. Adjustments for light and full load, phase balance, and power factor.
6. Four-dial clock register.
7. Integral demand indicator.
8. Contact devices to operate remote impulse-totalizing demand meter.
9. Ratchets to prevent reverse rotation.
10. Removable meter with drawout test plug.
11. Semiflush mounted case with matching cover.
12. Appropriate multiplier tag.

G. Impulse-Totalizing Demand Meter:

1. Comply with ANSI C12.1.
2. Suitable for use with switchboard watt-hour meter, including two-circuit totalizing relay.
3. Cyclometer.
4. Four-dial, totalizing kilowatt-hour register.
5. Positive chart drive mechanism.
6. Capillary pen holding a minimum of one month's ink supply.
7. Roll chart with minimum 31-day capacity; appropriate multiplier tag.
8. Capable of indicating and recording 30-minute integrated demand of totalized system.

2.5 CONTROL POWER

A. Control Circuits: 120-V ac, supplied through secondary disconnecting devices from control-power transformer.

B. Control Circuits: 120-V ac, supplied from remote branch circuit.

C. Electrically Interlocked Main and Tie Circuit Breakers: Two control-power transformers in separate compartments, with interlocking relays, connected to the primary side of each control-power transformer at the line side of the associated main circuit breaker. 120-V secondaries connected through automatic transfer relays to ensure a fail-safe automatic transfer scheme.

D. Control-Power Fuses: Primary and secondary fuses for current-limiting and overload protection of transformer and fuses for protection of control circuits.

E. Control Wiring: Factory installed, with bundling, lacing, and protection included. Provide flexible conductors for No. 8 AWG and smaller, for conductors across hinges, and for conductors for interconnections between shipping units.

2.6 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.

C. Portable Circuit-Breaker Lifting Device: Floor-supported, roller-based, elevating carriage arranged for movement of circuit breakers in and out of compartments for present and future circuit breakers.

D. Overhead Circuit-Breaker Lifting Device: Mounted at top front of switchboard, with hoist and lifting yokes matching each drawout circuit breaker.

E. Spare-Fuse Cabinet: Suitably identified, wall-mounted, lockable, compartmented steel box or cabinet. Arrange for wall mounting.

F. Mounting Accessories: For anchors, mounting channels, bolts, washers, and other mounting accessories, comply with seismic requirements as per manufacturer's instructions.

2.7 IDENTIFICATION

A. Mimic Bus: Entire single-line switchboard bus work, as depicted on factory record drawing, on a photoengraved nameplate.

1. Nameplate: At least 0.032-inch- thick anodized aluminum, located at eye level on front cover of the switchboard incoming service section.

B. Mimic Bus: Entire single-line switchboard bus work, as depicted on factory record drawing, on an engraved laminated-plastic (Gravoply) nameplate.

1. Nameplate: At least 0.0625-inch- thick laminated plastic (Gravoply), located at eye level on front cover of the switchboard incoming service section.

C. Mimic Bus: Continuously integrated mimic bus factory applied to front of switchboard. Arrange in single-line diagram format, using symbols and letter designations consistent with final mimic-bus diagram.

D. Coordinate mimic-bus segments with devices in switchboard sections to which they are applied. Produce a concise visual presentation of principal switchboard components and connections.

E. Presentation Media: Painted graphics in color contrasting with background color to represent bus and components, complete with lettered designations.

F. Service Equipment Label: NRTL labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Receive, inspect, handle, and store switchboards according to NEMA PB 2.1.

1. Lift or move panelboards with spreader bars and manufacturer-supplied lifting straps following manufacturer's instructions.
2. Use rollers, slings, or other manufacturer-approved methods if lifting straps are not furnished.
3. Protect from moisture, dust, dirt, and debris during storage and installation.
4. Install temporary heating during storage per manufacturer's instructions.

B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work or that affect the performance of the equipment.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install switchboards and accessories according to NEMA PB 2.1.

B. Equipment Mounting: Install switchboards on concrete base, 4-inch nominal thickness. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete."

1. Install conduits entering underneath the switchboard, entering under the vertical section where the conductors will terminate. Install with couplings flush with the concrete base. Extend 2 inches above concrete base after switchboard is anchored in place.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to switchboards.
6. Anchor switchboard to building structure at the top of the switchboard if required or recommended by the manufacturer.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, straps and brackets, and temporary blocking of moving parts from switchboard units and components.

D. Comply with mounting and anchoring seismic requirements as per manufacturer's instruction.

E. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

F. Install filler plates in unused spaces of panel-mounted sections.

G. Install overcurrent protective devices, surge protection devices, and instrumentation.

1. Set field-adjustable switches and circuit-breaker trip ranges.

H. Install spare-fuse cabinet.

I. Comply with NECA 1.

3.4 CONNECTIONS

A. Bond conduits entering underneath the switchboard to the equipment ground bus with a bonding conductor sized per NFPA 70.

B. Support and secure conductors within the switchboard according to NFPA 70.

3.5 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Division 260553 "Identification for Electrical Systems."

B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Division 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Division 260553 "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Acceptance Testing:

    a. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit. Open control and metering circuits within the switchboard, and remove neutral connection to surge protection and other electronic devices prior to insulation test. Reconnect after test.
    b. Test continuity of each circuit.

2. Test ground-fault protection of equipment for service equipment per NFPA 70.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
4. Correct malfunctioning units on-site where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
5. Perform the following infrared scan tests and inspections, and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front and rear panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
    c. Instruments and Equipment:

        1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

6. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

C. Switchboard will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Division 260573 "Overcurrent Protective Device Coordination Study."

3.8 PROTECTION

A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

3.9 INSTRUCTION

A. Instruct the City of New York operating personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories and to use and reprogram microprocessor-based trip, monitoring, and communication units.

END OF SECTION 26 24 13

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Branch-circuit panelboards.

B. Related Sections:
1. Division 26 28 16 “Enclosed Switchboards and Circuit Breakers.”
2. Division 26 05 73 “Overcurrent Protective Device Coordination Study.”

1.3 DEFINITIONS

A. Refer to DDC General Conditions.

B. GFCI: Ground-fault circuit interrupter.

C. GFEP: Ground-fault equipment protection.

D. MCCB: Molded-case circuit breaker.

E. SPD: Surge protective device.

F. VPR: Voltage protection rating.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

B. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 1.

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions.

B. Product Data: For each type of panelboard.

1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

C. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Include evidence of NRTL listing for series rating of installed devices.
7. Include evidence of NRTL listing for SPD as installed in panelboard.
8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include wiring diagrams for power, signal, and control wiring.
10. Key interlock scheme drawing and sequence of operations.
11. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device. Include an Internet link for electronic access to downloadable PDF of the coordination curves.

D. Qualification Data: For testing agency.

E. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined this speicifcation. Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

G. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

H. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in DDC General Conditions, include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Manufacturer Qualifications: ISO 9001 or 9002 certified.

C. Testing Agency Qualifications: Member Company of NETA or an NRTL.

1. Testing Agency’s Field Supervisor: Currently certified by NETA to supervise on-site testing.

D. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

E. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined by NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Comply with NEMA PB 1 (Panelboards).

H. Comply with NFPA 70 (National Electrical Code).

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.8 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Not exceeding minus 22 deg F to plus 104 deg F.
b. Altitude: Not exceeding 6600 feet.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by the City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify the Commissioner no fewer than 14 days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without commissioner written permission.
3. Comply with NFPA 70E.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.

1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces as per ASCE 7-10 with the following parameters:

1. Building Occupancy Category: II
2. Seismic Design Category: B
3. Site Class: D (assumed)
4. Risk Level: II.
5. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NEMA PB 1 (Panelboards).

E. Comply with NFPA 70 (National Electrical Code).

F. Enclosures: Flush and Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

    a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
    b. Outdoor Locations: NEMA 250, Type 3R.
    c. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

2. Height: 84 inches maximum.
3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
5. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
6. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
7. Finishes:

    a. Panels and Trim: galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    b. Back Boxes: Same finish as panels and trim.
    c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.

G. Incoming Mains:

1. Location: Convertible between top and bottom.
2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

H. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

    a. Plating shall run entire length of bus.
    b. Bus shall be fully rated the entire length.

2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
5. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
6. Split Bus: Vertical buses divided into individual vertical sections.

I. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Terminations shall allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
6. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
7. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
8. Gutter-Tap Lugs: Mechanical type suitable for use with conductor material and with matching insulating covers. Locate at same end of bus as incoming lugs or main device.

J. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to The City of New York for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

K. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

1. Percentage of Future Space Capacity: Ten percent.

L. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include label or manual with size and type of allowable upstream and branch devices listed and labeled by an NRTL for series-connected short-circuit rating.

1. Panelboards rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
2. Panelboards rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

M. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.
3. For installation of integral TVSS to the panelboards, refer to Section “Transient Voltage Suppression for Low Voltage Electrical Power Circuits.”
4. Individual neutral conductor for each branch circuit or 2-pole/3-pole circuit breakers for multiwire branch circuits; handle ties are not allowed.

2.2 POWER PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer.
2. Siemens Energy & Automation, Inc.
3. Square D; a brand of Schneider Electric.
4. Or approved equal.

B. Panelboards: NEMA PB 1, distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches high, provide two latches, keyed alike.

D. Mains: Circuit breaker.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

G. Branch Overcurrent Protective Devices: Fused switches.

H. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
2. External Control-Power Source: 120-V branch circuit.

2.3 BRANCH CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer.
2. Siemens Energy & Automation, Inc.
3. Square D; a brand of Schneider Electric.
4. Or approved equal.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
2. External Control-Power Source: 120-V branch circuit.

F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

G. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Breaker Types shown below (B1, 2, 3, 4, 5) and ratings shall be as indicated on Drawings.

B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

a. Inverse time-current element for low-level overloads.
b. Instantaneous magnetic trip element for short circuits.

c. Adjustable magnetic trip setting for circuit-breaker frame sizes

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic Trip Circuit Breakers: 400A

   a. RMS sensing.
   b. Field-replaceable rating plug or electronic trip.
   c. Digital display of settings, trip targets, and indicated metering displays.
   d. Multi-button keypad to access programmable functions and monitored data.
   e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
   f. Integral test jack for connection to portable test set or laptop computer.
   g. Field-Adjustable Settings:

      1) 100% rated
      2) Instantaneous trip.
      3) Long- and short-time pickup levels.
      4) Long and short time adjustments.
      5) Ground-fault pickup level, time delay, and I squared T response.

4. Current-Limiting Circuit Breakers: Frame sizes 800A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. Integrally Fused Circuit Breakers: Frame sizes 1200A; Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
6. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
7. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
8. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
9. Subfeed Circuit Breakers: Vertically mounted.
10. MCCB Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Breaker handle indicates tripped status.
    c. UL listed for reverse connection without restrictive line or load ratings.
    d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
    f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
    h. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

i. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.
j. Auxiliary Contacts: One, SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
k. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.
l. Multipole units enclosed in a factory assembled to operate as a single unit.
m. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
n. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses and Spare-Fuse Cabinet: Comply with requirements specified in Section 26 28 13 "Fuses."
2. Fused Switch Features and Accessories:

a. Standard ampere ratings and number of poles.
b. Mechanical cover interlock with a manual interlock override, to prevent the opening of the cover when the switch is in the on position. The interlock shall prevent the switch from being turned on with the cover open. The operating handle shall have lock-off means with provisions for three padlocks.
c. Auxiliary Contacts: One normally open and normally closed contact(s) that operate with switch handle operation.

2.5 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Directory card inside panelboard door, mounted in metal frame with transparent protective cover.

1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

D. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.

1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

2.6 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.

B. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Comply with NECA 1.

C. Install panelboards and accessories according to NEMA PB 1.1.

D. Equipment Mounting:

1. Install panelboards on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Attach panelboard to the vertical finished or structural surface behind the panelboard.
3. Comply with requirements for seismic control devices Identified in this section

E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

F. Comply with mounting and anchoring requirements as per manufacturers requirements to meet the seismic criteria.

G. Mount top of trim 90 inches above finished floor unless otherwise indicated.

H. Mount panelboard cabinet plumb and rigid without distortion of box.

I. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

J. Mounting panelboards with space behind is recommended for damp, wet, or dirty locations. The steel slotted supports in the following paragraph provide an even mounting surface and the recommended space behind to prevent moisture or dirt collection.

K. Mount surface-mounted panelboards to steel slotted supports 5/8 inch in depth. Orient steel slotted supports vertically.

L. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.
2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.

M. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

N. Install filler plates in unused spaces.

O. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

P. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

Q. Mount spare fuse cabinet in accessible location.

3.4 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate City of New York's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

E. Install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems" identifying source of remote circuit.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers and low-voltage surge arrestors stated in NETA ATS (Standard for the Acceptance Testing Specifications for Electrical Power Equipment and Systems), Paragraph 7.6 Circuit Breakers and Paragraph 7.19.1 Surge Arrestors, Low-Voltage. Perform optional tests. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.

c. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 05 73 "Overcurrent Protective Device Coordination Study."

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes. Prior to making circuit changes to achieve load balancing, inform commissioner of effect on phase color coding.

1. Measure loads during period of normal facility operations.
2. Perform circuit changes to achieve load balancing outside normal facility operation schedule or at times directed by the commissioner. Avoid disrupting services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After changing circuits to achieve load balancing, recheck loads during normal facility operations. Record load readings before and after changing circuits to achieve load balancing.
4. Tolerance: Maximum difference between phase loads, within a panelboard, shall not exceed 20 percent.

3.7 PROTECTION

A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 26 24 16

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI
2. Snap switches and wall-box dimmers.
3. Wall-switch and exterior occupancy sensors.
4. Communications outlets.
5. Device plates.
6. Occupancy sensors.
7. Wall box digital time switches.

B. Related Sections include the following:
1. Division 26 05 00 "Common Work Results for Electrical."
2. Division 26 05 33 "Raceways and Boxes for Electrical Systems."
3. Division 26 05 53 "Identification for Electrical Systems."

1.3 DEFINITIONS

A. Refer to DDC General Conditions.

B. EMI: Electromagnetic interference.

C. GFCI: Ground-fault circuit interrupter.

D. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

E. RFI: Radio-frequency interference.

F. SPD: Surge Protective Device.

G. UTP: Unshielded twisted pair.

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each type of product indicated.

C. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

D. Samples: One for each type of device and wall plate specified, in each color specified.

E. Field quality-control test reports.

F. Operation and Maintenance Data: To include all manufacturers' packing label warnings and instruction manuals that include labeling conditions. Include wiring diagrams and set-up instructions.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to Commissioner and the City of New York, and marked for intended use.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for New York City-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

1.7 REQUIRED MATERIALS

A. Furnish required materials described in subparagraphs below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Every device not listed above, one of every type installed

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Legrand North America (Pass & Seymour).
2. Hubbell Incorporated (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Or approved equal

2.2 RECEPTACLES

A. General Description: Straight blade, feed through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A

C. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

D. Flat low profile Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD1, NEMA WD6 configuration 5-20R and UL 498 Supplement SD.

2.3 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

C. Pilot Light Switches, 20 A:

1. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

D. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.

E. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

2.4 OCCUPANCY SENSORS

A. Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft.

B. Wall-Switch Sensors:

1. Description: Adaptive-technology type, 120/277 V, adjustable time delay up to 20 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft.

C. Long-Range Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, with a minimum coverage area of 1200 sq. ft.

D. Long-Range Wall-Switch Sensors:

1. Description: Dual technology, with both passive-infrared- and ultrasonic-type sensing, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, and a minimum coverage area of 1200 sq. ft.

E. Wide-Range Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 150-degree field of view, with a minimum coverage area of 1200 sq. ft.

2.5 COMMUNICATIONS OUTLETS

A. Telephone Outlet:

1. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e. Comply with UL 1863.

2.6 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Steel with white baked enamel, suitable for field painting.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."
5. For receptacles with other than 120 volt, inscribe voltage available.
6. For receptacles served by emergency circuit, inscribe “Emergency.”

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant , die-cast aluminum with lockable cover.

2.7 DIGITAL TIME SWITCHES

A. General
1. Shall automatically turn lights off after a pre-selected time. Time to be adjustable from 5 minutes to 60 minutes.
2. Shall provide a flash warning at 5 minutes before the end of timing cycle.
3. Color to match device plate color.

2.8 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: As selected by commissioner, unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Emergency Power System: Red.
3. SPD: Blue.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Digital Time Switches
1. Initial Settings:
    a. Set flash warning to be on.
    b. Set beep warning to be off.

I. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

J. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.3 IDENTIFICATION

A. Comply with Specification 260553 "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.
1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Test straight blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz.

END OF SECTION 26 27 26

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SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:

   a. Control circuits.
   b. Panelboards.
   c. Switchboards.
   d. Enclosed controllers.
   e. Enclosed switches.

2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

A. Refer to DDC General Conditions

B. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.

   a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
   b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.

2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
3. Current-limitation curves for fuses with current-limiting characteristics.
4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in electronic format suitable for use in coordination software and in PDF format.
5. Coordination charts and tables and related data.

6. Fuse sizes for elevator feeders and elevator disconnect switches.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in DDC General Conditions, include the following:

1. Ambient temperature adjustment information.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in electronic format suitable for use in coordination software and in PDF format.
4. Coordination charts and tables and related data.

1.5 FIELD CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Bussmann, an Eaton business

B. Littlefuse, Inc.

C. Mersen USA.

D. Or approved equal

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 250-V, zero- to 600-A rating, 200 kAIC, time delay.
2. Type RK-5: 250-V, zero- to 600-A rating, 200 kAIC, time delay.
3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, fast acting, time delay.
4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC, fast acting, time delay.
5. Type J: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
6. Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.

7. Type T: 250-V, zero- to 1200-A rating, 200 kAIC, very fast acting**,** time delay.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.3 SPARE-FUSE CABINET

A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
2. Finish: Gray, baked enamel.
3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Service Entrance: Class L, fast acting.
2. Feeders: Class L, fast acting for over 600A; Class RK1, fast acting for 600A and under.
3. Motor Branch Circuits: Class RK1, time delay.
4. Large Motor Branch (601-4000 A): Class L, time delay.
5. Power Electronics Circuits: Class J, high speed.
6. Other Branch Circuits: Class RK1, time delay.
7. Control Transformer Circuits: Class CC, time delay, control transformer duty.
8. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install spare-fuse cabinet(s) in the main electrical service room or as directed in the field by the City of New York.

3.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Molded-case switches.
5. Enclosures.

B. Related Sections

1. Division 26 05 19 “Low Voltage Electrical Cables.”
2. Division 26 05 73 “Overcurrent Protective Device Coordination Study.”
3. Division 26 05 53 “Identification for Electrical Systems.”
4. Division 26 24 13 “Switchboards.”
5. Division 26 24 16 “Panelboards.”
6. Division 26 28 13 “Fuses.”

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. NC: Normally closed.

C. NO: Normally open.

D. SPDT: Single pole, double throw.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Submit on translucent log-log graph paper.

C. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

D. Qualification Data: For qualified testing agency.

E. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Field quality-control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

G. Manufacturer's field service report.

H. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in DDC General Conditions, include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Submit on translucent log-log graph paper.

1.6 REQUIRED MATERIALS

A. Furnish required materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: Two for each size and type.

1.7 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Testing Agency Qualifications: Member Company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

C. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Comply with NFPA 70 (National Electrical Code).

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by the City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify the Commissioner no fewer than 14 days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Commissioner's written permission.
4. Comply with NFPA 70E.

1.9 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer.
2. General Electric Company.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.
5. Or approved equal.

B. Type GD, General Duty, Three Pole, Single Throw, 240-V ac, 800 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with cartridge fuse interiors to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Type HD, Heavy Duty, Three Pole, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

F. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
6. Hookstick Handle: Allows use of a hookstick to operate the handle.
7. Lugs: Mechanical type, suitable for number, size, and conductor material.
8. Service-Rated Switches: Labeled for use as service equipment.

2.2 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer.
2. General Electric Company.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.
5. Or approved equal.

B. Type GD, General Duty, Three Pole, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Type HD, Heavy Duty, Three Pole, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

F. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
5. Hookstick Handle: Allows use of a hookstick to operate the handle.
6. Lugs: Mechanical type, suitable for number, size, and conductor material.
7. Service rated switches; labeled for use as service equipment.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer.
2. Siemens Energy & Automation, Inc.
3. Square D; a brand of Schneider Electric.
4. Or approved equal

B. General Requirements:

1. Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
2. Breaker Types shown below (C through G) and ratings shall be as indicated on Drawings.

C. Thermal-Magnetic Circuit Breakers: 400A Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 400A

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: 800A Field-replaceable rating plug, rms sensing, with the following 3 through 5 field-adjustable settings:

1. 100% rated.
2. Instantaneous trip.
3. Long- and short-time pickup levels.
4. Long- and short-time time adjustments.
5. Ground-fault pickup level, time delay, and I^2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400A and smaller; let-through ratings less than NEMA FU 1, RK-5.

G. Integrally Fused Circuit Breakers: Frame sizes 800A; Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

I. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).

J. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
5. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
6. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
7. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
8. Zone-Selective Interlocking: Integral with ground-fault trip unit; for interlocking ground-fault protection function.
9. Electrical Operator: Provide remote control for on, off, and reset operations.
10. Accessory Control Power Voltage: Integrally mounted, self-powered.

2.4 MOLDED-CASE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer.
2. Siemens Energy & Automation, Inc.

3. Square D; a brand of Schneider Electric.
4. Or approved equal.

B. General Requirements: MCCB with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.

C. Features and Accessories:

1. Standard frame sizes and number of poles.
2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
3. Ground-Fault Protection: Comply with UL 1053; remote-mounted and powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
4. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
5. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
6. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic switch contacts, "b" contacts operate in reverse of switch contacts.
7. Alarm Switch: One NO & NC contact that operates only when switch has tripped.
8. Key Interlock Kit: Externally mounted to prohibit switch operation; key shall be removable only when switch is in off position.
9. Zone-Selective Interlocking: Integral with ground-fault shunt trip unit; for interlocking ground-fault protection function.
10. Electrical Operator: Provide remote control for on, off, and reset operations.
11. Accessory Control Power Voltage: Integrally mounted, self-powered.

2.5 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Comply with mounting and anchoring requirements specified in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NECA 1.

3.4 IDENTIFICATION

A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
    c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 05 73 "Overcurrent Protective Device Coordination Study."

END OF SECTION 26 28 16

SECTION 26 29 23 – VARIABLE FREQUENCY MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. This Section includes solid-state, PWM, variable frequency controllers (VFCs) for speed control of three-phase, squirrel-cage induction motors.

B. Related Sections include the following:
1. Section 262816"Enclosed Switches and Circuit Breakers."

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. BMS: Building management system.

C. IGBT: Insulated gate bipolar transistor.

D. LAN: Local area network.

E. PID: Control action, proportional plus integral plus derivative.

F. PWM: Pulse-width modulated.

G. VFC: Variable frequency controller (equals VFD-variable frequency drive or VSD-variable speed drive)..

1.4 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of VFC. Include dimensions, mounting arrangements, location for conduit entries, shipping and operating weights, and manufacturer's technical data on features, performance, electrical ratings, characteristics, and finishes.

C. Shop Drawings: For each VFC.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:

    a. Each installed unit's type and details.
    b. Nameplate legends.
    c. Short-circuit current rating of integrated unit.
    d. Listed and labeled for series rating of overcurrent protective devices in combination controllers by an NRTL acceptable to the Commissioner and The City of New York.
    e. Features, characteristics, ratings, and factory settings of each motor-control center unit.

2. Wiring Diagrams: Power, signal, and control wiring for VFCs. Provide schematic wiring diagram for each type of VFC.

D. Coordination Drawings: Floor plans, drawn to scale, showing dimensioned layout, required working clearances, and required area above and around VFCs where pipe and ducts are prohibited. Show VFC layout and relationships between electrical components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate field measurements.

E. Qualification Data: For manufacturer.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For VFCs, all installed devices, and components to include in emergency, operation, and maintenance manuals.

1. Routine maintenance requirements for VFCs and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

H. Load-Current and Overload-Relay Heater List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.

I. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed and arrange to demonstrate that dip switch settings for motor running overload protection suit actual motor to be protected.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within proximity of Project site, a service center capable of providing instructions, parts, and emergency maintenance and repairs.

C. Source Limitations: Obtain VFCs of a single type through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to The City of New York, and marked for intended use.

E. Comply with NFPA 70.

F. Product Selection for Restricted Space: Drawings indicate maximum dimensions for VFCs, minimum clearances between VFCs, and adjacent surfaces and other items. Comply with indicated maximum dimensions and clearances.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver VFCs in shipping splits of lengths that can be moved past obstructions in delivery path as indicated.

B. Store VFCs indoors in clean, dry space with uniform temperature to prevent condensation. Protect VFCs from exposure to dirt, fumes, water, corrosive substances, and physical damage.

C. If stored in areas subject to weather, cover VFCs to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install electric heating of sufficient wattage to prevent condensation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation, capable of driving full load without derating, under the following conditions, unless otherwise indicated:

1. Ambient Temperature: 0 to 40 deg C.
2. Humidity: Less than 90 percent (noncondensing).
3. Altitude: Not exceeding 3300 feet.

B. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by The City of New York unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify Commissioner no fewer than two days in advance of proposed interruption of electrical service.
2. Indicate method of providing temporary electrical service.
3. Do not proceed with interruption of electrical service without The Commissioner’s written permission.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for VFCs, minimum clearances between VFCs, and adjacent surfaces and other items. Comply with indicated maximum dimensions and clearances.

1.8 COORDINATION

A. Coordinate layout and installation of VFCs with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Specification 033000 "Cast-in-Place Concrete. (For floor mounted VFC's)"

C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Specification 075216 "SBS Modified Bitumen Roofing System."

D. Coordinate features of VFCs, installed units, and accessory devices with pilot devices and control circuits to which they connect.

E. Coordinate features, accessories, and functions of each VFC and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load. Short-circuit withstand rating shall be same as short-circuit current rating of upstream overcurrent protective device or as indicated in contract documents, whichever is higher.

F. Coordinate monitoring and control features of VFC's with communication requirements of BMS. Communication between the systems shall be seamless with specified features of the VFC fully integrated into the BMS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB Power Distribution, Inc.
2. Eaton Corporation; Cutler-Hammer Products.
3. General Electric Company.
4. Allen-Bradley Co.; Industrial Control Group.
5. Siemens Energy and Automation.
6. Square D.
7. Toshiba International Corporation.
8. Or approved equal.

2.2 VARIABLE FREQUENCY CONTROLLERS

A. Description: NEMA ICS 2, IGBT, PWM, VFC; listed and labeled as a complete unit and arranged to provide variable speed of an NEMA MG 1, Design B, 3-phase induction motor by adjusting output voltage and frequency.

1. Provide unit suitable for operation of premium-efficiency motor as defined by NEMA MG 1.

2. Both driven motor manufacturer and drive manufacturer shall have published lists showing compatibility with each other's equipment.

B. Design and Rating: Match load type such as fans, blowers, and pumps; and type of connection used between motor and load such as direct or through a power-transmission connection.

C. Output Rating: 3-phase; 6 to 60 Hz, with voltage proportional to frequency throughout voltage range.

D. Unit Operating Requirements:

1. Input ac voltage tolerance of 208 V, plus or minus 5 percent.
2. Input frequency tolerance of 50/60 Hz, plus or minus 6 percent.
3. Minimum Efficiency: 96 percent at 60 Hz, full load.
4. Minimum Displacement Primary-Side Power Factor: 96 percent.
5. Overload Capability: 1.1 times the base load current for 60 seconds; 2.0 times the base load current for 3 seconds.
6. Starting Torque: 100 percent of rated torque or as indicated.
7. Speed Regulation: Plus or minus 1 percent.

E. Isolated control interface to allow controller to follow control signal over an 11:1 speed range.

1. Electrical Signal: 4 to 20 mA at 24 V.
2. Pneumatic Signal: 3 to 15 psig (20 to 104 kPa).

F. Internal Adjustability Capabilities:

1. Minimum Speed: 5 to 25 percent of maximum rpm.
2. Maximum Speed: 80 to 100 percent of maximum rpm.
3. Acceleration: 2 to a minimum of 22 seconds.
4. Deceleration: 2 to a minimum of 22 seconds.
5. Current Limit: 50 to a minimum of 110 percent of maximum rating.

G. Self-Protection and Reliability Features:

1. Input transient protection by means of surge suppressors.
2. Under- and overvoltage trips; inverter overtemperature, overload, and overcurrent trips.
3. Motor Overload Relay: Adjustable and capable of NEMA ICS 2, Class 10 performance.
4. Notch filter to prevent operation of the controller-motor-load combination at a natural frequency of the combination.
5. Instantaneous line-to-line and line-to-ground overcurrent trips.
6. Loss-of-phase protection.
7. Reverse-phase protection.
8. Short-circuit protection.
9. Motor overtemperature fault.

H. Multiple-Motor Capability: Controller suitable for service to multiple motors and having a separate overload relay and protection for each controlled motor. Overload relay shall shut off controller and motors served by it when overload relay is tripped.

I. Automatic Reset/Restart: Attempts three restarts after controller fault or on return of power after an interruption and before shutting down for manual reset or fault correction. Bidirectional autospeed search shall be capable of starting into rotating loads spinning in either direction and returning motor to set speed in proper direction, without damage to controller, motor, or load.

J. Power-Interruption Protection: To prevent motor from re-energizing after a power interruption until motor has stopped.

K. Torque Boost: Automatically varies starting and continuous torque to at least 1.5 times the minimum torque to ensure high-starting torque and increased torque at slow speeds.

L. Motor Temperature Compensation at Slow Speeds: Adjustable current fall-back based on output frequency for temperature protection of self-cooled, fan-ventilated motors at slow speeds.

M. Status Lights: Door-mounted LED indicators shall indicate the following conditions:

1. Power on.
2. Run.
3. Overvoltage.
4. Line fault.
5. Overcurrent.
6. External fault.

N. Panel-Mounted Operator Station: Start-stop and auto-manual selector switches with manual speed control potentiometer and elapsed time meter.

O. Indicating Devices: Meters or digital readout devices and selector switch, mounted flush in controller door and connected to indicate the following controller parameters:

1. Output frequency (Hz).
2. Motor speed (rpm).
3. Motor status (running, stop, fault).
4. Motor current (amperes).
5. Motor torque (percent).
6. Fault or alarming status (code).
7. PID feedback signal (percent).
8. DC-link voltage (VDC).
9. Set-point frequency (Hz).
10. Motor output voltage (V).

P. Control Signal Interface:

1. Electric Input Signal Interface: A minimum of 2 analog inputs (0 to 10 V or 0/4-20 mA) and 6 programmable digital inputs.
2. Pneumatic Input Signal Interface: 3 to 15 psig.
3. Remote Signal Inputs: Capability to accept any of the following speed-setting input signals from the BMS or other control systems:

    a. 0 to 10-V dc.
    b. 0-20 or 4-20 mA.
    c. Potentiometer using up/down digital inputs.
    d. Fixed frequencies using digital inputs.
    e. RS485.
    f. Keypad display for local hand operation.

4. Output Signal Interface:

    a. A minimum of 1 analog output signal (0/4-20 mA), which can be programmed to any of the following:

        1) Output frequency (Hz).
        2) Output current (load).
        3) DC-link voltage (VDC).
        4) Motor torque (percent).
        5) Motor speed (rpm).
        6) Set-point frequency (Hz).

5. Remote Indication Interface: A minimum of 2 dry circuit relay outputs (120-V ac, 1 A) for remote indication of the following:

    a. Motor running.
    b. Set-point speed reached.
    c. Fault and warning indication (overtemperature or overcurrent).
    d. PID high- or low-speed limits reached.

Q. Communications: Provide an RS485 interface allowing VFC to be used with an external system within a multidrop LAN configuration. Interface shall allow all parameter settings of VFC to be programmed via BMS control. Provide capability for VFC to retain these settings within the nonvolatile memory.

R. Manual Bypass: Magnetic contactor arranged to safely transfer motor between controller output and bypass controller circuit when motor is at zero speed. Controller-off-bypass selector switch sets mode, and indicator lights give indication of mode selected. Unit shall be capable of stable operation (starting, stopping, and running), with motor completely disconnected from controller (no load).

S. Bypass Controller: NEMA ICS 2, full-voltage, nonreversing enclosed controller with across-the-line starting capability in manual-bypass mode. Provide motor overload protection under both modes of operation with control logic that allows common start-stop capability in either mode.

T. Integral Disconnecting Means: NEMA AB 1, instantaneous-trip circuit breaker with lockable handle.

U. Isolating Switch: Non-load-break switch arranged to isolate VFC and permit safe troubleshooting and testing, both energized and de-energized, while motor is operating in bypass mode.

V. Remote Indicating Circuit Terminals: Mode selection, controller status, and controller fault.

2.3 ENCLOSURES

A. Provide enclosure to for outdoor installation.

2.4 ACCESSORIES

A. Devices shall be factory installed in controller enclosure, unless otherwise indicated.

B. Push-Button Stations, Pilot Lights, and Selector Switches: NEMA ICS 2, heavy-duty type.

C. Stop and Lockout Push-Button Station: Momentary-break, push-button station with a factory-applied hasp arranged so padlock can be used to lock push button in depressed position with control circuit open.

D. Control Relays: Auxiliary and adjustable time-delay relays.

E. Standard Displays:

1. Output frequency (Hz).
2. Set-point frequency (Hz).
3. Motor current (amperes).
4. DC-link voltage (VDC).
5. Motor torque (percent).
6. Motor speed (rpm).
7. Motor output voltage (V).

F. Historical Logging Information and Displays:

1. Real-time clock with current time and date.
2. Running log of total power versus time.
3. Total run time.
4. Fault log, maintaining last four faults with time and date stamp for each.

G. Current-Sensing, Phase-Failure Relays for Bypass Controller: Solid-state sensing circuit with isolated output contacts for hard-wired connection; arranged to operate on phase failure, phase reversal, current unbalance of from 30 to 40 percent, or loss of supply voltage; with adjustable response delay.

2.5 FACTORY FINISHES

A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested VFCs before shipping.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EXAMINATION

A. Examine areas, surfaces, and substrates to receive VFCs for compliance with requirements, installation tolerances, and other conditions affecting performance.

B. Examine roughing-in for conduit systems to verify actual locations of conduit connections before VFC installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 APPLICATIONS

A. Select features of each VFC to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; and duty cycle of motor, controller, and load.

B. Select horsepower rating of controllers to suit motor controlled.

3.4 INSTALLATION

A. Anchor each VFC assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with mounting surface.

B. Install VFCs on concrete bases.

C. Comply with mounting and anchoring requirements specified in Section 260529 "Hangers and Supports for Electrical Systems."

D. Controller Fuses: Install fuses in each fusible switch. Comply with requirements in Section 262813 "Fuses."

3.5 CONCRETE BASES

A. Coordinate size and location of concrete bases.

B. Concrete base is specified in Section 260500 "Common Work Results for Electrical," and concrete materials and installation requirements are specified in Division 03.

3.6 IDENTIFICATION

A. Identify VFCs, components, and control wiring according to Section 260553 "Identification for Electrical Systems."

B. Operating Instructions: Frame printed operating instructions for VFCs, including control sequences and emergency procedures. Fabricate frame of finished metal, and cover instructions with clear acrylic plastic. Mount on front of VFC units.

3.7 CONTROL WIRING INSTALLATION

A. Install wiring between VFCs and remote devices according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Bundle, train, and support wiring in enclosures.

C. Connect hand-off-automatic switch and other automatic-control devices where applicable.

1. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.
2. Connect selector switches with control circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.8 CONNECTIONS

A. Conduit installation requirements are specified in other Division 26 Sections. Drawings indicate general arrangement of conduit, fittings, and specialties.

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.9 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each enclosed controller element, bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to perform the following:

1. Inspect controllers, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment.
2. Assist in field testing of equipment including pretesting and adjusting of solid-state controllers.
3. Report results in writing.

C. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:

D. Perform the following field tests and inspections and prepare test reports:

1. Perform each electrical test and visual and mechanical inspection, except optional tests, stated in NETA ATS. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.10 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.11 INSTRUCTION

A. Engage a factory-authorized service representative to instruct The City of New York operating personnel to adjust, operate, and maintain variable frequency controllers. Refer to Addendum to General Conditions.

END OF SECTION 262923

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SECTION 26 31 00 - PHOTOVOLTAIC COLLECTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

1. PV system description.
2. Manufactured PV units.
3. PV module framing.
4. PV array construction.
5. Inverters.
6. System overcurrent protection.
7. Mounting structures.

1.3 REFERENCE STANDARDS

A. American National Standards Institute (ANSI):
1. C12.1: Standard for Electricity Meters.
2. C12.20: Standard for Electrical Meters.

B. The Institute of Electrical and Electronics Engineers, Inc (IEEE):
1. IEEE 929: Recommended Practice for Utility Interface of Intermediate PV Systems.
2. IEEE 80: Recommended Grounding Practices.
3. IEEE 1547-2018: IEEE Standard for Interconnection and Interoperability of Distributed Energy Resource with Associated Electric Power System Interfaces.

C. Underwriters Laboratories, Inc. (UL):
1. 1741/ 1741 SA: Standard for Safety for Static Inverters, Converters, Controllers and Interconnection System Equipment for Use in Photovoltaic Power Systems.
2. 1703: Standard for Flat-Plate Photovoltaic Modules and Panels.

1.4 DEFINITIONS

A. Refer to DDC General Conditions.

B. FEP: Fluorinated ethylene propylene.

C. IP Code: Required ingress protection to comply with IEC 60529 (Degrees of Protection Provided by Enclosure).

D. MPPT: Maximum power point tracking.

E. PTC: PVUSA Test Condition. Commonly regarded as a "real-world" measure of PV output. See below for definition of "PVUSA."

F. PV: Photovoltaic.

G. PVUSA: Photovoltaics for Utility Systems Applications.

H. STC: Standard Test Conditions defined in IEC 61215(Terrestrial photovoltaic modules – Design qualification and type approval).

1.5 SUBMITTAL PROCEDURES

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for PV panels.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

C. Shop Drawings: For PV modules.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Detail fabrication and assembly.
4. Include diagrams for power, signal, and control wiring.

D. Site Parameters Report: Submit report identifying environmental and bioclimatic conditions at site including, solar irradiation, solar insolation, altitude, humidity, maximum temperature, minimum temperature, rooftop ambient temperature, and seasonal ambient conditions that impact energy production of PV system

E. Structural Certification: Certification by Professional Engineer licensed in the State of New York demonstrating ability of roof to support all loads required for PV system.

F. Factory Test Reports: Solar panels and inverters.

1.6 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

B. Field quality-control reports.

C. Sample Warranty: For manufacturer's special materials and workmanship warranty and minimum power output warranty.

D. Comply with NFPA 70

E. Source Limitations: Obtain solar panels from single manufacturer. Mounting for PV system specified in this Section shall be from single manufacturer. PV system inverters shall be from single manufacturer. AC power panels shall be from single manufacturer.

F. Manufacturer: The manufacturer providing the material or equipment specified in this section must, for the past five (5) years, have been regularly engaged in the manufacture of material or equipment similar in type to that required for this Project. Such similar material or equipment provided by the manufacturer must have been in satisfactory service for not less than five (5) years.

G. Installer: The contractor or subcontractor performing the work of this section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work. In addition, the contractor or subcontractor performing the work must be approved by the manufacturer and by the New York State Energy Research and Development Authority (NYSERDA).

H. Listing and Labeling: Electrical components, devices, and accessories, List and label, as defined in NFPA 70, Article 100, by testing agency acceptable to The City of New York, and marked for intended use.

I. Certificate of Compliance: Provide certificate of compliance to referenced standards from manufacturer of PV Systems.

J. Qualifications:
   1. Provide qualifications of Testing Facility and individual who will be performing tests.
   2. Installation Personnel: Submit evidence prior to work that persons who are to perform work herein have appropriate training or experience in PV system installation with similar modules and associated equipment. Install shall have certification from Photovoltaic module manufacturer and inverter manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and receive all PV system materials required for the work.

B. Prior to and during construction, provide secure storage on site for all PV system materials stored on site.

C. Store and handle to comply with manufacturer's directions, and as required to prevent damage to glass, PV materials, and system component electronics.

D. If stored in areas subjected to weather, cover PV panels and system component electronics to provide protection from weather, dirt, dust, corrosive substances, and physical damage.

E. Replace any scratched or damaged PV system materials or system components.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following site-specific conditions, unless otherwise indicated:
   1. Ambient Temperature: -15 deg C to 30 deg C.
   2. Relative humidity: Up to 100% non-condensing.

1.9 CLOSEOUT SUBMITTALS

A. Refer to DDC General Conditions

B. Operation and Maintenance Data: For PV modules to include in operation and maintenance manuals.

1.10 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of PV modules that fail in materials or workmanship within specified warranty period.

   1. Manufacturer's materials and workmanship warranties include the following:

      a. Faulty operation of PV modules.

   2. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer's Special Minimum Power Output Warranty: Manufacturer agrees to repair or replace components of PV modules that fail to exhibit the minimum power output within specified warranty period. Special warranty, applying to modules only, applies to materials only, on a prorated basis, for period specified.

   1. Manufacturer's minimum power output warranties include, the following warranty periods, from date of Substantial Completion:

      a. Specified minimum power output to 80 percent or more, for a period of 25 years.

1.11 SYSTEM PERFORMANCE REQUIREMENTS

A. Product selection for mounting:

1. Support PV systems associated with new construction by structure using fixed mounted system as specified herein and in the contract documents.

1.12 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Specification 075216 "SBS Modified Bitumen Roofing System"

B. Coordinate layout and installation of PV System and components with other construction, including conduit, piping, equipment, roof drains, roof penetrations, antennas, and adjacent obstructions and surfaces. Maintain required clearances for workspace and equipment access.

C. Coordinate size and locations of mounting bases and casting of anchor-bolt inserts into concrete slabs, beams and columns.

D. Coordinate location of ballast support rails with existing structural framing.

E. Coordinate system with structural capability of roof structure. Coordination of loading from PV mounting system with design of main building is responsibility of Structural Engineer licensed in the State of New York.

F. Coordinate Roof Slope: Project-specific application will define PV system slope; however, mounting system requires coordination with roof slope for water drainage.

G. Coordination with roof membrane: Contractor shall coordinate type, thickness, and construction of roof membrane. PV System shall be able to function with installed roof membrane and not create leaks in roof. Contractor shall ensure that PV system does not cause roof to leak.

H. Provide system technical coordination for utility interconnection agreements. Provide grid connection as required, and in location as designated by local utility company.

I. Coordinate electrical voltage, phase, and hertz characteristics of PV system’s output with electrical characteristics of local utility company. Provide isolation transformers where indicated to step-down PV system output voltage to match local utility company’s voltage.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Solar Panel Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. SunPower Corp
2. LG Electronics USA, INC
3. Suntech
4. Panasonic

5. Canadian Solar
6. Kyocera
7. Or approved equal.

B. Inverter Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. SMA America
2. SolarEdge Technologies, Inc
3. Schneider Electric Solar
4. Or approved equal

C. Combiner/Collector Box Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. SMA America
2. Blue Oak PV Products
3. Solar BOS
4. Or approved equal

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Hazardous Locations: FM Global approved for NFPA 70, Class 1, Division 2, Group C and Group D.

C. Seismic Qualification Certificates: For PV system accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Solar Panel Electrical Termination: Potted block with factory installed positive and negative Multi-contact connectors as indicated on the contract drawings.

E. All cell interconnections on all types of PVs shall be made with the encapsulation.

F. Diodes: All solar panels shall be supplied with factory installed by-pass diodes. All DC circuits shall be supplied with field installed blocking diodes.

G. Three Phase Central Inverters: Match inverter frequency to local utility company frequency. Match inverter output voltage to local utility company utilization voltage. Provide isolation transformers where indicated to match PV system voltage to local utility voltage.

H. Provide AC disconnect switches to building power distribution system.

I. Combiner/Collector Boxes: DC combiner boxes and AC collector boxes shall be UL 1741 listed with required number of inputs and outputs for PV system configuration.

J. Isolation Transformer: Provide isolation transformer and associated disconnect switch between AC collector boxes and building power distribution system connection.

K. Exposed Conduit: All exterior exposed conduits shall be galvanized rigid steel (RMC) with threaded fittings.

L. Disconnect Switches: Provide AC and DC disconnect switches as required.

M. Multi-Connect Connectors: Provide connectors as recommended by manufacturer. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. MC
2. Tyco
3. Huber+Suhner
4. Or approved equal.

N. PV system Output: Where grid tied PV systems are acceptable to local utility company, PV system's inverters shall match local utility company exactly in voltage, phase, and frequency to allow it to be grid-tied in accordance with local utility company's safety and power quality requirements. Provide revenue metering at utility meter to account for PV system generated power being registered on utility meter for power generation credit based upon time of day and PV power generated. Coordinate all requirements with local utility company. Refer to Specification 260500 "Common Work Results for Electrical, Communications and Electronic Safety" for additional metering requirements. Provide safety disconnect switches to disconnect PV system from local utility line in event of utility failure. Provide energy monitoring system with PV inverter. System output display shall provide information regarding voltage, amperage, frequency and total power generated (in kwh). Further display/information requirements shall be determined by the Commissioner.

2.3 PV CAPACITIES AND CHARACTERISTICS

A. Minimum Electrical Characteristics:

1. Rated Open-Circuit Voltage: 85.6 V dc.
2. Maximum System Voltage: 600 V dc.
3. Maximum Power at Voltage (Vpm): 72.9 V dc.
4. Short-Circuit Temperature Coefficient: 3.5 mA/deg C.
5. Rated Short-Circuit Current (Isc): 6.43A.
6. Maximum System: 600 V dc.
7. Rated Operation Current (Imp): 5.97A.
8. Maximum Power at STC (Pmax): 435 watts.

B. Additional Electrical Characteristics:

1. PTC Rating: 435 watts.
2. Peak Power per Unit Area: 1000 watts.
3. Tolerance of Pmax: +/-5 percent.
4. Minimum Peak Power: 435 watts.
5. Series Fuse Rating: 20A.
6. Module Efficiency: 20 percent.
7. Temperature Cycling Range: -40 deg F to +185deg F.
8. Humidity, Freeze, Damp Heat Condition: percent RH.
9. Wind Loading or Surface Pressure: 50 lbf/sq. ft..
10. Maximum Distortion Angle: .
11. Hailstone Impact Withstand: 1 inch diameter at 51 mph wind velocity.
12. Series Fuse Rating: 20A.

C. Normal Operating Temperature Characteristics (NOTC):

1. Temperature at Nominal Operating Cell Temperature: 45 deg C +/- 2 deg C.
2. Temperature Coefficient (NOTC Nominal Power): -0.36% / deg C.
3. Temperature Coefficient (NOTC Open-Circuit Voltage): -0.26% / deg C.
4. Temperature Coefficient (NOTC Short Circuit Current): -0.02% / deg C.

2.4 PV SYSTEMS DESCRIPTION

A. Interactive PV System: Collectors connected in parallel to the electrical utility; and capable of providing power for Project and supplying power to a distributed network.

1. A 1694-module array to generate a total nominal rated output of 750 kW.

2. System Components:

a. PV modules.
b. Array frame.
c. Utility-interactive inverter.
d. Overcurrent protection, disconnect, and rapid shutdown devices.
e. Mounting structure.
f. Utility meter.
g. Monitoring Software with PV generation performance tracking.

2.5 MANUFACTURED PV UNITS

A. Cell Materials: Amorphous silicon (a-Si).

B. Cell Materials: Micromorphous silicon (a-Si+uc-Si).

C. Cell Materials: Copper indium (di)selenide (CIS).

D. Cell Materials: Copper indium gallium (di)selenide (CIGS).

E. Cell Materials: Cadmium telluride (CdTe).

F. Module Construction:

1. Nominal Size: 41.16 inches wide by 81.36 inches long.
2. Weight: 56 lb.

G. Insulating Substrate Film: Flexible.

H. Conducting Substrate Film: Flexible.

I. Encapsulant: Ethyl vinyl acetate.

J. Front Panel: Fully tempered glass.

K. Backing Material: Tempered glass.

L. Bypass Diode Protection: Internal.

M. Junction Box:

1. Size: 1.56 by 3.96 by 0.52 inch.
2. Fully potted, vandal resistant.
3. IP Code: IP65 or IP66.
4. Flammability Test: UL 1703.

N. Output Cabling:

1. 0.158 inch.
2. Quick, multiconnect, polarized connectors.
3. Two-Conductor Harness: No traditional return wire is needed from the end of a row back to the source combiner.

O. Series Fuse Rating: as specified.

2.6 PV MODULE FRAMING

A. PV laminates mounted in anodized extruded-aluminum frames.

1. Entire assembly UL listed for electrical and fire safety, Class A, according to UL 1703, and complying with IEC 61215.
2. Frame strength exceeding requirements of certifying agencies in subparagraph above.
3. Finish: Anodized aluminum.

a. Alloy and temper recommended by framing manufacturer for strength, corrosion resistance, and application of required finish.
b. Color: As indicated by manufacturer's designations.

2.7 PV ARRAY CONSTRUCTION

A. Framing:

1. Material: Extruded aluminum or Galvanized steel.
2. Maximum System Weight: Less than 4 lb/sq. ft.
3. Minimum Distance to Connectors: 2” inches.
4. Raceway Cover Plates: Plastic or Galvanized steel.

B. Flat-Roof Mounting:

1. No roof penetrations.
2. Self-ballasting.
3. Wind-tunnel tested to 110-mph wind.
4. Service Life: 25 years.
5. Freestanding system.

2.8 INVERTER

A. DC-AC Inverters: Inverters shall provide output waveform to match building power distribution system when grid tied to local utility. Inverter output shall comply with all local utility company requirements. Inverters shall be compatible with its associated PV system array output and utility input as indicated on Construction Drawings. Inverters shall be capable of complete automatic unattended operation including start-up, synchronization, and disconnect, and operating in parallel with other inverters and utility. Voltage and frequency tolerances shall be plus/minus 10 percent. The inverters shall be capable of shutting down without damage when PV array output is outside tolerance parameters of inverter. Manufacturer shall connect array to ground in inverter in accordance with array requirements, as indicated on Construction Drawings. Inverters shall be at minimum listed to UL1741 and compliant with IEEE 929 and IEEE 1547-2018. Inverters shall be at minimum 95.5 percent efficient.

B. Inverter Type: String.

C. Control Type: Maximum power point tracker control.

D. Inverter Electrical Characteristics:

1. Maximum Recommended PV Input Power: 50 kilowatts.
2. Maximum Open-Circuit Voltage: 600V dc.
3. PV Start Voltage: 188V dc.
4. MPPT Voltage Range: 330-800V dc
5. Maximum Input Current: 120A.
6. Number of String Inputs: 2 per MPPT.
7. Number of Independent MPPT Circuits: 6.
8. Nominal Output Voltage:600V dc.
9. CEC Rated Power: 50 kilowatts.
10. Nominal Output Voltage: 480V ac.
11. Maximum Output Current: 50A.
12. Peak Efficiency: 97.5 percent.

13. CEC Weighted Efficiency: 97.5 percent.
14. DC/AC Terminal Range (AWG): 12AWG to 10 AWG (DC) / 4WG to 4/0 AWG CU/AL (AC).
15. Communications Interface: RS 485, RS 232 or Ethernet.
16. Utility Interface: Utility-interactive inverter.

E. Operating Conditions:

1. Operating Ambient Temperatures: Minus 13 to plus 140 deg F.
2. Storage Temperature: Minus 40 to plus 158 deg F.
3. Relative Humidity: Zero to 100 percent, noncondensing.

F. Charge controllers shall have the following:

1. Overcurrent protection.
2. Generator input breaker box.
3. Automatic transfer relay.
4. Digital display.
5. Transformer.
6. Disconnect switch.
7. Shunt controller.
8. Shunt regulator.
9. Surge overload protection.

G. Enclosure:

1. NEMA 250, Type 4X.
2. Enclosure Material: Galvanized steel.
3. Cooling Methods:

    a. Fan convection cooling.
    b. Passive cooling.

4. Protective Functions:

    a. AC over/undervoltage.
    b. AC over/underfrequency.
    c. Ground overcurrent.
    d. Overtemperature.
    e. AC and dc overcurrent.
    f. DC overvoltage.
    g. Anti-Islanding protection.

H. Disconnects: Rated for system voltage and conductor.

I. Regulatory Approvals:

1. IEEE 1547.1: Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces.

2. IEEE 1547.3: Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems.
3. UL 1741: Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources.
4. UL 1741 SA: Supplement A to UL 1741 – Specifications for Grid Support Utility Interactive Inverters.
5. UL 1699B: Standard for Photovoltaic (PV) DC Arc-Fault Circuit Protection.

J. Characteristics:

1. Inverter Dimensions: 25 inches width, 23 inches Deep, 29 inches height.
2. Inverter Weight: 185 lb.

2.9 SYSTEM OVERCURRENT PROTECTION

A. Fuses: 50A.

2.10 MOUNTING STRUCTURES

A. Roof Mount: Extruded aluminum, four rails, tilt legs, and roof standoffs.

2.11 ACCESSORIES

A. DC Combiner Box: UL listed components and suitable for the environment in which installed with provisions for 600Vdc fuses of appropriate size for each source circuit in accordance with NFPA 70 guidelines with electrical characteristics, as indicated on Construction Drawings.

B. Devices and enclosures shall be rated for application. Exterior installations of components shall have minimum steel NEMA 3R rating for exterior wet locations. Enclose interior installations in minimum steel NEMA 1 enclosures.

C. Fabrication of supports for system components (excluding PV module support) shall be heavy-duty, self supporting galvanized steel channel provided with captive clips for panels, boxed and conduits.

D. Cabling: All conductors, cabling, and associated connectors shall be UL listed for environmental conditions in which they will operate.

2.12 DATA ACQUISITION SYSTEM

A. Provide all data acquisition system (DAS) equipment required for complete and working DAS. DAS equipment shall include all of sensors and wiring required to measure and record parameters indicated herein.

B. All equipment supplied for DAS shall have capability of operating at voltage and frequency available at installation location.

C. Integrate DAS with building automation system (BAS). Instruments and measuring equipment shall report directly to BAS. BAS shall provide output to lobby display. When BAS is not available at site, provide computer for DAS of latest available technology and operating system, and with ability to share data collected by DAS system with remote computer as described in this Section, and to future BAS via RS-485/Ethernet connection.

D. The DAS shall perform the following tasks:
1. Sample listed parameters data at least 20 times per minute, and log the average values to data storage area in maximum of 15 minute intervals.
2. Retain logged data upon loss of power.
3. Start logging data and reestablish network connections automatically when power is restored.
4. Generate daily and monthly files as defined herein.
5. Store logged data for a minimum of five years.

E. The following parameters shall be monitored.
1. Ambient temperature (C) shall be measured with stainless steel sheathed temperature sensor module. House temperature sensor in steel shielded enclosure.
2. Measure wind Speed (m/s) with approved anemometer.
3. Measure plane of array (rooftop) irradiance (W/m^2) by approved pyranometer.
4. Measure module temperature with surface mounted temperature sensor (mounted on rear of module) adhered with high temperature epoxy.
5. Instantaneous voltage (V), amps (A), energy (kW), and accumulated (kWh) power output for the PV system. Provide voltage and amp meters for this task.

F. Daily file shall be generated by DAS that includes, at minimum, 15-minute averaged data over entire day for each of parameters listed above in tabular format.

G. Monthly file shall be generated by DAS that include, the following parameters in tabular format presented for each day in month.
1. Daily total irradiance (kWh/m^2)
2. Total daily AC power produced by PV system (kWh)
3. Peak AC power output for PV system (kW)
4. Average temperature for day (°C)
5. Maximum temperature for day (°C)
6. Maximum module temperature for day (°C)
7. Minimum temperature for day (°C)
8. Average wind speed for day (m/s)
9. Total calculated CO_2 abated by use of PV system.

H. DAS system shall have ability to broadcast instantaneous data onto TCP/IP network in xlm format or similar approved internet based communications protocol such that it can be read by standard web browser.

I. When there is no BAS, provide and program computer to display in a location designated by Commissioner, real time data that is broadcast by DAS equipment.

J. Display shall be updated at minimum of 12 times per minute, and it shall allow for flexibility in content, such that content and appearance may be changed at any time.

K. Real time display shall include in graphical format, at minimum, the following:
1. Instantaneous irradiance as measured by pyranometer.
2. Instantaneous ambient temperature.
3. Instantaneous wind speed.
4. Combined instantaneous AC power being produced by all PV systems.
5. Total daily electrical energy harvest produced by all PV system as running sum.
6. Total year to date electrical energy harvest produced by all PV systems as running sum.
7. Total lifetime electrical energy harvest produced by all PV systems as running sum.
8. Aggregate amount of CO_2 abated by use by all PV systems as running total.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

B. At the start of construction, the contractor or subcontractor performing the work muss apply for the photovoltaic rebate under the NY-Sun Residential/Nonresidential Incentive Program – PON 2112 for the City of New York. Submit all needed paperwork to NYSERDA on behalf of the City of New York with the incentive to be received by the City of New York.

C. Field Test Reports: Submit written test reports; include the following:
1. Test procedures used.
2. Final Test results. Include all test results and demonstrate their comparison to and compliance with requirements. Provide test results on uplift of the pedestals supporting PV systems.
3. Report shall include results of all failed tests and corrective action taken to achieve test results that comply with requirements.

D. Operation and Maintenance Manuals:
1. Each item of equipment and each system: Include description of unit or system, and component parts. Give function, normal operating characteristics, and limiting conditions. Include commercial number of replaceable parts.
2. Provide approved engineering submittals. Include equipment sizing calculations.
3. Provide manufacturer's installation wiring diagrams and schematic diagrams.
4. Include as-installed color coded wiring diagrams and schematic diagrams with wire functions labeled on the diagrams.
5. Operating procedures: Include routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instruction. Include summer, winter, and any special operating instructions. Include the preferred mounting angle of solar panels for summer and winter optimum performance.
6. Maintenance requirements: Include required materials, routine procedures and guide for cleaning, trouble-shooting, and repairing solar panels including disassembly, repair and reassembly instructions, alignment, adjusting, balancing, and checking instructions. Include procedures for testing printed circuit boards, cells, and modules.
7. Include manufacturer's printed installation manuals, operation and maintenance instructions, and repair guides.
8. Provide manufacturer's control diagram and repair guide for each piece of equipment.

9. Provide original manufacturer's parts list, illustration, assembly drawings, repair guide, and diagrams required for maintenance.
10. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
11. Provide a screen shot of each display page of DAS output.
12. For PV systems with solar panels installed in a manner that limits maintenance access to less than two sides of each solar panel, provide preferred method for preventing undesirable vegetation around solar panels and for protecting the solar panels while removing vegetation around solar panels.

3.2 EXAMINATION

A. Examine substrate areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Do not begin installation until mounting surfaces have been properly prepared.

C. If preparation of mounting surfaces is the responsibility of another installer, notify commissioner of unsatisfactory preparation before proceeding.

D. Examine modules and array frame before installation. Reject modules and arrays that are wet, moisture damaged, or mold damaged.

E. Examine roofs, supports, and supporting structures for suitable conditions where PV system will be installed.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with NECA 1.

B. Coordinate layout and installation of PV panels with roof support assembly and other construction.

C. Support PV panel assemblies independent of supports for other elements such as roof and support assemblies, enclosures, vents, pipes, and conduits. Support assembly to prevent twisting from eccentric loading.

D. Install PV inverters and system control in locations indicated on Drawings.

E. Install weather seal fittings and flanges where PV panel assemblies penetrate exterior elements such as walls or roofs. Seal around openings to make weathertight. See Section 079200 "Joint Sealants" for materials and application.

F. Seismic Restraints: Comply with requirements for seismic-restraint according to IEEE 344 to withstand seismic forces as per ASCE 7-10 with the following parameters:
   1. Building Occupancy Category: II

2. Seismic Design Category: B
3. Site Class: D (assumed)
4. Risk Level: II.
5. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
6. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

G. Wiring Method: Install cables in raceways.

H. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.4 CONNECTIONS

A. Coordinate PV panel cabling to equipment enclosures to ensure proper connections.

B. Coordinate installation of utility-interactive meter with utility.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

D. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.5 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Specification 260553 Identification for Electrical System.

B. PV system signs shall be printed in English and in local language.

C. Appropriately identify and label PV system equipment as indicated in NFPA 70 with permanent, self-adhesive, engraved red stock with white core plastic with minimum thickness 1.5mm. Lettering shall be standard engravers letter style using standard size appropriate for application in accordance with NFPA 70.

D. Label DC combiners, AC collectors, DC-AC inverters, DAS enclosures, and PV system disconnects. Use permanent, self-adhesive, printed labels identifying system component pertaining to PV system, and provided in both English. Lettering shall be standard engravers letter style using standard size appropriate for application in accordance with NFPA 70.

E. Provide warning signs for PV system startup and restart for inverters with DC disconnect switch. Refer to Article on “Start-Up Services.”

F. Provide warning signs for PV system at DC disconnect switches indicating that voltage is present on DC solar panel portion of circuit during daylight hours. Provide warning signs for PV system at AC disconnect switches indicating that voltage is present on local electrical utility portion of circuit when utility power is available.

G. Operating Instructions: Printed basic instructions for PV system components, including operation, disconnection, and emergency procedures.

H. Label DC system components with material described herein for operating DC current (Imax), system operating DC Voltages (Vmax), maximum string DC voltage (Voc), and maximum system DC current (Isc).

3.6 FIELD QUALITY CONTROL

A. Testing: After installing PV System components and after building electrical system has been energized, demonstrate product capability and compliance with requirements.

B. Contractor shall be present for complete system review and startup acceptance test with the Commissioner. Contractor shall be prepared at any time during this process to provide access to all portions of installation, and shall remedy any portion of system that is not in compliance with this specification, that does not perform to manufacturer's operating specifications, or that fails to operate due to poor workmanship.

C. In addition to the following test sequence, Contractor shall perform all tests required by manufacturer as outlined in inverter's installation and operator's manual.
   1. Ensure that inverter is switched off before proceeding.
   2. Test and record AC line voltage at the inverter to ensure that it is within proper limits as stated by the manufacturer.
   3. Test that phase sequencing is correct, if applicable.
   4. Check continuity of all fuses.
   5. Check that DC open circuit voltage is within manufacturer's recommended range at DC disconnects.
   6. If DC voltage is correct, close inverter cover, close DC and AC disconnect switches, and turn on inverter.
   7. After Manufacturer's specified start-up time, confirm that inverter is operating by recording DC operating voltage and currents, AC Phase voltages and phase currents and inverter power.
   8. Close all open equipment enclosures.
   9. Look and listen for, find the cause of, and remedy anything unusual from the PV array or PV system components.

D. Additional testing shall demonstrate proper functional operation of control and protective features under normal and abnormal conditions. In some cases devices external to inverters can handle one or more of these features:
   1. Confirm wake-up and sleep operations of PV system.
   2. Confirm inverter sleep operation during loss of building power and loss of array.

E. Provide photo record of installation and major components, including solar panels, inverters, transformers, combiners, collectors, and all display screens shall be made. Include photos

showing connections within all installed enclosures. Provide electronic copies of photo record on compact disc and hard copy of the photo record (with labels for each photo) in Operation and Maintenance Manual identified in Submittals article.

3.7 PRE-OPERATIONAL APPROVALS

A. For sites served by local electric utility company, do not connect PV system to building electrical power distribution system for testing purposes without written permission from local electric utility company. Once entire PV system is correctly installed and properly wired, and preliminary field-testing, system review and start-up test are successfully completed, Contractor shall contact utility to schedule and be present for any inspections required for PV system approval. Written notice of approval from local electric utility company must be received before system is permanently paralleled with their system. Contractor shall obtain this approval from local electric utility company, and include a copy in the Operation and Maintenance Manual.

3.8 CLEANING

A. Remove all excess sealants, fillings, grease, tape residue, dust and debris from PV system components.

B. Protect work from damage by other trades.

C. Ensure site is clean and secure, in workman like condition, during and at completion of the project.

3.9 STARTUP SERVICES

A. Perform testing as prescribed in this specification and in accordance with manufacturer's recommendations.

B. For PV system incorporating inverters with ON switch, all PV system disconnects are in CLOSED position prior to turning on inverter. For PV system incorporating inverters that do not incorporate an ON switch, PV system will be turned on when all PV system disconnects are in CLOSED position.

C. Ensure there is written permission from local utility company for interconnection of PV system with utility grid. Local utility company may require that representative of utility be on-site during initial interconnection; Contractor shall accommodate this requirement, if stated by utility.

D. Startup for the Data Acquisition System (DAS). Perform the following tests before system is deemed complete.
   1. Confirm that DAS reads zero for all measurements when respective instruments are turned off.

2. Verify and record that all measurements are reading in proper range when respective instruments are turned on. Include copy of test results in Operation and Maintenance manual described herein.
3. Verify that all files created by DAS are in proper format and have proper values.
4. Verify that real time data is being displayed properly on lobby display.
5. Confirm that all links to real time and archived data are working properly.
6. Confirm that data files are retained upon loss of power.
7. Confirm that daily, monthly, and total since system installation files are being generated properly.
8. Confirm that UPS shuts down computer upon extended power outages.
9. Confirm that data acquisition system starts automatically and re-established network connections upon restoration of power.

3.10 FIELD TESTING

A. Engage electrically qualified agent to inspect, field test, and document performance of components and equipment after installation. Prepare written test results in report. Report shall include documentation of all potential shading obstructions on solar panels.

B. All test instruments shall be identified in Report and listed by manufacturer, model number, serial number, date of calibration, and calibration authority. All test instruments shall have been calibrated within past year. Test instruments shall have attached calibration sticker that is traceable to NIST.

C. Obtain copy of local utility company's agreement to connect PV system to building power distribution system prior to all testing.

D. Contractor shall provide written procedures document. Procedure entries shall include: Date; time; person taking data; recorded value of data; indication if recorded value is out of range of system and/or equipment tolerance. Each page of the procedures shall have: test name; equipment tested; location; date; time; person performing test; model number of equipment; serial number of equipment; manufacturer; tolerance ranges of equipment tested for reference. Approach to numbering solar panels in PV array for testing shall be identified.

E. Witness startup of PV system. Commissioner shall witness startup.

F. Keep Log and include it as appendix to Report. Log shall include: issue description; log tracking number; date; time; person investing issue; action taken; person taking action; date of closure of issue. Include copy of Commissioning Issues Log in written procedures to Contractor.

G. Perform the following field tests and inspections as follows for test report:
   1. Test insulation resistance and continuity for each DC circuits, AC feeders, grounding including ground fault protection, and control circuits. Disconnect all sensitive electronic equipment prior to testing. Visually and mechanically inspect all cabling, connections, and conduits. Verify color coding of conductors per NFPA 70. Verify proper torque of termination connections with calibrated torque wrench.
   2. Test ground fault protection of PV system.

3. Test output of each solar panel. Identify which panels are shaded at any point of day between 9 AM and 4 PM.
4. Verify proper voltage and current to each input to combiner boxes, inverters, AC collector boxes, and isolation transformer.
5. Measure voltage drop on all DC circuits and AC feeders. Verify that voltage drop between solar panels and inverters does not exceed 3 percent on each DC circuit. Verify that voltage drop between inverters and connection to building power distribution system does not exceed 1 percent on each AC feeder.
6. Verify operation of all disconnect switches and proper sizing of all overcurrent protection devices in accordance with Division 26 Sections on enclosed switches and circuit breakers and on panelboards.
7. Verify that displays accurately represent output of PV system. Independently measure energy produced by PV system, and compare data to log data of DAS. Track data and compare data to log data for minimum of one month.
8. Verify solar panel output under Normal Operating Cell Temperature (NOCT). Silicon solar panels shall exhibit power output of not less than 80 percent of the rated power specified at time of delivery. Thin film solar panels shall exhibit power output of not less than 90 percent of rated power specified at time of delivery. NOCT shall be 46 to 49 deg C, air mass shall be 1.5, and wind speed shall be between 1 and 10 m/s during testing. DC voltage and current readings shall be recorded every 6 minutes over continuous 6 hour period when irradiance is 5 W/m^2 or greater. Record data for 30 days.

H. Contractor shall remove and replace malfunctioning equipment. Retest PV system as specified above.

3.11 INSTRUCTION

A. Provide 6 hours on-site instruction session for PV system components and Data Acquisition System (DAS). Provide Instructor with at least 3 years experience in installation and operation of PV systems used in project. Session shall review system, including review of wiring diagrams, equipment list.

END OF SECTION 263100

SECTION 26 41 13 - LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section includes lightning protection system for ordinary structures.

B. Section includes lightning protection system for the following:

1. Ordinary structures.
2. Rooftop modular equipment enclosures
3. Photovoltaic Panels and System Components

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. LPI: Lightning Protection Institute.

C. NRTL: National recognized testing laboratory.

1.4 SUBMITTALS

A. Refer to DDC General Conditions Section 01 33 00 “Submittal Procedures” for all submittals.

B. Product Data: For each type of product

C. Shop Drawings:

1. Include layouts of the lightning protection system, with details of the components to be used in the installation.
2. Include raceway locations needed for the installation of conductors.
3. Details of air terminals, ground rods, ground rings, conductor supports, splices, and terminations, including concealment requirements.
4. Include roof attachment details, coordinated with roof installation.
5. Calculations required by NFPA 780 for bonding of metal bodies.

D. Coordination Drawings: Lightning protection system Shop Drawings, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Lightning protection cabling attachments to roofing systems and accessories.
2. Lightning protection strike termination device attachment to roofing systems, coordinated with the roofing system manufacturer.
3. Lightning protection system components penetrating roofing and moisture protection systems and system components, coordinated with the roofing system manufacturer.

E. Product Certificates: For each type of roof adhesive for attaching the roof-mounted air terminal assemblies, approved by the roofing-material manufacturer.

F. Written statement, signed by Contractor, that roof adhesive for air terminals is approved by manufacturers of both the terminal assembly and the single-ply membrane roofing material.

G. Field inspection reports indicating compliance with specified requirements.

H. Maintenance Data: For lightning protection system to include in maintenance manuals.

1. In addition to items specified in DDC General Conditions, include the following:

a. Dimensioned site plan showing dimensioned route of the ground loop conductor and the ground rod locations. Comply with requirements of Section 017839 "Project Record Documents."
b. A system testing and inspection record, listing the results of inspections and ground resistance tests, as recommended by NFPA 780, Annex D.

I. Completion Certificate:

1. UL Master Label Certificate.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions Section 01 40 00 “Quality Requirements”.

1.6 COORDINATION

A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and Installer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Heary Bros. Lightning Protection Co. Inc.
2. Independent Protection Co.
3. Thompson Lightning Protection, Inc.
4. Or approved equal.

2.2 LIGHTNING PROTECTION SYSTEM COMPONENTS

A. Comply with UL 96.

B. Terminals: Nickel plated, solid copper.

1. Generally 18 inch high, 1/2 diameter.
2. On Flat Portion of Roof: 48 inch high, 3/4 inch diameter.
3. Single-Membrane, Roof-Mounting Air Terminals: Designed for single-membrane roof materials.

C. Stack-Mounting Air Terminals: Stainless steel or Solid copper.

D. Ground Rods, Ground Loop Conductors, and Concrete-Encased Electrodes: Comply with Division 26 05 26 "Grounding and Bonding for Electrical Systems" and with standards referenced in this Section.

E. Air Terminal Fasteners: Two bolts type for parapet mounting, stamped plate, adhesive mounting type for flat roof areas.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Install lightning protection components and systems according to UL 96A and NFPA 780 for Class II buildings.

B. Air Terminals: Install air terminals spaced 20 feet apart maximum around outside perimeter of roof and 2500 square feet apart maximum through center of flat portion of roof. Support all

terminals over 24 inches with suitable brace located at a point not less than 1/2 height of terminal.

1. Coordinate the installation of air terminal on roof to provide protection to the photovoltaic array, do not install terminals on PV panels, PV support structure or PV equipment.
2. Coordinate the installation of air terminal on roof to provide protection to the mechanical equipment.

C. Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends and narrow loops.

D. Conceal the following conductors:

1. System conductors.
2. Down conductors.
3. Interior conductors.
4. Conductors within normal view from exterior locations at grade within 200 feet of building.
5. Notify Commissioner at least 48 hours in advance of inspection before concealing lightning protection components.

E. Cable Connections: Use approved exothermic-welded connections for all conductor splices and connections between conductors and other components, except those above single-ply membrane roofing.

F. Air Terminals on Single-Ply Membrane Roofing: Comply with adhesive manufacturer's written instructions.

G. Roof Penetration: Provide with pitch pocket.

H. Bond metals of conductance subject to direct lightning stroke to system using same size cable as roof conductors.

I. Bond extremities of vertical metal bodies exceeding 60 feet in length to lightning protection components.

J. A counterpoise installation based on requirements in Division 26 05 26 Section "Grounding and Bonding for Electrical Systems" may be used as a ground loop required by NFPA 780, provided counterpoise conductor meets or exceeds minimum requirements in NFPA 780.

1. Bond ground terminals to counterpoise conductor.
2. Bond grounded metal bodies on building within 12 feet of ground to counterpoise conductor.
3. Bond grounded metal bodies on building within 12 feet of roof to counterpoise conductor.

K. Provide common grounding bond between lightning protection system and electric and telephone service ground and other underground metallic piping systems that enter the building.

L. Bond lightning protection components with intermediate-level interconnection loop conductors to grounded metal bodies of building at 60-foot intervals.

3.3 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

3.4 FIELD QUALITY CONTROL

A. UL Inspection: Provide inspections as required to obtain a UL Master Label for system.

END OF SECTION 26 41 13

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SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   1. The Contract Drawings
   2. The Specifications
   3. The general conditions,
   4. The Addendum
   5. The Contract [City of New York Standard Construction Contract].

B. Section 262726 "Wiring Devices" for manual wall-box dimmers.

1.2 SUMMARY

A. Section Includes:

   1. Interior lighting fixtures, lamps, and ballasts.
   2. Emergency lighting units.
   3. Exit signs.
   4. Lighting fixture supports.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, and finishes.

C. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.

D. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

   a. Air outlets and inlets.
   b. Smoke and fire detectors.
   c. Occupancy sensors.

d. Access panels.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace lighting that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion for luminaire.

2. Warranty Period: 1 years from date of Substantial Completion for lamp.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

2.2 LED LIGHTING

A. General Requirements for LED lighting: Comply with UL recognize components and RoHS compliant. Indoor luminaires shall be CULus listed for 25°C ambient environments. All LED luminaires furnished complete with LEDs and power supplies shall be UL listed.

B. All LED systems (light modules, power supplies, connectors, control interfaces, etc) shall be UL listed

C. All LED Luminaire manufacturers shall provide electrical and photometric data performed in accordance with IESNA LM-79 Approved Method: Electrical Photometric Measurements of Solid-State Lighting Products.

D. Published LED life ratings shall be based on the point at which LED sources reach L70 lumen maintenance and tested in accordance with IESNA LM-80 Approved method: Testing Lumen Maintenance of LED Light Sources.

E. All LED light sources shall have a CRI of 80 or greater with R9 greater than 0.

F. LED power supplies shall operate LEDs within the current limit specifications of the manufacturer

G. LED power supply shall have a Class A sound rating.

2.3 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with regulations of The City of New York and New York City Department of Buildings.

B. Internally Lighted Signs:

1. Lamps for AC Operation: Fluorescent, two for each fixture, 20,000 hours of rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

    a. Battery: Sealed, maintenance-free, nickel-cadmium type.
    b. Charger: Fully automatic, solid-state type with sealed transfer relay.
    c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.4 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
7. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Section 260529 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Rod Hangers: 3/8-inch minimum diameter, cadmium-plated, threaded steel rod.

2.6 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide product by one of the following or approved equal:
1. Lithonia
2. Cooper
3. GE
4. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Comply with NFPA 70 for minimum fixture supports.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

D. Adjust aimable lighting fixtures to provide required light intensities.

E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 26 51 00

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SECTION 28 31 11 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the project:
   1. The Contract Drawings
   2. The Specifications
   3. The general conditions,
   4. The Addendum
   5. The Contract [City of New York Standard Construction Contract].

1.2 SUMMARY

A. Section Includes:

   1. Fire Alarm Control panel.
   2. Manual Fire-Alarm Boxes.
   3. System smoke detectors.
   4. Heat Detectors.
   5. Duct smoke detectors.
   6. Notification Devices
   7. Addressable interface device.
   8. Digital Alarm Communicator Transmitter.

1.3 DEFINITIONS

A. Refer to DDC General Conditions

B. LED: Light-emitting diode

C. NFPA 70: National Electrical Code, 2011 Edition, as modified by the 2016 New York City Electrical Code

D. NFPA 72: National Fire Alarm and Signaling Code, 2010 Edition, as modified by Appendix Q of the City of New York Building Code.

E. NICET: National Institute for Certification in Engineering Technologies.

F. NRTL: Nationally recognized testing laboratory.

G. UL: Underwriters Laboratories.

1.4 SYSTEM DESCRIPTION

A. Non-coded, UL Listed addressable manual and automatic fire alarm system with automatic sensitivity control of smoke detectors; multiplexed signal transmission, dedicated to fire-alarm service only.

1.5 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.6 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. General Submittal Requirements:

1. Submittals shall be approved by Commissioner.
2. Shop Drawings shall be prepared by persons with the following qualifications:
   a. NICET-certified fire-alarm technician.
   b. Licensed or certified by city or New York.

C. Product Data: For each type of product indicated.

D. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 (National Fire Alarm and Signaling Code).
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

7. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

E. Engineering Services: For smoke and heat detectors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in the State of New York responsible for their preparation.

1. Drawings showing the location of each smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the detector.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72.

F. Qualification Data: For qualified Installer.

G. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

H. Field quality-control reports.

I. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified, include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Record copy of site-specific software.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:

    a. Frequency of testing of installed components.
    b. Frequency of inspection of installed components.
    c. Requirements and recommendations related to results of maintenance.
    d. Manufacturer's user training manuals.

5. Manufacturer's required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at fire command center.

J. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.7 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm technician.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning with Substantial Completion, provide software support for 1.5 years.

C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within one year from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days' notice to Commissioner to allow scheduling and access to system and to allow Commissioner to upgrade computer equipment if necessary.

PART 2 - PRODUCTS

2.1 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices:

1. Duct smoke detectors.
2. Manual Stations.
3. Heat Detectors.
4. Verified automatic alarm operation of smoke detectors.

B. Fire-alarm signal shall initiate the following actions:

1. Annunciate, Display and Print out alarm at Fire Alarm Control Panel (FACP).
2. Activate the "FIRE" sign at the FACP.
3. Sound alarm over horns and activate strobes throughout the occupancy.
4. Indicate what kind of device has been activated and its precise location and name at the FACP.
5. Transmit an alarm signal to the remote alarm receiving station.
6. Shutdown Air Handling Units with capacities over 2,000 cfm and associated smoke dampers.
7. Transmit signal to BMS system.
8. Record events in the system memory.

C. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at FACP.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at FACP.

D. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at FACP.

2.2 FIRE ALARM CONTROL PANEL

A. General Requirements for Fire Alarm Control Panel:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.

    a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
    b. Include a real-time clock for time annotation of events on the event recorder and printer.

2. Addressable initiation devices that communicate device identity and status.

    a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at FACP.
    b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, 3 lines of 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Circuits:

1. Initiating Device, Notification Appliance, and Signaling Line Circuits:

a. Initiating Device Circuits: NFPA 72 Class B.
b. Notification Appliance Circuits: Class B.
c. Signaling Line Circuits: Class B.
d. Install addressable devices on each signaling line circuit such that it does not exceed 80 percent of the capacity of a signaling line circuit.

2. Strip Printer at FACP.

D. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm-verification" signal at FACP.
2. Activate an NRTL-listed and -approved "alarm-verification" sequence at FACP and detector.
3. Sound general alarm if the alarm is verified.
4. Cancel FACP indication and system reset if the alarm is not verified.

E. Notification Appliance Circuit: Operation shall sound in a:

1. Temporal 3 pattern.

F. Remote Smoke/Heat Detector Sensitivity Adjustment: Controls shall select specific addressable smoke/heat detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

a. Rate-of-rise temperature characteristic shall be selectable at FACP for 15 or 20 deg F per minute.
b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at FACP to operate at 135 or 155 deg F.
c. Provide multiple levels of detection sensitivity for each sensor.

G. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

H. Alarm Signaling Service: Central emergency alarm system with redundant preamplifiers, amplifiers, and tone generators provided as a special module that is part of the FACP:

1. Indicated number of alarm channels for automatic, simultaneous transmission of different alarms to different zones. Amplifiers shall comply with UL 1711 and be listed by an NRTL.

    a. Allow the application of and evacuation signal to indicated number of zones.
    b. Programmable tone sequence selection.

2. Status Annunciator: Indicate the status of various audible zones.
3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

I. Provide operators capability at the FACP through switches to:

1. Shutdown individual HVAC units.
2. Damper Control Switches and Status Indication for all Smoke and Combination Fire-Smoke Dampers.

J. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

K. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices and notification appliances shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

L. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: lead calcium or nickel cadmium.
2. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.3 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
   1. Double-action mechanism requiring two actions to initiate an alarm, breaking-glass pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
   2. Station Reset: Key operated test-reset lock, and manual station shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
   3. Indoor Protective Shield: Where indicated on the drawings provide factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
   4. Weatherproof Protective Shield: Where indicated on the drawings provide factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.4 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

   1. Comply with UL 268; operating at 24-V dc, nominal.
   2. Detectors shall be two-wire type.
   3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACP.
   4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
   5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
   6. Integral Visual-Indicating Light: LED type indicating detector showing it is operational and in alarm changes color.
   7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at FACP for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by FACP.

B. Photoelectric Smoke Detectors:

   1. Detector address shall be accessible from FACP and shall be able to identify the detector's location within the system and its sensitivity setting.
   2. An operator at FACP, having the designated access level, shall be able to manually access the following for each detector:

a. Primary status.
b. Device type.
c. Present average value.
d. Present sensitivity selected.
e. Sensor range (normal, dirty, etc.).

C. Ionization Smoke Detector:

1. Detector address shall be accessible from FACP and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at FACP, having the designated access level, shall be able to manually access the following for each detector:

a. Primary status.
b. Device type.
c. Present average value.
d. Present sensitivity selected.
e. Sensor range (normal, dirty, etc.)

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from FACP and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at FACP, having the designated access level, shall be able to manually access the following for each detector:

a. Primary status.
b. Device type.
c. Present average value.
d. Present sensitivity selected.
e. Sensor range (normal, dirty, etc.).

3. Number of settable levels in fire-alarm control unit varies among manufacturers and between detector types. Indicate specific number of levels on Drawings or in "Remarks" column of a detector schedule.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions were applied.
6. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.5 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire command center.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F or 135 deg F depending on application

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.6 ADDRESABLE MONITOR MODULE

A. The addressable monitor module shall be provided for monitoring and interfacing normally open, latching alarm contacts or normally closed latching trouble contacts, to the addressable system, via a separate supervised class B circuit.

B. The interface element shall be identified by the control panel and contain an addressable element which is monitored by a serial polling operation.

C. The addressable monitor module shall be equipped with screw-type terminals.

D. The addressable monitor module shall include an integral visual alarm L.E.D. to indicate operation.

E. The addressable monitor module shall be capable of occupying the same initiating circuit along with other addressable devices.

F. The addressable monitor module shall be suitable for surface or flush mounting.

2.7 ADDRESSABLE CONTROL MODULE.

A. The addressable control module shall be provided with control capabilities utilizing form C dry contacts.

B. Minimum: Single pole contact, double throw output (SPDT) or as required to perform specific function.

C. The addressable control module shall be identified by the control panel and monitored by a serial polling operation.

D. The addressable control module shall be capable of occupying the same initiating circuit along with other addressable devices.

E. The addressable control module shall include an integral visual alarm L.E.D. to indicate relay activation, along with the capability of providing confirmation of actuation at the FACP.

F. Module to be supervised.

G. Relay contacts: Minimum 300 mA at 120 VAC, Form C.

H. If circuit load exceeds module rating, provide auxiliary relays as required.

2.8 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

B. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output:
   a. As indicated on the design drawings.
   b. 15/30/75/110 cd, selectable in the field.
2. Mounting: Ceiling or wall mounted as indicated on the design drawings.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, color to be coordinated with the Commissioner.

C. Tone Notification Appliances:

1. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.
2. High-Range Units: Rated 2 to 15 W.
3. Low-Range Units: Rated 1 to 2 W.
4. Mounting: Flush.
5. Matching Transformers: Tap range matched to acoustical environment of speaker location.

2.9 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire command center and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.
2. Programming device.
3. LED display.
4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or FACP.

D. Digital data transmission shall include the following:
1. Address of the alarm-initiating device.
2. Automatic Alarm (Smoke, Duct, Heat).
3. Water Flow Alarm.
4. System supervisory signal.
5. System trouble signal.
6. Loss of AC supply or loss of power.
7. Low battery.
8. Abnormal test signal.
9. Communication bus failure.

E. Back-up Power: Rechargeable battery and automatic charger.

2.10 DEVICE GUARDS

A. Description: Plastic STI covers of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by manufacturer of device.
2. Finish: Paint of color to match the protected device.

2.11 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. Case-Acme; a division of Firecom, Inc.
2. Edwards System Technology; a United Technologies Corp. company.
3. Notifier; a Honeywell company.
4. Siemens Building Technologies, Inc.; Fire Safety Division.
5. Or approved equal.

PART 3 - EXECUTION

3.1 EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire command center on concrete base with tops of cabinets not more than 72 inches above the finished floor.
1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Smoke - or - Heat Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
3. Smooth ceiling spacing shall not exceed 30 feet.
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.

6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.

E. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

F. Audible Alarm-Indicating Devices: Provide 'A' and 'B' for each audible appliance on each floor. Provide adequate dBA setting to meet 15 dba above average ambient levels or 5 dBA above the maximum sound level having a duration of at least 60 seconds, whichever is greater. Wall-mounted appliances shall be installed such that their tops are above the finished floors at heights of not less than 90 inches and below the finished ceilings at distances of not less than 6 inches. Ceiling-mounted appliances shall not exceed 20 feet above the finished floor.

G. Visible Alarm-Indicating Devices: Provide 'A' and 'B' for each visible appliance on each floor. All strobes serving common areas shall be synchronized. Wall-mounted appliances shall be mounted such that the entire lens is not less than 80 inches and not greater than 96 inches above the finished floor.

H. Audible/Visible Alarm-Indicating Devices: Provide 'A' and 'B' for each audible/visible appliances on each floor. All strobes serving common areas shall be synchronized. Wall-mounted appliances shall be mounted such that the entire lens is not less than 80 inches and not greater than 96 inches above the finished floor. Ceiling-mounted appliances shall not exceed 20 feet above the finished floor.

I. Device Location-Indicating Lights: Locate in public space near the device they monitor.

J. FACP: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.

3.3 CONNECTIONS

A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Smoke dampers in air ducts of designated air-conditioning duct systems.
2. Alarm-initiating connection to elevator recall system and components.
3. Supervisory connections at valve supervisory switches.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with New York City Electrical Code. Install a ground wire from main service ground to fire-alarm control unit.

3.6 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Contractor; Commissioner and the FDNY - Fire Department Inspector.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

   a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
   b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
5. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

6. Contractor shall file all required fire department forms (A-433; B-45 and As-Built Riser Diagram) for FDNY Inspections.
7. Contractor shall provide adequate man-power for all FDNY inspections.

D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 INSTRUCTION

A. The Contractor shall provide instruction session to the City of New York's operating maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 REGULATORY REQUIREMENTS

A. Open Fires: Comply with the rules and regulations of the Department of Environmental Conservation Title 6, Chapter III Air Resources, Part 215. A permit is required before any burning is allowed.

B. Herbicides: Comply with the rules and regulations of the Department of Environmental Conservation Title 6, Chapter 4 Quality Services, Parts 320 through 329.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Herbicides: A chemical or a combination of chemicals which, according to the manufacturer's label, will kill stumps and roots. Deliver herbicides to the site in original manufacturers containers indicating type and percentage of chemical, and application instructions.

PART 3 - EXECUTION

A. Refer to DDC General Conditions.

3.1. PREPARATION

A. Protection

1. Prevent damage to buildings, pavement, pipes, conduits, poles and other structures above and below ground that are adjoining or included in the contract area. Restore damage that may have occurred during construction.

3.2. REMOVALS

A. Remove all living or dead tree and shrub growth where indicated or specified.

3.3. CLEAN UP

A. Dispose of all unusable materials from the site within 4 days after cutting by burning or by other methods approved by the Department of Environmental Conservation.

B. Remove and dispose of all debris from property. Leave Work area in a neat uncluttered condition.

END OF SECTION 31 10 00

SECTION 31 23 16 - EXCAVATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SECTION INCLUDES

A. Excavation for gas and utility trenches.

1.3 RELATED SECTIONS

A. Section 312323 - Backfilling

B. Section 312333 – Trenching, Backfilling and Compaction

1.4 QUALITY ASSURANCE

A. Do not excavate wet or frozen materials without written approval from the City of New York.

B. Provide safety barricades around open excavations.

1.5 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the work are as indicated.

PART 2 PRODUCTS

Not Used.

PART 3 - EXECUTION

A. Refer to DDC General Conditions.

3.1. PREPARATION

A. Identify required lines, levels, contours and datum.

B. Identify known underground, above ground and aerial utilities. Stake and flag locations.

C. Notify utility company to remove or relocate utilities, if required.

D. Protect above and below grade utilities which are to remain.

E. Protect benchmarks, existing structures, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic.

F. Notify the City of New York prior to commencement of excavation.

3.2. EXCAVATION

A. Underpin adjacent structures that may be damaged by excavation work, including utilities and pipe chases.

B. Excavate subsoil required to accommodate building foundations, slabs-on-grade, paving, drainage or sanitary structures, sidewalks, landscaping and construction operations to the limits as indicated on the plans.

C. Machine slope banks to angle of repose or less.

D. Excavation cut not to interfere with normal 45 degree bearing splay of foundations.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Hand trim excavation. Remove loose matter.

G. Remove lumped subsoil, boulders, and rock.

H. Notify City of New York of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

I. Correct unauthorized excavation at no extra cost to the City of New York in accordance with Section 312316.

J. Stockpile excavated material in area designated on site and remove excess material not being reused from site.

3.3. FIELD QUALITY CONTROL

A. Perform field inspection and testing as required under the general requirements of the Contract. The City of New York is responsible for engaging a Testing Agency for all special inspection items.

B. Provide for visual inspection of bearing surfaces.

3.4. PROTECTION

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION 31 23 16

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SECTION 31 23 23 - BACKFILLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2. SECTION INCLUDES

A. Pavement construction backfilling to sub-grade elevations.

B. Consolidation and compaction.

C. Fill for over-excavation.

1.3. RELATED SECTIONS

A. Section 31 23 33 – Trenching, Backfilling and Compaction

1.4. REFERENCES

A. Refer to DDC General Conditions.

B. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10 lb. Rammer and 18-inch Drop.

1.5. SUBMITTALS

A. Refer to DDC General Conditions.

B. Test Reports: Submit sieve analysis for each type fill to be used.

PART 2 - PRODUCTS

2.1. FILL MATERIALS

A. Type A - Coarse Stone: Angular, washed natural stone; free of shale, clay, friable material, sand, debris; graded in accordance with ANSI/ASTM C136 within the following limits:

Sieve Size	Percent Passing
2-inch	100%
1-inch	95%
3/4-inch	75 - 90%
5/8-inch	35 - 60%
3/8-inch	15 - 35%
No. 4	< 5%

B. Type B - Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; graded in accordance with ANSI/ASTM C136, to the following:
1. Minimum Size: 1/4-inch.
2. Maximum Size: 5/8-inch.

C. Type C - Sand: Natural river or bank sand; washed, free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136, within the following limits:

Sieve Size	Percent Passing
No. 4	100%
No. 14	10 – 100%
No. 50	5 – 90%
No. 100	4 – 30%
No. 200	0 – 1%

D. Type D - Subsoil: Reused, excavated material, graded, free of lumps, rocks and gravel larger than 3 inches in size, debris and contaminants.

E. Type E – Porous material sizes 1 and 2 to be used around drainage structures only.

PART 3 – EXECUTION

A. Refer to DDC General Conditions.

3.1. EXAMINATION

A. Verify existing conditions and substrate.

B. Verify fill materials to be reused are acceptable.

C. Verify items to be buried during backfilling process have been inspected prior to backfilling.

3.2. PREPARATION

A. Compact sub-grade to 95 percent maximum dry density in accordance with ANSI/ASTM D1557.

B. Cut out soft areas of sub-grade not capable of in situ compaction. Backfill with Type C fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.3. BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy materials.

C. Place and compact materials in continuous layers not exceeding six (6) inches compacted density.

D. All backfilled materials shall be compacted to 95 percent maximum dry density in accordance with ANSI/ASTM D1557. Maintain optimum moisture content to attain required density.

E. Employ a placement method that does not disturb or damage structures or other items against which material is backfilled.

F. Backfill against supported structures. Do not backfill against unsupported structures.

G. Backfill simultaneously on each side of structure.

H. Make grade changes gradual. Blend slope into level areas.

I. Remove surplus backfill materials from site.

J. Leave fill material stockpile areas completely free of excess fill materials

3.4. TOLERANCES

A. Maximum Variation From Top Surface of Backfilling Under Paved Areas: 1/4 inch.

B. Maximum Variation From Top Surface of General Backfilling: One (1) inch.

3.5. FIELD QUALITY CONTROL

A. Perform field tests and analysis of fill material in accordance with ANSI/ASTM D1557.

B. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to The City of New York.

C. Unless additional testing is required by the Commissioner, compaction tests shall be taken at the following rates:

1. Concrete Structures: One test per five (5) vertical feet of structure.
2. Pavement Subgrade: One test per 500 square feet of subgrade immediately prior to placing subbase.
3. Concrete Flatwork and Pavers: One test per 400 square feet of flatwork.
4. Curbing: One test per 100 linear feet.

END OF SECTION 31

SECTION 31 23 33 - TRENCHING, BACKFILL AND COMPACTION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes

1. Native Backfill Material
2. Crushed Stone Bedding
3. Select Backfill Material
4. Shoring and Bracing
5. Excavation
6. Backfill and Compaction

B. Related Sections:

1. Section 31 25 00 Erosion Sedimentation Control
2. Section 32 11 23 Aggregate Base Course

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. American Society for Testing and Materials (ASTM)

1.	ASTM D1557	Testing Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 kg) Rammer and 18- In. (457 mm) Drop
2.	ASTM D2922	Testing for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
3.	ASTM D448	Standard Classification for Sizes of Aggregate for Road & Bridge Construction

1.4 SUBMITTALS

A. Refer to DDC General Conditions.

B. Submit two (2) copies of the quality control testing including location where testing was done. Testing results shall include:

1. Materials source testing
2. Background testing
3. Installation testing
4. Additional density testing, if required.

1.5 QUALITY ASSURANCE

A. Contractor shall obtain an independent testing laboratory, approved by the City of New York, to provide quality control.

B. Background Testing:

1. Perform five (5) moisture density test for each native sil to determine the density of the undisturbed soils.
2. Moisture/density testing shall be in accordance with ASTM 1557 (Modified Proctor).

C. Installation Testing

1. Moisture/Density testing shall be according to ASTM D2922 (Nuclear Method)
2. Perform at least one (1) moisture/density test for each 100 linear feet of trench at a depth and location directed by the Commissioner.

D. Additional density and gradation testing shall be required when aggregate density does not meet project requirements, there is a change in compaction method, there is a change in the source or quality of aggregate, or as directed by the Commissioner.

PART 2 – PRODUCTS

2.1. NATIVE BACKFILL

A. Unless shown otherwise on drawings or ordered in writing by the Commissioner, material excavated from the trench shall be used for backfilling.

B. Excavated material shall be used as backfill provided that such material consists of loam, clay or other materials that are, in the judgment of the Commissioner, suitable for backfilling. Backfill material shall be free from frozen materials, organic matter, large stones or boulders, concrete, refuse and litter.

2.2. SELECT BACKFILL MATERIAL

A. Select backfill material shall be used as shown on drawings or ordered in writing by the Commissioner.

B. Select backfill material shall conform to the following gradation:

1. ¾-inch (19.0 mm) Crushed Rock – ASTM D448-No. 67

SIEVE SIZE	% PASSING BY WEIGHT
1-inch	100
3/4-inch	90-100
3/8-inch	20-55
No. 4	0-10
No. 8	0-5

C. Structural Fill shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter. Structural Fill shall conform to the following gradation requirements:

1. Sieve Size — Percent Passing by Weight

*	100
No. 4	30 - 95
No. 40	10 - 70
No. 200	0 - 15

* Two thirds (2/3) of the loose lift thickness.

PART 3 – EXECUTION

A. Refer to DDC General Conditions.

3.1. SHORING AND BRACING

A. Provide shoring and bracing materials, such as sheet piling, up rights, stringers and cross braces, in good serviceable condition. Shoring shall be provided as required for safety.

B. Maintain shoring and bracing in trenches and excavations regardless of duration that the excavation will be open. Carry down shoring and bracing as excavation progresses and arrange bracing such that it does not place stress on completed work.

C. Exercise care during removal of shoring and bracing materials to prevent collapse or caving of excavation.

D. Damages to pipes or structures as a result lack of adequate shoring and bracing on the part of the Contractor, shall be restored at the Contractor's expense.

3.2. EXCAVATION

A. Removal of Obstructions

1. Remove obstructions mounds of dirt, stone, debris and refuse from within the construction limits
2. Remove and replace, in original condition, the following: signs, culverts, apron endwalls, riprap aprons, and guard posts.
3. Remove concrete and asphalt pavements, curb and gutter, and sidewalk to the maximum trench width at the ground surface or as shown on the drawings.
4. Sawcut pavement, curb and gutter, sidewalk and other surfaces vertically to a minimum depth of 3-inches prior to removal. Remove concrete surfaces to the nearest joint.

B. Trenching

1. Excavate trench to sufficient width and depth to allow for proper utility construction at the line and grades shown on drawings. Maximum trench width 2-feet above the top of the pipe shall be the outside diameter of the pipe plus 24- inches. Keep trench walls vertical when possible. The the Commissioner may prohibit benching or sloping of the trench walls if the excavation is within permanent pavement, if the excavation would not be contained within the limits of construction or if the excavation would endanger underground utilities or structures.
2. No more than 200-feet of trench shall be open at any given time.
3. Disposed of excess material.

3.3. DEWATERING

A. Contractor shall provide and maintain means and methods necessary to dewater excavations as needed. Dewater to a minimum of 3-feet below excavations.

B. Dispose of water in such a way as to prevent runoff and dewatering system discharge from entering the excavation. Convey groundwater to the point of discharge though piping. The use of open ditching or trenching, nor the use of the City of New York's utilities, shall be permitted. Sediment content of discharge shall not exceed 10 milligrams per liter.

C. Maintain dewatering system until backfilling and compaction is complete.

D. Obtain all necessary permits from NYCDEP dewatering.

E. Maintain a water supply to any private and public wells affected by the dewatering operation. Any damage caused to private wells as a result of dewatering shall be corrected.

3.4. BEDDING

A. Bedding material for sewers 18-inches in diameter and smaller shall conform to:

SIEVE SIZE	% PASSING BY WEIGHT
1-inch	100
3/4-inch	95-100
3/8-inch	30-55
No. 4	0-10
No. 8	0-5

B. Bedding material for sewers 18-inches in diameter and larger shall conform to:

1. ¾-inch (19.0 mm) Crushed Rock – ASTM D448-No. 67

SIEVE SIZE	% PASSING BY WEIGHT
1-inch	100
3/4-inch	90-100
3/8-inch	20-55
No. 4	0-10
No. 8	0-5

a. Bedding material for water mains and force mains shall consist of hard, durable particles ranging in size from fine to course in a substantially uniform combination. Material shall be free from organic matter, refuse, litter and balls or lumps of clay and shall conform to the gradation requirements detailed below:

SIEVE SIZE	% PASSING BY WEIGHT
1-inch	100
No. 16	45-80
No. 8	2-10

b. Spread bedding material over the bottom of the trench and solidly compacted such that after the pipe has been placed, imbedded to grade and aligned, there is a minimum of 4- inches of bedding material beneath the pipe barrel and a minimum of 3-inches of bedding material beneath the bell of the pipe. Fill excess depth resulting from excavation deeper than 6-inches beneath the pipe barrel with crushed stone.

c. Class "C" Bedding

1. Place bedding material up to the spring line of the pipe making sure that the lower quadrants of the pipe are firmly bedding and supported.

d. Class "B" Bedding

1. Place and compact bedding material to a level 12-inches above the top of pipe.

e. Provide an additional 3-inches of bedding material beneath the required 4-inches of bedding material where wet trench conditions exist.

3.5. BACKFILL AND COMPACTION

A. Backfill trench with excavated material in layers not more than 12-inches thick unless select backfill material is shown on drawings or ordered in writing by the Commissioner.

B. Backfill trench to last pipe joint, not to exceed 10-feet, at the end of each work day.

C. Compaction Requirements

1. The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM D1557, Method C. The compaction requirements are as follows:

a. Area		Minimum Degree of Compaction
1)	Below footings	95%
2)	Below slabs	95%
3)	Detention basin berms	95%
4)	Pavement base course	95%
5)	Pavement subbase	95%
6)	General fill below pavement subbase	90%
7)	Trench backfill	92%
8)	Lawn areas	85%

D. Warranty

1. Settlement or damage as a result of settlement that occurs during the specified warranty period shall be restored at the Contractor's expense. The Commissioner shall determine failed areas and the extent of restore shall be agreed upon prior to the restore being made.
2. Restore of settled areas shall require removal of existing material and recompaction or flushing of the trench, as agreed upon with the Commissioner
3. Contractor shall provide a standard one (1) year warranty for failed areas.

END OF SECTION 31 23 33

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SECTION 31 25 00 -EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 DESCRIPTION

A. This Section specifies requirements for temporary and permanent erosion control provisions as they relate to the construction process.

B. The work includes:

1. Providing and maintaining all temporary erosion control measures shown on the Drawings and required by the City of New York/Commissioner during the life of the Contract to control soil erosion and water pollution.
2. The installation and maintenance of additional silt fence, berms, ditches, sedimentation basins, construction exits, fiber mats, catchbasin filters, straw, netting, gravel, trenches, mulches, grasses, slope drains and other approved erosion control devices or methods, needed to protect any areas on or off site in accordance with the Stormwater Pollution Prevention Plan to be developed by the Contractor which is required by the New York City Department of Environmental Conservation.

1.3 RELATED SECTIONS

A. Sections which directly relate to the work of this Section include:

1. Section 31 10 00 – Site Clearing
2. Section 31 23 16 – Excavation
3. Section 31 23 33 – Trenching, Backfill and Compaction

1.4 DEFINITION AND COORDINATION OF EROSION CONTROL PROVISIONS

A. Permanent erosion control measures are defined as those elements that are to be incorporated into the final project product, including but not necessarily limited to such items as; finish paving and landscape, detention basin forebays, sedimentation control structures (Vortechnics, Stormceptor, catch basins, etc.), swales and ditches, berms, and other such items.

B. Temporary erosion control measures are defined as those elements that are required by permit approvals and necessary to be installed by the Contractor to meet The New York City Department of Environmental Conservation for the construction program, such items as; silt fences, berms, portable sedimentation basins, straw bales, check dams, and other such items, all of which shall be removed by the Contractor after installation of permanent erosion control measures, stabilization of the site, and prior to final completion of the project.

C. The temporary control provisions shall be coordinated with the permanent erosion control features to the extent practical to ensure economical, effective and continuous erosion control throughout the construction and post-construction period.

1.5 PRIOR TO CONSTRUCTION

A. Prior to the start of the construction, the Contractor shall submit to the City of New York/Commissioner: schedules for the construction of required stormwater detention basins, temporary and permanent erosion and sediment control work, clearing and grubbing, grading, structures at watercourses, construction, and paving. No work shall be started until control schedules and methods of operations have been submitted to the City of New York/Commissioner.

1.6 CONSTRUCTION OPERATIONS

A. When in the opinion of the City of New York/Commissioner it becomes necessary, the City of New York/Commissioner will inform the Contractor of construction procedures and operations that jeopardize erosion and sedimentation control provisions.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Erosion Control Blanket/Fabric Netting—

1. Curlex blankets, as manufactured by American Excelsior Company, Polyjute Style 465 GT, as manufactured by Synthetic Industries, Erosion Control Blankets 5758N, SC1250BN, C125BN as manufactured by North American Green or approved equal.

B. Straw bale sediment traps consisting of straw bales banded with wire or nylon tape (minimum two bands for bale) approximately two-feet, six-inches in length.

1. Stakes for straw bales shall be 1-1/2inch by 1-1/2 inch by 4 feet long.

C. Silt fence fabric shall be 100X, as manufactured by Mirafi, US Construction Fabrics, Cherokee Manufacturing, or approved equal.

D. Filter fabric at construction entrance shall be 600X, as manufactured by Mirafi, STRATA, IWT Cargo-Guard, or approved equal.

PART 3 - EXECUTION

3.1. EROSION CONTROL - STRAW BALES

A. Straw bales shall be installed at the locations, shown on the Drawings and in general as follows:

1. Toe of slope of embankment construction to filter all runoff flowing to off-site discharges.
2. Toe of temporary earthwork stockpile slopes.
3. Across construction ditches prior to entry into drainage system or waterway, and at 50 foot intervals along the remainder of the ditch.
4. Surrounding completed drainage inlets.
5. Other locations shown on the Contract Drawings and required by NYCDEC regulations and permits.

B. Tightly abut straw bales to form a continuous barrier. Secure bales in place with two stakes per bale. The bales shall be trenched 4 inches into the ground. Soil shall be constructed on the upside slope of the bales. Deteriorated, destroyed or rotted bales shall be replaced immediately. Sediment shall be removed and disposed of periodically from behind the straw bales. The accumulated sediment shall not be allowed to rise above the mid height of the bale. All sediment, straw bales and appurtenances shall be removed and disposed of at the completion of the Contract.

3.2. TEMPORARY EROSION CONTROL MATS

A. Erosion control mats shall be installed in accordance with the manufacturer's recommendations.

B. Areas to receive mats shall be smooth graded and compacted. Remove all rocks, dirt clods, vegetation and other obstructions that may cause damage to the mats.

C. Unroll mats parallel to the direction of water flow and lay flat against the ground. Overlap roll ends 1 to 2 feet with upslope mat on the top to prevent uplift of mat end by water flow. Overlay adjacent edges of mat by six inches. Extend mat 2 to 3 feet above the crest of steep slopes and anchor by excavating a 6 inch deep trench, and secure end of mat in trench, backfill and compact. Secure mat to the ground using staples or pins furnished by manufacturer of mat.

3.3. SILT FENCE

A. Silt fence shall be installed at locations as shown on the Drawings.

B. Supporting posts shall be spaced 4 feet on center, and driven at least one foot into the ground. Posts shall be 1-1/2 inch square or heavier wood posts, or standard steel posts.

C. Fabric shall be anchored in a 4-inch deep trench dug on the upslope side of the posts. The trench shall be at least 4 inches wide. The fabric shall be laid in the trench, backfilled and compacted.

D. Fabric rolls shall be spliced at posts. The fabric shall be overlapped 6 inches, folded over and securely fastened to posts.

E. Silt fences shall be inspected immediately after each storm event and at least daily during prolonged rainfall.

3.4. CONSTRUCTION REQUIREMENTS - TEMPORARY SEDIMENT CONTROL

A. The Contractor shall construct all permanent erosion and sediment control features at the earliest practical time as outlined in the accepted schedule. Temporary erosion and sediment control measures shall be used to correct conditions that develop during construction which were unforeseen, but are needed prior to installation of permanent control features, or that are needed temporarily to control erosion or sedimentation which develops during construction operations.

B. Where erosion is likely to be a problem, clearing and grubbing operations shall be scheduled and performed so that grading operations and permanent erosion and sediment control features can follow immediately thereafter, if conditions permit; otherwise, temporary control measures will be required between successive construction stages.

C. Contractor shall be responsible for controlling erosion within the project area and retaining sediment on-site away from sensitive environmental resources.

D. Failure by the Contractor to control erosion, pollution, and siltation shall be cause for the City of New York to employ outside assistance to provide the necessary corrective measures.

E. The Contractor shall remove and properly dispose of sediment from control facilities as required by the City of New York/Commissioner. The Contractor shall modify and improve erosion and sedimentation control facilities and replace deteriorated straw bales and other devices as required by the City of New York/Commissioner.

F. Minimum temporary and permanent erosion and sedimentation control measures are shown on the Drawings. The Contractor shall strictly adhere to the minimum provisions shown. Additionally, temporary measures shall be selected and constructed by the Contractor in consultation with the City of New York/Commissioner to accommodate changing field conditions that develop during construction.

G. The temporary sedimentation basins shall be maintained from the start of construction until construction of the permanent detention basins and/or stormwater system is completed and

perimeter areas are stabilized. A temporary outlet shall be constructed above the expected sediment levels. Construction of the basins shall be sequenced so that the temporary outlet is installed and basin embankment is constructed with the material available from the initial site excavations.

H. In disturbed areas where construction has permanently or temporarily ceased, the area must be stabilized within 7 days. If earth disturbing activities will resume within 7 days, temporary stabilization is not required.

I. All disturbed areas shall be re-vegetated by loaming and seeding unless otherwise noted on the approved plan.

3.5. MAINTENANCE OF EROSION CONTROL MEASURES

A. The Contractor shall check the condition of erosion and sedimentation control devices daily and maintain them in good operating condition. Straw bales shall be replaced when deteriorated.

B. The Contractor shall inspect the condition of diversion dikes and ditches, filter berms, interceptor dikes, sediment basins and other erosion and sedimentation control devices after each rainstorm and during major storm events. Restorations shall be made as necessary.

C. During construction, temporary outlets of the drainage systems shall direct the flow to temporary or permanent sedimentation basins.

D. Temporary soil erosion and sedimentation control devices shall be removed and adjacent areas outside the limits of grading restored upon completion of the work or when required by the City of New York/Commissioner.

END OF SECTION 31 25 00

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SECTION 32 11 23 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SECTION INCLUDES

A. The work to be performed includes the preparation of the aggregate base course foundation; and the production, stockpiling, hauling, placing, and compacting of aggregate base course.

1.3 RELATED SECTIONS

A. The following is a list of specifications which may be related to this section:

1. Section 31 23 16, Excavation.
2. Section 31 25 00, Erosion and Sedimentation Controls
3. Section 31 23 33, Trenching, Backfilling and Compaction.
4. Section 32 16 13, Concrete Curbs, and Gutters.

1.4 REFERENCES

A. Refer to DDC General Conditions.

B. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):

   a. M147, Standard Specification for Materials for Aggregate and Soil- Aggregate Subbase, Base, and Surface Courses.
   b. T11, Standard Method of Test for Materials Finer Than 75㎛ (No. 200) Sieve in Mineral Aggregates by Washing.
   c. T27, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
   d. T89, Standard Specification for Determining the Liquid Limit of Soils.
   e. T90, Standard Specification for Determining the Plastic Limit and Plasticity Index of Soils.
   f. T96, Standard Specification for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

g. T99, Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 kg (5.5 pound) Rammer and a 305 mm (12 in) Drop.
h. T180, Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18-in) Drop.
i. T190, Standard Specification for Resistance R-Value and Expansion Pressure of Compacted Soils.
j. T265, Standard Method of Test for Laboratory Determination of Moisture Content of Soils.
k. T310, Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2. ASTM International (ASTM):

a. C88, Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
b. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).
c. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3(2,700 kN-m/m3)).
d. D1883, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
e. D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
f. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.5 SUBMITTALS

A. Refer to DDC General Conditions.

B. Contractor shall cooperate with Commissioner in obtaining and providing samples of all specified materials.

C. Contractor shall submit certified laboratory test certificates for all items required in this section.

D. Contractor shall submit tickets for each load of aggregate.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Aggregates: Aggregates for bases shall be crushed stone, crushed slag, crushed gravel or natural gravel that conforms to the quality requirements of AASHTO M147, except that the requirements for the ratio for the minus No. 200 sieve fraction to the minus No. 40 sieve fraction shall not apply. The requirements for the Los Angeles wear test shall not apply to Class

1, 2, and 3. Aggregates for bases shall meet the grading requirements as called out in the drawings. The liquid limit shall be as shown in the table and the plasticity index shall be ≤6.

B. Gradations:

Standard US Sieve Size	Percentage by Weight Passing Square-Mesh Sieves						
	LL < 35				LL < 30		
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
4 inches	--	100	--	--	--	--	--
3 inches	--	95 - 100	--	--	--	--	--
2½inches	100	--	--	--	--	--	--
2 inches	95 - 100	--	--	100	--	--	--
1½inches	--	--	--	90 - 100	100	--	--
1 inch	--	--	--	--	95 - 100	--	100
¾ inch	--	--	--	50 - 90	--	100	--
No. 4	30 - 65	--	--	30 - 50	30 - 70	30 - 65	--
No. 8	--	--	--	--	--	25 - 55	20 - 85
No. 200	3 - 15	3 - 15	20 max.	3 - 12	3 - 15	3 - 12	5 - 15
Note: Class 3 materials shall consist of bank or pit run material.							

PART 3 -EXECUTION

A. Refer to DDC General Conditions.

3.1. GENERAL

A. Equipment:

1. Equipment shall be capable of performing the work as described in this specification. Equipment that is inadequate to obtain the results specified shall be replaced or supplemented as required to meet the requirements of this specification. Any equipment that is used in an improper manner may be cause for rejection of the work if in the opinion of Commissioner, the work fails to meet the requirements of this specification.
2. Equipment used for compaction shall be the rolling type, vibratory type, or combination of both types, and shall be of sufficient capacity to meet the compaction requirements herein.

3.2. PREPARATION OF FOUNDATION

A. General:

1. The foundation shall be considered to be the finished earth subgrade, subbase course, or base course, as the case may be, upon which any subbase, base, or surface course is to be constructed.
2. Preparation of foundation for construction of a subbase, base, or surface course shall consist of the work necessary to restore, correct, strengthen, or prepare the foundation to a condition suitable for applying and supporting the intended course.
3. The foundation shall be prepared and constructed such that it will have a uniform density throughout. It shall be brought to the required alignment and cross section with equipment and methods adapted for the purpose. Upon completion of the shaping and compacting operations, the foundation shall be smooth, at the required density, and at the proper elevation and contour to receive the aggregate base course.
4. Unless otherwise provided, all holes, ruts, and other depressions in the foundation shall be filled with materials similar to those existing in the foundation. High places shall be excavated and removed to the required lines, grade and section.
5. Areas of yielding or unstable material shall be excavated and backfilled with stabilization rock as determined by Commissioner. Base course material shall not be placed on a foundation that is soft, spongy, or one that is covered by ice or snow. Base course shall not be placed on a dry or dusty foundation where the existing condition would cause rapid dissipation of moisture from the base course material and hinder or preclude its proper compaction. Dry foundations shall have water applied, reworked, and compacted as necessary.
6. Commissioner may direct Contractor to make minor adjustments in the finish grade from that shown in the drawings as may be necessary or desirable to maintain the characteristics of a stabilized foundation by minimizing the amount of cutting into or filling.

B. Roads and Parking Areas: For aggregate base course roads and parking areas, the top six (6) inches of topsoil shall be stripped within the area to be aggregate surfaced. Following stripping of the topsoil, the upper twelve (12) inches of the subgrade shall be scarified and compacted to a minimum of ninety-five percent (95%) of the Maximum Standard Proctor Density (ASTM D698). Onsite material may be used as accepted by Commissioner, for compacted fill for the aggregate base course. Fill shall be placed within two percent (2%) of optimum moisture content and compacted to a minimum of ninety five percent (95%) of the Maximum Standard Proctor Density (ASTM D698).

C. Pavements: Aggregate base course used as a foundation for pavements shall be placed on the subgrade within two percent (2%) of optimum moisture and compacted to a minimum of one hundred percent (100%) of the Maximum Modified Proctor Density (ASTM D1557). The top six (6) inches of topsoil shall be stripped within the area to be aggregate surfaced. Following stripping of the topsoil, the upper twelve (12) inches of the subgrade shall be scarified and compacted to a minimum of ninety- five percent (95%) of the Maximum Standard Proctor Density (ASTM D698). Onsite material may be used, as accepted by Commissioner, for compacted fill for the aggregate base course. Fill shall be placed within two percent (2%) of

optimum moisture content and compacted to a minimum of ninety five percent (95%) of the Maximum Standard Proctor Density (ASTM D698). Deviations in aggregate base course under pavements of more than one-quarter (1/4) inch in ten (10) feet, measured with a ten-foot (10') straight edge, shall be corrected prior to pavement construction.

D. Earth Subgrade: When the foundation is an earth subgrade it shall be prepared by removing all vegetation, excavating and removing materials, filling depressions, scarifying, shaping, smoothing and compacting to meet the required grade, section and density. Stones over six (6) inches in greatest dimension shall be removed.

3.3. PLACEMENT

A. The aggregate base course shall be constructed to the width and section shown in the drawings. If the required compacted depth of base course exceeds six (6) inches, the base shall be constructed in two (2) or more layers of approximate equal thickness. The maximum compacted thickness of any one (1) layer shall not exceed six (6) inches.

B. Each layer shall be constructed as far in advance of the succeeding layer as Commissioner may direct. The work shall, in general, proceed from the point on the project nearest the point of supply of the aggregate in order that the hauling equipment may travel over the previously placed material, and the hauling equipment shall be routed as uniformly as possible over all portions of the previously constructed courses or layers of the base course.

C. The material shall be deposited on the soil foundation, or previously placed layer, in a manner to minimize segregation and to facilitate spreading to a uniform layer of the required section. In the event that blending of materials is necessary to provide required gradation and properties of the material, and is done in the roadway, the same shall be accomplished by mixing the aggregate and blending material by means of blade graders, discs, harrows, or other equipment to effect a uniform distribution and gradation throughout the finished mixture. Excessive mixing and grading that will cause segregation between the coarse and fine materials is prohibited.

3.4. COMPACTION

A. After a layer or course has been placed and spread to the required thickness, width and contour, it shall be compacted. If the material is too dry to readily attain the required density, it shall be uniformly moistened to the degree necessary during compaction operations for proper compaction.

B. Compaction of each layer shall continue until the required density specified in Article Preparation of Foundation is reached. The surface of each layer shall be maintained during compaction operations in such a manner that a uniform texture is produced and aggregates firmly keyed.

C. All areas where proper compaction is not obtainable due to segregation of materials, excess fines, or other deficiencies in the aggregate shall be reworked as necessary or the material removed and replaced with aggregates that will meet this specification.

D. The surface of each layer shall be kept true and smooth at all times.

3.5. MIXING

A. Unless otherwise specified, Contractor shall mix the aggregate by any one of the three following methods:

1. Stationary Plant Method: Aggregate base course and water shall be mixed in an approved mixer. After mixing, the aggregate shall be transported to the project site while it contains the proper moisture content and shall be placed on the roadbed by means of an approved spreader.
2. Travel Plant Method: After the material for each layer has been placed through an aggregate spreader or windrow-sizing device, it shall be uniformly mixed by a traveling mixing plant.
3. Road Mix Method: After material for each layer has been placed, the materials shall be mixed while at optimum moisture content by motor graders or other approved equipment until the mixture is uniform throughout.

3.6. SHOULDER CONSTRUCTION

A. Shoulders shall be constructed with base course material to conform to the elevation and section shown in the drawings. No equipment shall be used which by its design or through its manner of operation will damage the pavement or curbs. Insofar as practicable, the base course material shall be placed directly on the shoulder area. Materials that are deposited outside the shoulder area, if not contaminated, shall be recovered and placed within the required limits. Contractor shall not be compensated for materials not recovered as determined by Commissioner.

B. Materials shall not be deposited on the pavement or surfacing during placing unless specifically permitted by Commissioner.

C. The base course material as placed shall be spread and compacted to the required density in layers not exceeding six (6) inches in compacted thickness. Any material inadvertently placed on the pavement shall be broomed from the pavement. The result shall not effect a change in the gradation of the shoulder material.

END OF SECTION 32 11 23

SECTION 32 11 26 - ASPHALTIC BASE COURSE

PART 1 – GENERAL

1.1. RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2. SECTION INCLUDES

A. This Section includes requirements for:

1. Subgrade preparation for granular base construction.
2. Sub-base and base course construction for asphalt paving.
3. Sub-base and base course construction for gravel surfacing.
4. Restoration of existing gravel surfacing.

1.3. RELATED REQUIREMENTS

A. The following is a list of specifications which may be related to this section:

1. Backfilling: Section 31 23 23

1.4. REFERENCE DOCUMENTS

A. Refer to DDC General Conditions.

B. American Society for Testing and Materials (ASTM):

1. ASTM D698-07e1 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m3).

1.5. PROTECTION

A. Restrict traffic over completed or partially completed work after inclement weather or at any time when there is tendency for subgrade material to work into base material.

PART 2 - PRODUCTS

2.1. MATERIALS

A. Granular fill material products.

B. Base materials

PART-3 EXECUTION

1.1. SUBGRADE PREPARATION

A. Excavate soft areas of subgrade, fill with 6 inches crushed gravel and compact to minimum 95% of Standard Proctor Density.

B. In excavated areas, where fill material depth will be 4” or less, scarify subgrade to depth of 6”.

C. Compact subgrade to minimum 95% of Standard Proctor Density.

D. Ensure that required subgrade elevations are maintained upon completion of subgrade preparation.

1.2. SUB-BASE COURSE CONSTRUCTION

A. Place sub-base course on prepared subgrade to a 6” compacted depth. Compact to minimum 95% of Standard Proctor Maximum Dry Density (ASTM D698).

B. Place sub-base gravel course in continuous horizontal layers not exceeding 10 inches lift.

C. Re-mix coarse aggregate with fines and work gravel to achieve required depth, grade and section.

D. Apply water to sub-base gravel course uniformly and in sufficient quantities to obtain optimum moisture content for compaction.

E. Grade sub-base gravel course to within 2 inches of design grade by blading and compacting.

1.3. BASE COURSE CONSTRUCTION

A. Place base course of over sub-base course to compacted depth. Compact to 95 % of Standard Proctor Maximum Dry Density (ASTM D698).

B. Ensure that coarse aggregates and fine aggregates are well mixed.

C. Place base gravel course in continuous horizontal layers not exceeding 6” lift.

D. Apply water to base gravel uniformly and in sufficient quantities to obtain optimum moisture content for compaction.

E. Grade base gravel course to within 1 – 2 inchecs of design grade by blading and compacting.

F. Do not conceal manhole covers, valve covers or catch basin rims.

1.4. COMPACTION EQUIPMENT

A. Use smooth drum or pad type vibratory roller for gravel compaction.

END OF SECTION 32 11 16

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SECTION 32 12 13 - BITUMINOUS TACK AND PRIME COATS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 REFERENCES

A. Refer to DDC General Conditions.

B. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
2. AASHTO T 102 (2009; R 2013) Standard Method of Test for Spot Test of Asphaltic Materials
3. ASTM INTERNATIONAL (ASTM)
4. ASTM D1250 (2008) Standard Guide for Use of the Petroleum Measurement Tables
5. ASTM D140/D140M (2016) Standard Practice for Sampling Asphalt Materials
6. ASTM D2026/D2026M (2015) Cutback Asphalt (Slow-Curing Type)
7. ASTM D2027/D2027M (2013) Cutback Asphalt (Medium-Curing Type)
8. ASTM D2028/D2028M (2015) Cutback Asphalt (Rapid-Curing Type)
9. ASTM D2397/D2397M (2017) Standard Specification for Cationic Emulsified Asphalt
10. ASTM D2995 (1999; R 2009) Determining Application Rate of Bituminous Distributors
11. ASTM D6373 (2016) Standard Specification for Performance Graded Asphalt Binder
12. ASTM D946/D946M (2015) Penetration-Graded Asphalt Cement for Use in Pavement Construction
13. ASTM D977 (2017) Standard Specification for Emulsified Asphalt
14. U.S. GREEN BUILDING COUNCIL (USGBC)
15. LEED BD+C (2009; R 2010) Leadership in Energy and Environmental Design(tm) Building Design and Construction (LEED-NC)

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Certificates of compliance for asphalt materials delivered will be obtained and checked to ensure that specification requirements are met. Quantities of applied material will be determined. Tack coat materials will not be diluted. Prime coat materials when emulsions are used can be diluted on site with potable water up to 1-part emulsion to 1-part water.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inspect the materials delivered to the site for contamination and damage.

B. Unload and store the materials with a minimum of handling.

1.5 EQUIPMENT, TOOLS AND MACHINES

A. General Requirements

1. Equipment, tools and machines used in the work are subject to approval.
2. Maintain in a satisfactory working condition at all times.
3. Calibrate equipment such as asphalt distributors, scales, batching equipment, spreaders and similar equipment within 12 months of their use.
4. If the calibration expires during project, recalibrate the equipment before work can continue.

B. Bituminous Distributor

1. Provide a self-propelled distributor with pneumatic tires of such size and number to prevent rutting, shoving or otherwise damaging the surface being sprayed.
2. Calibrate the distributer in accordance with ASTM D2995. Engineer and equip the distributor to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled total liquid rates from 0.14 to 4.5 L/square meter 0.03 to 1.0 gallons per square yard, with a pressure range of 172.4 to 517.1 kPa 25 to 75 psi and with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths.
3. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor.
4. The distributor will be capable of circulating and agitating the bituminous material during the heating process.

C. Heating Equipment for Storage Tanks

1. Use steam, electric, or hot oil heaters for heating the bituminous material.
2. Provide steam heaters consisting of steam coils and equipment for producing steam, so designed that the steam cannot come in contact with the bituminous material.

3. Fix an armored thermometer to the tank with a temperature range from 4.4 to 204.4 degrees C 40 to 400 degrees F so that the temperature of the bituminous material may be determined at all times.

D. Power Brooms and Power Blowers

1. Use power brooms and power blowers suitable for cleaning the surfaces to which the bituminous coat is to be applied.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Apply bituminous coat only when the surface to receive the bituminous coat is dry. A limited amount of moisture (approximately 0.14 liter/square meter 0.03 gallon/square yard) can be sprayed on the surface of unbound material when prime coat is used to improve coverage and penetration of asphalt material.

B. Apply bituminous coat only when the atmospheric temperature in the shade is 10 degrees C 50 degrees F or above and when the temperature has not been below 2 degrees C 35 degrees F for the 12 hours prior to application, unless otherwise directed.

PART 2 - PRODUCTS

2.1. PRIME COAT

A. Provide asphalt conforming to one of the following grades:

B. Cutback Asphalt

1. Provide cutback asphalt conforming to ASTM D2026/D2026M, Grade SC-70 SC-250 ASTM D2027/D2027M, Grade MC-30 MC-70 MC-250 ASTM D2028/D2028M, Grade RC-70 RC-250.

C. Emulsified Asphalt

1. Provide emulsified asphalt conforming to ASTM D977, Type SS-1 or SS1h, ASTM D2397/D2397M, Type CSS-1 or CSS-1h. Asphalt emulsion can be diluted up to 1-part water to 1-part emulsion for prime coat use. Do not dilute asphalt emulsion for tack coat use.

2.2. TACK COAT

A. Note A in TABLE 1 of ASTM D2028/D2028M should be reviewed and the material specified by viscosity or penetration. Cutback asphalt grades recommended for tack are RC-70 and RC-250. In cold-weather construction, cutback asphalt can be used with less concern than emulsions which contain water.

B. Paving grade asphalts can also be used in tack coat applications. High heat is required to achieve spraying consistency for these materials. When asphalt cement is used, the tack coat grade should be the same grade as that for the asphalt mixture or the normal unmodified asphalt grade used for the local area by the DOT.

2.3. ASPHALT CEMENT

A. Provide asphalt cement conforming to ASTM D946/D946M or ASTM D6373 Grade RS-1, SS-1, and SS-1h.

2.4. CUTBACK ASPHALT

A. Provide cutback asphalt conforming to ASTM D2028/D2028M, Grade RC-70 RC-250.

2.5. EMULSIFIED ASPHALT

A. Provide emulsified asphalt conforming to ASTM D977, Type RS-1 MS-1 HFMS-1 SS-1 SS1h ASTM D2397/D2397M, Type CRS-1 CSS-1 CSS-1h.

B. For prime coats the emulsified asphalt can be diluted with up to 1-part emulsion to 1-part water. No dilution is allowed for tack coat applications.

C. The base asphalt used to manufacture the emulsion is required to show a negative spot when tested in accordance with AASHTO T 102 using standard naphtha.

PART 3 - EXECUTION

A. Refer to DDC General Conditions.

3.1. PREPARATION OF SURFACE

A. Immediately before applying the bituminous coat, remove all loose material, dirt, clay, or other objectionable material from the surface to be treated by means of a power broom or blower supplemented with hand brooms.

B. Apply treatment only when the surface is dry and clean.

3.2. APPLICATION RATE

A. The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Commissioner.

B. Tack Coat

1. Apply bituminous material for the tack coat in quantities of not less than 0.14 L 0.03 gallons nor more than 0.46 L/square meter 0.10 gallons per square yard of residual asphalt onto the pavement surface as approved by the Commissioner. Do not dilute asphalt emulsion when used as a tack coat.

C. Prime Coat

1. Apply bituminous material for the prime coat in quantities of not less than 0.23 L 0.05 gallons nor more than 0.54 L/square meter 0.12 gallons per square yard of residual asphalt for asphalt emulsion up to a 1 to 1 dilution rate or for residual asphalt for cutback asphalt.

3.3. APPLICATION TEMPERATURE

A. Viscosity Relationship
1. Apply asphalt at a temperature that will provide a viscosity between 10 and 60 seconds, Saybolt Furol, or between 20 and 120 square mm/sec 20 and 120 centistokes, kinematic. Furnish the temperature viscosity relation to the Commissioner.

B. Temperature Ranges

1. The viscosity requirements determine the application temperature to be used. The following is a normal range of application temperatures:

	Cutback Asphalts
MC-30	29-87 degrees C 85-190 degrees F
SC-70, MC-70, RC-70	50-107 degrees C 120-225 degrees F
SC-250, MC-250, RC-250	75-132 degrees C 165-270 degrees F
	Asphalt Emulsion
All Grades 2	0-70 degrees C 70-160 degrees F
	Asphalt Cement
All Grades	135-175 degrees C 275-350 degrees F

2. Some of these temperatures for rapid cure cutbacks are above the flash point of the material and care should be taken in their heating.

3.4. APPLICATION

A. General

1. Following preparation and subsequent inspection of the surface, apply the bituminous prime or tack coat with the bituminous distributor at the specified rate with uniform distribution over the surface to be treated.
2. Properly treat all areas and spots, not capable of being sprayed with the distributor, with the hand spray.
3. Until the succeeding layer of pavement is placed, maintain the surface by protecting the surface against damage and by restoring deficient areas at no additional cost to The City of New York.
4. If required, spread clean dry sand to effectively blot up any excess bituminous material.
5. No smoking, fires, or flames other than those from the heaters that are a part of the equipment are permitted within 8 meters 25 feet of heating, distributing, and transferring operations of cutback materials.
6. Prevent all traffic, except for paving equipment used in constructing the surfacing, from using the underlying material, whether primed or not, until the surfacing is completed.
7. The bituminous coat requirements are described herein.

B. Prime Coat

1. The prime coat is required if it will be at least 7 days before the asphalt mixture is constructed on the underlying base course, etc. The type of liquid asphalt and application rate will be as specified herein.
2. Protect the underlying layer from any damage (water, traffic, etc.) until the surfacing is placed.
3. If the Contractor places the surfacing within seven days, the choice of protection measures or actions to be taken is at the Contractor's option.
4. Restore (recompact or replace) damage to the underlying material caused by lack of, or inadequate, protection by approved methods at no additional cost to the City of New York.
5. If the Contractor opts to use the prime coat, apply as soon as possible after consolidation of the underlying material.
6. Apply the bituminous material uniformly over the surface to be treated at a pressure range of 172.4 to 517.1 kPa 25 to 75 psi; the rate will be as specified above in paragraph application rate.
7. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper and to ensure that all sprayers will operate at full force on the surface to be treated. Immediately after application remove and destroy the building paper.

C. Tack Coat

1. A tack coat should be applied to every bound surface (asphalt or concrete pavement) that is being overlaid with asphalt mixture and at transverse and longitudinal joints.
2. Apply the tack coat when the surface to be treated is clean and dry.

3. Immediately following the preparation of the surface for treatment, apply the bituminous material by means of the bituminous distributor, within the limits of temperature specified herein and at a rate as specified above in paragraph application rate.
4. Apply the bituminous material so that uniform distribution is obtained over the entire surface to be treated. Treat lightly coated areas and spots missed by the distributor by spraying with a hand wand or using other approved method.
5. Following the application of bituminous material, allow the surface to cure without being disturbed for period of time necessary to permit setting of the tack coat.
6. Apply the bituminous tack coat only as far in advance of the placing of the overlying layer as required for that day's operation.
7. Maintain and protect the treated surface from damage until the succeeding course of pavement is placed.

3.5. CURING PERIOD

A. Following application of the bituminous material and prior to application of the succeeding layer of asphalt mixture allow the bituminous coat to cure and water or volatiles to evaporate prior to overlaying.

B. Maintain the tacked surface in good condition until the succeeding layer of pavement is placed, by protecting the surface against damage and by restoring and recoating deficient areas.

C. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course.

D. Furnish and spread enough sand to effectively blot up excess bituminous material.

3.6. FIELD QUALITY CONTROL

A. Obtain certificates of compliance for all asphalt material delivered to the project.

B. Obtain samples of the bituminous material under the supervision of the Commissioner.

C. The sample may be retained and tested by the Commissioner at no cost to the Contractor.

3.7. SAMPLING AND TESTING

A. Furnish certified copies of the manufacturer's test reports indicating temperature viscosity relationship for cutback asphalt or asphalt cement, compliance with applicable specified requirements, not less than 5 days before the material is required in the work.

B. Sampling

1. Sample bituminous material in accordance with ASTM D140/D140M.

C. Calibration Test

1. Furnish all equipment, materials, and labor necessary to calibrate the bituminous distributor. Calibrate using the approved job material and prior to applying the bituminous coat material to the prepared surface. Calibrate the bituminous distributor in accordance with ASTM D2995.

D. Trial Applications

1. Before applying the spray application of tack or prime coat, apply three lengths of at least 30 meters 100 feet for the full width of the distributor bar to evaluate the amount of bituminous material that can be satisfactorily applied.

E. Tack Coat Trial Application Rate

1. Apply the trial application rate of bituminous tack coat materials in the amount of 0.23 L/square meter 0.05 gallons per square yard. Make other trial applications using various amounts of material as may be deemed necessary.

F. Prime Coat Trial Application Rate

1. Apply the trial application rate of bituminous materials in the amount of 0.66 L/square meter 0.15 gallon per square yard. Make other trial applications using various amounts of material as may be deemed necessary.

G. Sampling and Testing During Construction

1. Perform quality control sampling and testing as required in paragraph field quality control.

3.8. TRAFFIC CONTROLS

A. Keep traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

END OF SECTION 32 12 13

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 SUMMARY

A. Section Includes:

1. Concrete reinforcement and accessories.
2. Cast-in-place concrete.

B. Related Sections:

1. Section 07 92 00 "Joint Sealants" for sealant for joints.
2. Section 31 23 23 "Backfilling" for compacted fill for paving.
3. Section 32 11 23 "Aggregate Base Courses".

1.3 REFERENCES

A. Refer to DDC General Conditions.

B. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

C. ASTM International:

1. ASTM A 185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
2. ASTM A 49 Standard Specification for Heat-Treated Carbon Steel Joint Bars, Micro alloyed Joint Bars, and Forged Carbon Steel Compromise Joint Bars
3. ASTM A 996 Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
4. ASTM C 33 Specification for Concrete Aggregates
5. ASTM C 94 Specification for Ready-Mixed Concrete

6. ASTM C 150 Specification for Portland Cement
7. ASTM C 260 Specification for Air-Entraining Admixtures for Concrete
8. ASTM C 1315 Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
9. ASTM C 494 Specification for Chemical Admixtures for Concrete
10. ASTM D1751 Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
11. ASTM D1752 Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

1.4 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Submit on the following:
1. Joint filler
2. Admixtures
3. Curing compounds.

C. Submit signed verification from the source of supply for each material used on the Work indicating that the materials meet specified requirements.

1.5 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Obtain materials specified in this section from the same sources throughout the Work.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II .

B. Normal-Weight Aggregates: ASTM C 33.

C. Water: ASTM C 94/C 94M and potable.

2.2 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615; 60-ksi yield grade; deformed steel bars, uncoated finish.

B. Welded Steel Wire Fabric: Plain type, ASTM A 185; in flat sheets; uncoated finish.

C. Tie Wire: Annealed steel, 16 AWG or heavier.

D. Dowels: ASTM A 615; 40-ksi yield grade, plain steel, uncoated finish.

2.3 ACCESSORIES

A. Pre-formed Joint for Expansion Joints.

2.4 CONCRETE MIX

A. Mix concrete in accordance with ASTM C 94.

B. Provide concrete for characteristics:

UNIT	MEASUREMENT
Compressive Strength at 7 days	2600 psi
Compressive Strength at 28 days	4000 psi

C. Use accelerating admixtures meeting ASTM C 494 in cold weather only when approved by the Commissioner. Use of admixtures shall not relax cold weather placement requirements.

D. Use set-retarding admixtures meeting ASTM C 494 during hot weather only when approved by the Commissioner.

E. Add air entraining agent meeting ASTM C 260, to concrete mix for concrete work subject to freeze/thaw cycling].

F. Use admixture like fly ash.

PART 3 - EXECUTION

A. Refer to DDC General Conditions.

3.1. EXAMINATION

A. Verify that compacted subgrade is ready to support paving and imposed loads.

B. Verify that gradients and elevations of base are correct.

C. By starting the work of this section, the Subcontractor warrants that it has examined and verified that the existing conditions comply with and conform to the provisions of the preceding paragraphs.

3.2. PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Notify the Commissioner at least 48 hours prior to commencement of concreting operations.

3.3. FORMING

A. Place and secure forms to correct location, dimension, and profile.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint fillers vertically, in straight lines. Secure to formwork during concrete placement.

3.4. REINFORCEMENT

A. Place reinforcement at top and bottom of slabs-on-grade.

B. Interrupt reinforcement at control contraction expansion joints.

C. Place reinforcement to achieve slab and curb alignment as detailed.

D. Provide dowelled joints at interruptions of concrete with one end of dowel set in capped sleeve to allow longitudinal movement.

3.5. FORMED JOINTS

A. Place expansion joints at 20 ft (6 m) intervals to correct elevation and profile. Align curb, gutter, and sidewalk joints.

B. Place joint filler between paving components and building or other appurtenances. Recess top of filler ¼ inches for sealant placement by Section 07 92 00 " Joint Sealants for Concrete Work".

C. Provide scored/ sawn joints at (3-foot (0.90 m)) intervals of sidewalk.

3.6. PLACING CONCRETE

A. Ensure that reinforcement, inserts, embedded parts, formed joints and are not disturbed during concrete placement.

B. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

C. Place concrete to pattern indicated. Saw-cut contraction joints 3/16 inch (5 mm)- inch wide at an optimum time after finishing. Cut 1/3 into (8 mm) depth of slab.

D. Trowel smooth.

3.7. FINISHING

A. Paving: Light broom.

B. Sidewalk Paving: Light broom, radius and trowel joint edges.

C. Curbs and Gutters: Light broom.

D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.8. FIELD QUALITY CONTROL

A. Maintain records of placed concrete items during construction and transmit the records to the City of New York for archiving at project completion. Record date, location of pour, quantity, air temperature, and test samples taken.

3.9. PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION 32 13 13

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SECTION 32 13 73 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Curbs and Gutters: Section 32 16 13.

1.3 SUBMITTALS

A. Refer to DDC General Conditions for all submittals.

B. Product Data: Catalog sheets, specifications, and installation instructions for each product specified except miscellaneous materials.

1.4 QUALITY ASSURANCE

A. Refer to DDC General Conditions.

B. Container Labels: Include manufacturer's name, trade name of product, kind of material, specification number (if applicable), expiration date (if applicable) and packaging date or batch number.

1.5 PROJECT CONDITIONS

A. Environmental Conditions

1. Temperature: Unless otherwise approved or recommended in writing by the sealant manufacturer, do not install sealants at temperatures below 40 degrees F or above 85 degrees F.
2. Humidity and Moisture: Do not install the Work under this Section under conditions that are detrimental to the application, curing and performance of the specified materials.

B. Protection:

1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.

PART 2 - PRODUCTS

2.1. SEALANTS

A. Type 1B Sealant:

1. For Horizontal Joints: One-part, self-leveling silicone or polyurethane sealant for traffic bearing construction;

a) Bostik Chem-Calk 955-SL,
b) Tremco Vulkem 45,
c) Pecora Urexpan NR-201,
d) Pecora 300-SL,
e) Pecora 310-SL,
f) Sika Sikaflex-1CSL,
g) Dow Corning CCS.
h) Or Approved Equal

2. For Vertical Joints: One-part, non-sag silicone or polyurethane sealant;

a) Tremco Vulkem 116,
b) Pecora Dynatrol I,
c) Sika Sikaflex Textured Sealant,
d) Dow Corning CCS or CWS,
e) Pecora 301-NS, Pecora 311-NS.
f) Or Approved Equal

2.2. MISCELLANEOUS MATERIALS

A. Joint Primer/Sealer/Conditioner: As recommended by the sealant manufacturer for the particular joint surface materials and conditions.

B. Backer Rod: Compressible rod stock or expanded, extruded polyethylene.

C. Bond Breaker Tape: Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant.

D. Cleaning Solvents: Oil free solvents as recommended by the sealant manufacturer. Do not use re-claimed solvents.

E. Masking Tape: Removable paper or fiber tape, self-adhesive, non-staining.

2.3. COLOR OF MATERIALS

A. For exposed materials furnish color as indicated, provide the Commissioner with full range of colors offered by the manufacturer.. For concealed materials, provide the natural color which has the best overall performance characteristics.

PART 3 - EXECUTION

3.1. EXECUTION REQUIREMENTS

A. Refer to DDC General Conditions for the requirements governing execution.

3.2. PREPARATION

A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.

1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section. When necessary or when directed, wire brush, grind, or acid etch to thoroughly clean joint surfaces.

3.3. JOINT FILLER INSTALLATION

A. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.

1. Smooth Edged Joints: For joints between two concrete slabs or where new concrete abuts smooth edged materials use either filler as specified.
2. Irregular Edged Joints: For joints where new concrete abuts granite curbs or other irregular edges use closed cell polyurethane joint filler.

3.4. BACKER ROD AND BOND BREAKER TAPE INSTALLATION

A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.

B. Provide backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

3.5. SEALANT INSTALLATION

A. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.

B. Prime joint surfaces which are to receive Type 1A Sealant. Do not allow the primer to spill or migrate onto adjoining surfaces.

C. Apply sealant with ratchet hand gun or other approved mechanical gun. Where gun application is impractical, apply sealant by knife or by pouring as applicable.

D. Finishing: Tool all vertical, non-sag sealants so as to compress the sealant and eliminate air voids. Provide a neat smoothly finished joint with a slightly concave surface unless otherwise indicated or recommended by the manufacturer.

1. Use tool wetting agents as recommended by the sealant manufacturer.

3.6. CLEANING

A. Immediately remove misapplied sealant and drippings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.

B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up any remaining defacement caused by the Work.

END OF SECTION 32 13 73

SECTION 32 16 13 - CONCRETE CURBS AND GUTTERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

B. ASTM A283, Grade A – Low and Intermediate Tensile Strength Carbon Steel Plates

1.2 SUMMARY

A. Provide all labor, materials and equipment as necessary to complete all work as indicated on the Drawings and specified herein.

B. This section includes:

1. Curb and gutters.
2. Steel Facing

C. Related sections include the following:

1. Section 31 10 00-Site Clearing
2. Section 31 23 16-Excavation
3. Section 31 23 23-Backfilling
4. Section 32 13 13-Concrete Paving

1.3 QUALITY ASSURANCE

A. Refer to DDC General Conditions

B. Concrete sampling, testing, and inspection shall conform to the requirements found in Section 32 13 13 “Concrete Paving.”

1.4 SCHEDULE

A. Concrete shall not be placed after October 15 without written permission from the Commissioner.

1.5 GUARANTY

A. Furnish and sign 1 year written Contractor's Guaranty which shall cover cracking, spalling, settling, finishing and forming.

PART 2 - PRODUCTS

A. Concrete: Refer to Section 32 13 13 "Concrete Paving" for all products, except for the following:

1. Reinforcement: Shall be No. 4 bar reinforcement of new billet stock of intermediate grade in accordance with ASTM A615.

B. Structural steel plates:

1. ASTM A283, Grade A
2. Meets requirements of "New York Steel Construction Manual"
3. Fabrication of the steel facing shall conform to the requirements of Subsection 564-3 "Construction Details" of the NYSDOT Standard Specifications.

PART 3 – EXECUTION

A. Refer to DDC General Conditions.

3.1. PLACING FORMS

A. Steel or wood forms of an approved section shall be used throughout the construction. On radii 3 feet or less, 1/4-inch plywood or masonite shall be used. All forms shall have a height equal to concrete thickness. Built-up, battered, bent, twisted, or broken forms shall be removed from the work. Expansion joint materials shall not be used.

B. Forms shall be so constructed and set as to resist, without springing or settlement, the pressure of the concrete. On curbs of sharp radius, plywood or other approved flexible material shall be used in sections short enough to form a smooth, uninterrupted curb which shall not vary from the true radius by more than 1/4-inch. Forms shall not deviate more than 1/8-inch in 10 feet from the true horizontal alignment and no more than 1/8-inch in vertical alignment.

C. Where forms are set above general surrounding area, earth shall be placed along outside edges of forms to ensure stability.

D. Forms shall be cleaned and oiled each time they are used.

E. Forms must be approved by the Commissioner prior to placing concrete.

3.2. PLACING REINFORCEMENT

A. Place 2 bars in gutter pan as specified in Drawings and in the following areas:

1. Where curb crosses a recently filled trench and extending a minimum of 5 feet beyond trench wall.
2. Where fill soil of 18 inches or more occurs.
3. In all valley gutter pans. (exception – 3 bars as shown on the detail drawing)
4. In all path ramps and extending a minimum of eighteen inches beyond the bottom of the curb taper or curb transition.
5. As directed by the Commissioner.

3.3. PLACING CONCRETE

A. Section 32 13 13 “Concrete Paving.”

3.4. JOINTING

A. Control (contraction) joints shall be perpendicular to the curb edge, 1-1/2-inch deep, open and free of all excess concrete. Control joints shall be placed at intervals of not more than 10 feet as indicated on the Drawings.

B. Expansion joints shall be placed at all points of curvature, tangency, and at intervals of not more than 100 lineal feet.

3.5. FINISHING

A. Concrete shall be struck off true to cross section, after which it shall be finished smooth and even. Face forms, if used, shall be left in place until the concrete has set sufficiently so that they can be removed without injury to the curb. The remaining forms shall be rounded with an edging tool. No tool marks are to be left on exposed edges.

B. A straight edge check is to be made while concrete is still plastic. Irregularities exceeding 1/8-inch shall be corrected. Finish surfaces shall not vary form the required cross section as indicated on Drawings by more than 1/8-inch. They shall not vary from the true horizontal alignment by more than 1/4-inch in 10 lineal feet. Sections exceeding those limitations are subject to rejection and replacing at Contractor’s expense.

C. Adding water to the surface of the concrete to assist in finishing operations is not permitted. If a finishing aid is permitted by the Commissioner, it shall only be an approved product for that intended purpose and then applied according to the product recommendations.

3.6. STEEL FACING

A. All surfaces of completed steel facing including anchors, fastenings, etc., shall be thoroughly cleaned of all rust, oil, grease or foreign matter in accordance with Item 572.01 Structural Steel Paint System, Shop Applied of the NYSDOT Standard Specifications.

B. All surfaces of steel facing to be exposed after installation shall be painted in accordance with and meet the requirements of Item 18573.10 of the NYSDOT Standard Specifications.

C. Curved steel facing shall be bent to radii designated on the plans, with tangent 36-inch lengths provided in the end sections that will incorporate the point of curvature and point of tangency of the curb radius.

3.7. CURING AND ANTI-SPALLING COMPOUND APPLICATION

A. Section 32 13 13 “Concrete Paving.”

END OF SECTION 32 16 13

SECTION 33 05 97.23 - UNDERGROUND UTILITY WARNING TAPE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Addendum and (5) the Contract (City of New York Standard Construction Contract).

1.2 GENERAL REQUIREMENTS

A. Warning/identification tape shall be installed to identify location of underground utilities and to act as a warning against accidental excavation of buried utilities.

B. Warning/identification tape shall be used on all underground water and recycled water mains, potable and recycled water irrigation systems, sewer mains, and all related appurtenances.

C. Warning/identification tape shall also be used on cathodic protection wiring systems and tracer wire brought into and out of access ports.

PART 2 - PRODUCT

A. Warning Tape

B. Tracing Wire

PART 3 - INSTALLATION

3.1. WARNING TAPE

A. During the backfilling process, all PVC and Ductile Iron water mains, service lines and system appurtenances shall have a continuous warning tape placed immediately above them and throughout their length at a depth of eighteen (18) inches above the utility line surface.

B. The tape shall be six (6) inches wide. Tape material shall be formulated from 100 percent virgin polyolefin resins. Resins shall be pigmential for chemical stability and resistance to sulfide staining (color fastness).

C. Tape shall be constructed by the mechanical (non-adhesive) lamination of two plies of three layers blown film in such a manner as to produce a bi-axially oriented structure. The tape shall be able to provide a 700 percent elongation prior to rupture as per ASTM-D882.

D. The tape shall meet or exceed the standards provided in the Materials Specification List, included in these Standards. The warning tape shall be manufactured with a permanent APWA

line color pigment at a maximum of every thirty (30) inches along its length, be imprinted with a continuous warning message as follows:

1. "CAUTION: (State Type) WATER LINE BURIED BELOW"

2. At tees, tape ends, etc., the warning tape shall be tied together (spliced) with knot to create a continuous warning tape throughout the length of the pipeline and associated branch lines, appurtenances, etc.

3.2. TRACING WIRE

A. In addition to the installation of warning tape, copper tracing wire is to be installed with all water mains. This includes all mains, and individual hydrants. The tracing wire shall be taped, using electrical tape, on top of the pipe at ten (10) foot centers, for the total length of the pipe.

B. The tracing wire shall be 12 AWG (Average wire gauge), solid core, copper wire (solid core meaning one (1) single continuous strand of copper wire). In addition, the wire insulating coating (jacket) shall be blue in color and shall have 45 mils of polyethylene insulation thickness and high molecular weight. In addition, the tracing wire shall be HMW-PE and rated for UL 600V construction. The wire shall be suitable for wet or dry applications. The wire size (gauge) shall be continuously affixed (printed on) the entire length of all tracing wire coating and shall be easily read.

C. Where a splice is required, or when a three (3)-way splice is necessary, the wires shall be joined together with an appropriate size (blue) wire nut which shall then be placed inside a direct bury splice kit, of appropriate size. No bare wire shall be left exposed anywhere. All wires shall be spliced to all other wires for a continuous tracing wire system.

D. On all hydrants and above ground appurtenances, the tracing wire shall be run up and protected. This wire end shall not be bare, but shall have the coating jacket intact. Location and frequency of test boxes shall be as directed by the Commissioner. Test boxes, connected onto tracing wire system as per detailed drawings herein, shall be required where hydrants are not used or where hydrant spacing exceeds 500 feet.

E. No electrical connections of the tracing wire to any metal pipes or metal service lines will be allowed and care shall be taken to ensure that the tracing wire is not damaged during installation. The tracing wire will be tested for continuous signal (continuity test) and shorts to ground across all main and service lines before asphalt is installed, and prior to sub grade preparation. Tracing wire must be able to conduct a continuous signal before pipe is accepted.

END OF SECTION 33 05 97.23

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: August 12, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: August 12, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

			APPROVED BY:	
ADDENDA ISSUED	NO. OF DWG	DATE	ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

July 27, 2021

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The location of the Pre-Bid Site Walk Through has been changed to the corner of East 105th Street and Foster Avenue.**

2. **Bidders Questions and Responses to Questions:**
   See Attachment A.

3. **Revisions to PASSPort forms:**
   See Attachment B.

4. **Revisions to Documents:**
   See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled "Transferring Data Between Rounds of an RFX" has been added to the Documents section of the View RFx tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	We are unable to find One-page Bid Submission Form in V1 bid booklet, as called for within page#3 of said booklet "One-page signed Bid Submission Form delivered in person to DDC before the bid due date" hence please kindly advise where we can find this required Bid Submission Form, or please provide one if it is not within the bid document currently.	Bid Submission form is found in the Questionnaire, section "Paper Bid Submissions- To be Submitted to Agency."
2	We are unable to find the bid bond form within the bid document, hence please kindly advise where we can find the Bid Bond form, or please provide one if it is not within the bid document currently	Bid Bond Form is found in the Questionnaire, section "Paper Bid Submissions- To be Submitted to Agency." The bidder must select Bid Bond as the bid security type before the Bid Bond Form appears.
3	Please advise on the required M/WBE participation goal for this bid.	Please refer to the M/WBE Requirements tab in PASSPort for this information.
4	This project has an MBE requirement of 27% Black and 1% Hispanic. Please advise if we have options to go with different minorities to meet our goal.	The goal can only be met by the MBE requirement of 27% Black and 1% Hispanic.
5	We assume all work can be done during normal working hours. Please confirm.	Refer to Volume 3 - Addendum to General Conditions, "F. Construction Phasing Guidelines" on pp.5-6 for this information.

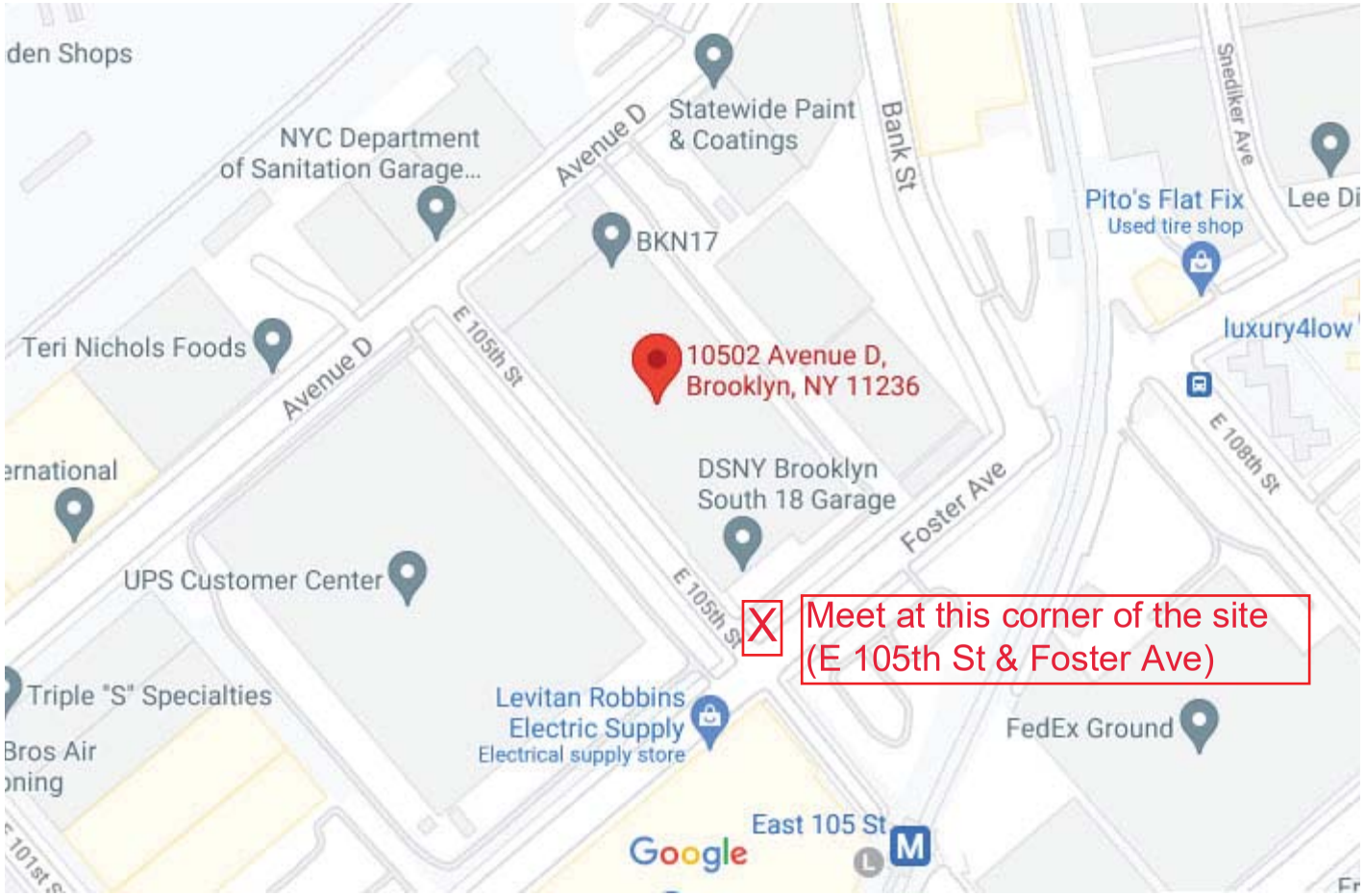
DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Pre-Bid Site Visit Location: map has been added

Title: Meet Up Location for the DSNY Brooklyn District 17 & 18 Garage Replacement of Roof and HVAC Systems Pre-Bid Site Walk Through
FMS ID: S136-383N



On Site Protocol: Wear a mask and socially distance during the course of the walk through.

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 2 of the procurement.

Please note that numbering of addenda is independent of rounds.

Pre-Bid Conference Changes:

The location of the Pre-Bid Site Walk Through has been changed to the corner of East 105th Street and Foster Avenue.

Questionnaire Changes:

None

Item Grid Changes:

None

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: August 18, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: August 18, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		
#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021	Sarah Zomick	8/9/21

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

August 9, 2021

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for August 12, 2021, at 2:30 pm is rescheduled to August 18, 2021 at 2:30 pm.**

   Contract #1 – General Construction Work

2. **Bidders Questions and Responses to Questions:**
   See Attachment A.

3. **Revisions to PASSPort forms:**
   See Attachment B.

4. **Revisions to Documents:**
   See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled "Transferring Data Between Rounds of an RFX" has been added to the Documents section of the View RFx tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 3 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

- The Bid Opening Date scheduled for August 12, 2021 at 2:30pm has been postponed to August 18, 2021 at 2:30pm.

Questionnaire Changes:

- Question added for Pre-Award Process Contact Person

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: August 20, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: August 20, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		
#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021		
#3 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/13/2021	Kh	CL

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

August 13, 2021

ADDENDUM No. # 3

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for August 18, 2021, at 2:30 pm is rescheduled to August 20, 2021 at 2:30 pm.**

   Contract #1 – General Construction Work

2. **Bidders Questions and Responses to Questions:**
   See Attachment A.

3. **Revisions to PASSPort forms:**
   See Attachment B.

4. **Revisions to Documents:**
   See Attachment C.

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DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Please confirm if a pretest is required before we demo RTU's and Fans.	Confirmed. Refer to Specification section 230593-3.16 for testing performed on existing systems. Note that airflow values are indicated for existing equipment to remain or be tied into.
2	The Drawings call for replacing Roof Hatches, but there is no specification on this. Please provide.	Refer to the attached specifications for Roof Accessories, include within Volume 3.
3	Drawing M701 has a schedule for Modine Gas Fired Unit heater. The unit heaters indicated on drawings are existing to remain. We assume this schedule is just for reference. Please confirm or clarify.	No, the schedule is not only for reference. Refer to mechanical drawings, truck wash area, as an example where a new unit heater is shown. Also refer to truck wash area where a new electrical room is created, and a new unit heater is provided.
4	Please provide engineer's estimate for this project.	DDC does not disclose this information. Refer to the Bid Breakdown in the PASSPort Questionnaire for all line items.
5	The Phasing Plan is for the interior of the building. Are we allowed to do work on the roof throughout the year during normal working hours, without any required phasing, such as removal of existing HVAC equipment?	No. Refer to Volume 3 – Addendum to General Conditions, "F. Construction Phasing Guidelines" on pp 5-6 for this information.
6	With regards to the solicitation for 85021B0135-S136-383N - DSNY BK 17/18 Garage Roof and HVAC Upgrade, is there an estimated range for this project? If that is not available to let us know if the project cost is below $5,000,000.	DDC does not disclose this information.
7	Addendum # 1 calls for MBE goal can be met by 27% Black and 1% Hispanic Subs. Can you please provide us an updated list for Black and Hispanic subs who performs HVAC, Electrical, Masonry, Plumbing, Masonry, Scaffolding work, and so on?	Vendors are encouraged to do their own search for suitable M/WBE subcontractors; they can do so by going to the New York City's Small Business Services website - http://mtprawvwsbswtp1-1.nyc.gov/ and they can also reach out to NYC SBS directly, in order to obtain a more narrow search of qualified subcontractors.

8	Addendum #1 was issued yesterday for Project #S136-383N. One of the questions was in regards to not being able to find the bid bond form within the bid document and DDCs response was that it is found in the questionnaire section "paper bid submissions – to be submitted to agency". Please be advised, the questionnaire section is not shown for this project, so we are still unable to locate the bid bond form. Can you please advise?	Please contact MOCS at help@mocs.nyc.gov for assistance.
9	What is the Bid Budget for this project?	DDC does not disclose this information.
10	Drawings A-105 & A-106 call for roof pavers. Please clarify if we are to install concrete pavers or manufactured ceramic granule roof walkway.	The roof walkway pavers shall be precast concrete ballast pavers with bearing pads.
11	Drawing A-111 calls for Truck wash area to be installed with Epoxy Flooring. Please provide us specs on Epoxy Flooring.	See Spec section 099100- Painting, Item 2.5A regarding Epoxy Concrete Sealer.
12	Volume 3- Addendum to the General Conditions calls for the GC to provide Trailer for CM and DDC. GC must provide weekly janitor service, drinking water, cleaning of office trailer, and so on. Since there will be no activity from November to April, do we still have to include this cost? Please advise.	Yes, year-round services for CM/DDC trailers must be provided, for the duration of the project.
13	We would like to request a one (1) week extension to the bid August 12th bid date.	The Bid Opening will be on August 18th at 2:30PM.
14	Please advise if Sidewalk Bridging will be required and if so please locate.	Sidewalk bridging will be required for roof and parapet work along the perimeter of the building. Note that the building garage doors will remain active during construction and high bay bridging will be required.
15	I did not see a specification or model number for the Unit Heater Double Wall Flue please advise.	Refer to revised specification 230500 Common Work Results for HVAC section 2.5.
16	Please advise where we connect to the sanitary a Domestic Water for the Shower Trailer indicated on Drawing PH100.	Connect to the nearest bathroom within the facility. Rough location is indicated.

17	The flashing for the existing Rooftop MU units is not indicated to contain asbestos. Please confirm.	Confirmed. The MU Units Flashing/Tar (Black) does not contain asbestos materials on the BK 17/18 Sanitation Garage Roof.
18	Please confirm that we can work on Phase PH1A thru PH1L simultaneously. Is the Phasing the same for the Roof Mechanical Equipment? If each phase is considered separate for the roof, there will considerable additional crane requirements and costs.	No, these are sub-phases of phase 1 and are not to be done simultaneously. Balance of locker room is to be operational under each phase.
19	Re: Solar Panels, what is the exact size in KW AC and KW DC?	Refer to Drawing E-604 for this information.
20	Re: Solar Panels, please confirm that the inverters used in the design are the SMA Core 1 33.3 KW AC inverters and the modules are the Sunpower E-20 SPR-435NE WHT-D.	Confirmed. Refer to Specification section 263100 for additional manufacturers.
21	The phasing plan shows ductwork, but there is no detail information provided. Please clarify the scope of work.	Detail information is provided on the mechanical ductwork plans – phasing drawings indicate only how phasing is to be performed.
22	I would like to request 2 weeks of bid extension. A few sub-contractors are requesting more time to bid this project.	The Bid Opening will be on August 18th at 2:30PM.
23	The phasing plan (PH-100.00) note #8, indicates the building work is only allowed to be performed during a non-snow season (April 1st to October 31st). Does this note apply to the roofing work as well?	Yes, this note applies to roof work as well.
24	Will the 2nd floor locker rooms be vacant during the construction phase?	No, lockers will be functional and are to be phased in construction.
25	I would like to request 2 week of bid extension. My few sub-contractors are requesting more time to bid this project.	The Bid Opening will be on August 18th at 2:30PM.
26	We are having a hard time finding qualified responsive and responsible Black only MBE to meet the 27% goal set forth within referenced bid. Since this is a fairly large dollar value contract, 27% of Black only MBE goal will take good portion of the contract value. Please allow bidders to utilize other City certified minority race to meet the goal.	If a bidder wants to modify the goal, a waiver request needs to be submitted: fill out Part 3 of the Schedule B – Request for Waiver of M/WBE Participation and submit to the MWBEModification@ddc.nyc.gov email address.

27	Since NYC MBE certificate does not state the race of MBE, bidders cannot determine which MBE is qualified as Black MBE. Can a bidder reply on NYC certified MBE to self-certify him/herself as Black MBE?	The goal can only be met by the MBE requirement of 27% Black and 1% Hispanic. Yes, a firm can submit their proof of ethnicity to NYC SBS. Although the ethnicity is not on the certificate, you can check the M/WBE status of a firm on the website at http://mtprawvwsbswtp1-1.nyc.gov/
28	Please advise if the descendent of a multi-raced MBE subcontractor, who is NYC duly certified MBE, such as Black & Asian, can be qualified as Black MBE to meet the 27% Black only MBE participation goal?	M/WBE businesses used to meet the Black, Hispanic, Asian, or Native American goals must be certified in these categories as listed in the NYC SBS Online Directory of Certified Businesses.
29	Does the Contractor's Bid Form have to be submitted with the bid filled out completely, or can the Contractor submit a lump sum bid price and submit a completed Contractor's Bid Form late if we are the low bidder?	The RFx must be fully responded to by the bid submission date and time.
29	Drawing A-105 calls for Walkway Pavers we did not see a detail or a specification on this please provide.	Refer to revised Specification section 075216 – Article 2.2.J, included with Volume 3, for this information.
30	The Addendum to General Conditions page 10 indicates a project safety representative is required for this project. Please confirm that a Project manager can fulfill this requirement and that a Dedicated Safety representative is not required.	A Project Safety Representative (PSR) is always required in all DDC projects; she/he must be full time while construction operations occur. The Project Safety Representatives are designated by the contractor, so it can be the superintendent or foreman, but this person must have sufficient experience and authority to implement corrective actions, even has the authority to stop the work. She/he is a Competent Person as defined by OSHA. Finally, the PSR shall possess at least the OSHA 30 hours construction safety training.
31	Based on MBE requirements of 27% black and 1% Hispanic, can you please provide an approved list of Electrical suppliers that we can use?	Vendors are encouraged to do their own search for suitable M/WBE subcontractors; they can do so by going to the New York City's Small Business Services website-http://mtprawvwsbswtp1-1.nyc.gov/. Vendors can also reach out to NYC SBS directly, to obtain a narrower search of qualified subcontractors.
32	What are the requirements for WBE on this project?	Please refer to the M/WBE Requirements tab in PASSPort for this information.
33	What is the % that can be applied towards minority goals for supplies?	There is no % that can be applied towards minority goals for suppliers/supplies.

34	On the ground floor drawings on all the UEF Fans, it shows a plenum with 4 inlets. Are these Return Registers? They are not identified. Please clarify plenum and register size.	Plenum shall be 52Wx52Lx40H, (4) registers shall be 42X36.
35	There is no specification section for gas fired heater's flue vent. Please confirm if we are allowed to use the threaded fittings for flue vent.	Refer to revised specification 230500 'Common Work Results for HVAC,' Article 2.5. Threaded fittings are not allowed, welded only.
36	The mechanical demolition plan (DMM-101.00) shows the demo of control panels and associated wiring. There is no wiring instructions provided. Please clarify in detail.	Contractor shall remove all associated wiring with control panel and equipment/components being served. All power wiring shall be removed and cut and capped back at the source.
37	The plumbing drawings show the plumbing vents and roof drains work. There are no sizes shown on the drawings. Please, clarify.	Replace-in-kind and install new roof drain at new roof level. Match existing piping and vent sizes.
38	Print E602 notes 3 and 4 clearly state new fuses are to be provided in existing switches in DPA, DPB. Notes 6,14, and 24 sound like new switches are to be provided in the MCC, where the existing are the same size. Are these 30 amp and 60 amp MCC switches to be changed, and if so all nameplate information will be needed.	Refer to E-400 series drawings which indicate the manufacturer and model of existing MCCs and other equipment.
39	Kindly provide the information on the existing Fire Alarm Vendor on site.	Current FA Vendor: Falcon Fire & Security LLC # 718-440-8377. Note that CASE/ACME (212-889-8700) was the original installing vendor.
40	Sheet keynote calls for Fireproofing as required. We did not see the existing Deck fireproofed. Are we installing fireproofing? And if so, please provide a specification and what needs to be fireproofed.	Fireproofing details are provided on the Drawings depending on condition encountered. Also, fireproofing is indicated in Specification section 072700.
41	The DDC General Conditions section 013233 calls for GC to hire a professional Photographer to take pictures. Do we need to include this cost once a Month or once a week?	Once a month.
42	Do we need to include full time Site safety officer?	Refer to response to question 30 in this Addendum.
43	Do we need to include a full time Fire watch?	Provide fire watch as required by General Conditions.

44	Locker / Shower trailer supplied by GC as per Drawing PH-100.00. who provides the cleaning service for Locker / shower trailer and if it is by GC is this service daily or weekly?	Contractor must provide daily cleaning service for the locker/shower trailer.
45	Kindly confirm that the "Proposal Amount" under the Item Grid adds up the bid price + the Allowance.	Confirmed.
46	The Specifications call for job completion for District 17/18 in 885 CCDS. With no work permitted from Nov-1 to April 15, this will give us about 2 summers. No GC work can start until 100% ACM is complete and we get ACP 21. There will be down time between ACM and getting DOB permit. Also, we cannot start installing the solar panels until the roof is completed. We recommend CCDS be extended to cover at least three seasons from April 15 to November 1st. Further, due to supply chain issues, there is no guarantee of material. This job has very high general conditions costs and High Liquidated Damages. Please advise.	Installing the solar panel can be done in phases, just like the roof, per the Contractor's own means and methods. The 885 CCDS for seasons 1, 2, and 3 remain as is.
47	Please advise if there is an existing BMS System of this project. If so, please provide information regarding the existing system.	No, refer to mechanical drawings, in particular M-800 series drawings and Specification section 230900 for the BMS system scope of work.
48	Please advise if any control / BMS work is required for existing equipment such as unit heaters, VAV boxes, fin tube radiator, etc.	Must refer to mechanical drawings, in particular M-800 series drawings and Specification section 230900 for the BMS system scope of work.

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Volume 3 has the following updates:

- Addendum to General Conditions, Section VII, line 3.18 (A-C) Security Guards/Fire Guards on site changed to “Applies”.
- Addendum to General Conditions, Schedule B, added 5 year warranty for 077200 Roof Accessories (Roof hatches).

- Table of Contents added 077200 Roof Accessories.

- Revised Specification section: 075216 – SBS Modified Bitumen Roofing System, Article 2.2J.
- New Specification section 077200 – Roof Accessories.
- Revised Specification section 230500 – Common Work Results for HVAC, Article 2.5.

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 4 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

The Bid Opening scheduled for August 18, 2021 at 2:30pm has been rescheduled to August 20, 2021 at 2:30pm.

Questionnaire Changes:

Updated Bid Breakdown excel file to add 077200 Roof Accessories

Item Grid Changes:

Fixed functionality of Item Grid.

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: September 1, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: September 1, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		
#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021		
#3 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/13/2021		
#4 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/18/2021	Sarah Zomick	8/18/21

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

August 18, 2021

ADDENDUM No. # 4

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for August 20, 2021, at 2:30 pm is rescheduled to September 1, 2021 at 2:30 pm.**

   Contract #1 – General Construction Work

2. **Bidders Questions and Responses to Questions:**
   See Attachment A.

3. **Revisions to PASSPort forms:**
   See Attachment B.

4. **Revisions to Documents:**
   See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled "Transferring Data Between Rounds of an RFX" has been added to the Documents section of the View RFx tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 5 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

The Bid Opening scheduled for August 20, 2021 at 2:30pm has been rescheduled to September 1, 2021 at 2:30pm.

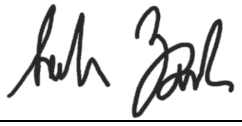
CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: September 21, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: September 21, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		
#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021		
#3 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/13/2021		
#4 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/18/2021		
#5 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/27/2021		 8/27/21

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

August 27, 2021

ADDENDUM No. # 5

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for September 1, 2021, at 2:30 pm is rescheduled to September 21, 2021 at 2:30 pm.**

   Contract #1 – General Construction Work

2. **Bidders Questions and Responses to Questions:**
   See Attachment A.

3. **Revisions to PASSPort forms:**
   See Attachment B.

4. **Revisions to Documents:**
   See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled "Transferring Data Between Rounds of an RFX" has been added to the Documents section of the View RFx tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

Attachment A
Addendum #5
August 27, 2021

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 6 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

The Bid Opening scheduled for September 1, 2021 at 2:30pm has been rescheduled to September 21, 2021 at 2:30pm.

Questionnaire Changes:

Section: “Paper Bid Submissions – To Be Submitted to Agency”, Question: “Bid Security”: Question response text has been updated.

Item Grid Changes:

None

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: September 21, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: September 21, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	APPROVED BY: GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		
#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021		
#3 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/13/2021		
#4 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/18/2021		
#5 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/27/2021		
#6 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents; Revisions to Drawings		9/9/2021	Sarah Zomick	CL 9/9/21

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

September 9, 2021

ADDENDUM No. # 6

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **The Bid Opening for the contract described below scheduled for September 22, 2021, at 2:30 pm is rescheduled to September 21, 2021 at 2:30 pm.**

   Contract #1 – General Construction Work

2. **Bidders Questions and Responses to Questions:**
   See Attachment A.

3. **Revisions to PASSPort forms:**
   See Attachment B.

4. **Revisions to Documents/Drawings:**
   See Attachment C.

Transferring Data Between Rounds of an RFX: A new document titled "Transferring Data Between Rounds of an RFX" has been added to the Documents section of the View RFx tab. Please refer to this document when an addendum has been issued. Note: Whenever an addendum is issued, the RFX item grid will be cleared. You can import the work you have already done by following the steps on this document.

DDC strongly advises vendors to finalize and submit bids 48 hours prior to due date and time. The City is not responsible for technical issues (e.g. internet connection, power outages, technology malfunction, computer errors, etc.) related to bid submissions.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Can you please get clarification what the composition of the existing roof is?	Standard built-up roofing.
2	Drawing detail 3/A401 calls for existing roof drain body to remain and replace Drain body Extension. However, plumbing drawing Detail 7/A501 calls for roof drain to be demolished and install new roof drain. Please clarify?	Roof drain replacements to be done per plumbing drawings. Architectural drawings A101 to A104, A401 and DM-101 to DM-104 were revised to match, included with this addendum.
3	Detail 45/E507 calls for Electrical Ground Test well. Is there a Grounding loop surrounding the building? If so, can we get As built drawings.	Install test wells and associated work as indicated on drawings. No as-builts of existing grounding systems are available.
4	Please confirm the bid breakdown is not required to be submitted with the bid, as this bid break down contains nearly 500 very detailed items to be broken down with pricing. Please confirm the low bidder can submit this detailed bid breakdown after the bid due date.	Bid Breakdown is required as part of the PASSPort Bid Submission.
5	Specification 237413-15 has a specification on standard roof curbs as well as vibration curbs, detail on M503 shows a standard Curb we assume a standard curb will be acceptable please confirm.	Yes, standard Curb is acceptable.
6	Drawing M107 at column 3 indicates to extend Chimney 3' above roof. I did not see a detail on this to include what material we will be using to extend please respond.	Contractor to confirm that the existing chimney, after applying new roof, will remain a minimum of 3' above the new roof. Should the chimney need to be extended to maintain min 3' above the new roof, contractor shall match existing construction of chimney to extend.
7	Kindly clarify the swing shift hours Page 5 of 26 Section 01 31 00 - Volume 3 of 3 has 3PM to 12AM and, on Drawing # PH-100.00 Note #8 has 3pm to 5am.	Swing-shift for locker room work should be 3 pm to 12 am. Refer to revised PH-100 drawing
8	We would like to get the Plan Holders List on the subject project.	The PASSPort Vendors list is included with this Addendum in PASSPort.
9	Sec. 075216 SBS cold roofing calls for 1/8" tapered insulation, ½" cover board, 2 ply base membrane and cap sheet. Drawing 1/A401 calls for underlayment board, 1 ply vapor barrier, 1/8" tapered insulation, ½" cover board, 3 ply membrane and cap sheet. Please advise which assembly is correct.	Provide roofing assembly as detailed in contract drawing A401.

10	Ref. drawing A111, 2/112, please provide structural drawings for metal deck and structural frame.	Provide 16 ga stud and joist framing at 24" o.c. with 22 ga metal deck as shown on details 1,2 and 3 in contract drawing A112.
11	E101. keynote 18, calls for us to build an underground vault with network protector at con ed connection point. This means con ed is meeting us at 13.8kv. E603 one-line states ConEd meeting us at 460 volt. Two very different conditions. Which is correct?	Refer to revised drawings E-504, E603, E604, C002 and BPP-002, BPP-004 (included with this addendum) for clarification on delineation of work between coned and contractor. Also see new 262200 low voltage transformer specification for additional transformers added.
12	Kindly advise if the Contractor can do the roofing/HVAC Equipment/solar panel work during the 7am to 4pm hours on the same days when the swing shift Phases# 1 and 2 are being performed.	Yes.
13	Please forward the contact information's of the existing fire alarm system servicing Garage 17 and 18.	Current FA Vendor: Falcon Fire & Security LLC # 718-440-8377. Note that CASE/ACM (212-889-8700) was the original installing vendor.
14	Addendum #5 states that the bid date is September 21st yet in PASSPort says September 22nd, for the above referenced project?	This has been corrected in this addendum; due date is September 21, 2021.

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

The following documents have been updated and are included with this Addendum:

Revised Volume 3:
New section 262200 Low Voltage Transformers

Revised Bid Drawings:
A-101- Roof Plan Construction 1 of 4
A-102- Roof Plan Construction 2 of 4
A-103- Roof Plan Construction 3 of 4
A-104- Roof Plan Construction 4 of 4
BPP-002.00 – Builders Pavement Plan Profile and Details
BPP-004.00 Builders Pavement Plan MPT
C-002 – Proposed Site Plan. Sections AND Details
DM – 101 – Roof Plan Removals 1 of 4
DM – 102 – Roof Plan Removals 2 of 4
DM – 103 – Roof Plan Removals 3 of 4
DM – 104 – Roof Plan Removals 4 of 4
E-101.00 Electrical Ground Floor Part Plan – District 17
E – 504.00 Electrical Details
E – 603.00 Electrical One Line Diagram – New Service
E – 604.00 Electrical Three Line Diagram – Photovoltaic System
PH – 100.00 Phasing

PASSPort Vendors List is included with this Addendum.

The City of New York
Department of Design and Construction

Division of Buildings

FMS ID Number S136-383N
Project Title NYC DEPARTMENT OF SANITATION GARAGE BROOKLYN DISTRICT NO. 17 AND NO. 18

Project Location 10502 AVENUE D BROOKLYN, NY 10461
Borough KINGS

Sponsor Agency NYC DEPARTMENT OF SANITATION

SHEET INDEX

SHEET NUMBER	SHEET TITLE
	ARCHITECTURAL
G-000	GENERAL COVER SHEET
G-100	GENERAL NOTES, ABBREVIATIONS AND SYMBOL LIST/LEGEND
G-101	FLOOD MAP
EN-001	2016 NYC ECC TABULAR ANALYSIS
EN-002	MECHANICAL COMPLIANCE
EN-003	MECHANICAL COMPLIANCE
DM-101	ROOF PLAN REMOVALS 1 OF 4
DM-102	ROOF PLAN REMOVALS 2 OF 4
DM-103	ROOF PLAN REMOVALS 3 OF 4
DM-104	ROOF PLAN REMOVALS 4 OF 4
DM-201	WEST AND NORTH ELEVATIONS REMOVALS
DM-202	EAST AND SOUTH ELEVATIONS REMOVALS
A-101	ROOF PLAN CONSTRUCTION 1 OF 4
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DMM-109	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
DMM-110	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
M-101	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 17
M-102	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 17
M-103	MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 18
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P-102	PLUMBING GROUND FLOOR PLAN-DISTRICT 17
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SHEET NUMBER	SHEET TITLE
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FA-106	FIRE ALARM 2ND FLOOR PLAN- DISTRICT 18
FA-107	FIRE ALARM ROOF
FA-108	FIRE ALARM ROOF
FA-109	FIRE ALARM ROOF
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PH-103.00	DISTRICT 18 PHASING PLANS
PH-104.00	DISTRICT 18 PHASING PLANS
PH-105.00	DISTRICT 18 PHASING PLANS

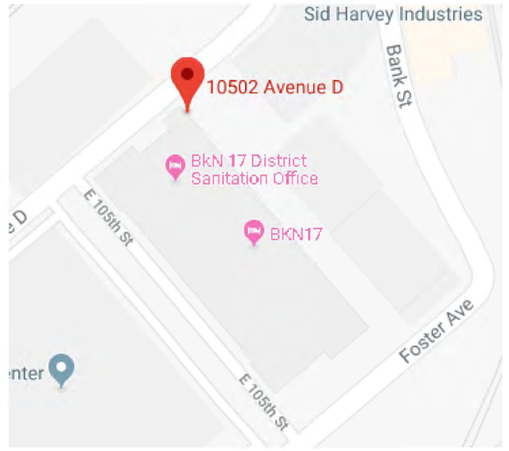
SPECIAL INSPECTION NOTES

1. INSPECTION OF SELECTED MATERIALS, EQUIPMENT, INSTALLATION, FABRICATION, ERECTION OR PLACEMENT OF COMPONENTS AND CONNECTIONS MADE DURING THE PROGRESS OF THE WORK TO ENSURE COMPLIANCE WITH THE CONTRACT DOCUMENTS AND PROVISIONS OF THE NEW YORK CITY CONSTRUCTION CODES, SHALL BE MADE BY A SPECIAL INSPECTOR. THE CITY OF NEW YORK WILL RETAIN THE SERVICES OF THE SPECIAL INSPECTOR AND BEAR THE COSTS FOR THE PERFORMANCE OF SPECIAL INSPECTIONS IN COMPLIANCE WITH NYC CONSTRUCTION CODES REQUIREMENTS OR AS ADDITIONALLY MAY BE CALLED FOR IN THE PROJECT SPECIFICATIONS
2. THE CONTRACTOR SHALL NOTIFY THE RELEVANT SPECIAL INSPECTOR IN WRITING AT LEAST 72 HOURS BEFORE THE COMMENCEMENT OF ANY WORK REQUIRING SPECIAL INSPECTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR, AND BEAR RELATED COSTS TO ASSURE THAT ALL CONSTRUCTION OR WORK SHALL REMAIN ACCESSABLE AND EXPOSED FOR INSPECTION PURPOSES UNTIL THE REQUIRED INSPECTION IS COMPLETED.
3. INSPECTIONS AND TESTS PERFORMED UNDER "SPECIAL INSPECTION" SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO COMPLY WITH THE CONTRACT DOCUMENTS, AND THAT THERE IS NO WARRANTY GIVEN TO THE CONTRACTOR BY THE CITY OF NEW YORK IN CONNECTION WITH SUCH INSPECTION AND TESTS OR CERTIFICATIONS MADE UNDER "SPECIAL INSPECTIONS".
4. THE CONTRACTOR MUST COORDINATE WITH THE RESIDENT ENGINEER OR DDC PROJECT MANAGER TO PROVIDE ACCESS AND SCHEDULE THE WORK FOR INSPECTION BY THE SPECIAL INSPECTOR.

LOCATION PLAN

BUILDING INFORMATION:

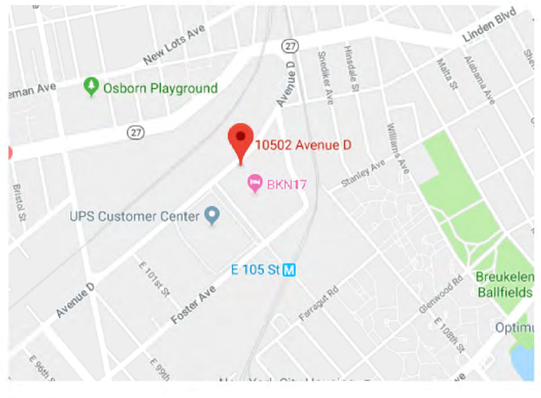
BLOCK: 4074
LOT: 01
ZONING DISTRICT: C1-2 IN R6



PROGRESS AND FINAL INSPECTIONS - TR-1
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BC 1704.3.2 STRUCTURAL STEEL - DETAILS
BC 1704.3.3 STRUCTURAL STEEL - HIGH STRENGTH BOLTING
BC 1704.3.4 STRUCTURAL COLD FORMED STEEL
BC 1704.16 MECHANICAL SYSTEMS
BC 1704.20.1 STRUCTURAL STABILITY - EXISTING BUILDINGS
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BC 1704.32 POST INSTALLED ANCHORS
BC 1704.4 CONCRETE CAST IN PLACE
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SHUTOFF DAMPERS
HVAC INSULATION AND SEALING
DUCT LEAKAGE TESTING
INTERIOR LIGHTING POWER
LIGHTING CONTROLS
ELECTRICAL MOTORS
MAINTENANCE INFORMATION

AREA PLAN



DDC DEPUTY COMMISSIONER SIGNATURE _____ DATE 11-12-2020

PROGRAM DIRECTOR SIGNATURE _____ DATE 11/12/2020

SYSKA HENNESSY GROUP
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VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

Hirani Engineering & Land Surveying, P.C.
Hirani Group
Engineers ■ Land Surveyors ■ Construction Managers
120 West John Street Hicksville, NY 11801
Tel: 516-248-1010 Fax: 516-248-9018
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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
GENERAL COVER SHEET

SEAL & SIGNATURE



DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	KH
CHECKED BY:	KH
DRAWING NUMBER:	G-000.00

Plotted: 8/12/2020 3:11:09 PM P:\NYC\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\G-000.00_DDC33000.DWG - khasan

ABBREVIATIONS

@	AT
℄	CENTERLINE
℅	BUILDING LINE
℔	PLATE
A	
A.C.	AIR CONDITIONED
ACOUS.	ACOUSTICAL
ACT.	ACOUSTICAL CEILING TILE
A.D.	AUTOMATIC DOOR
A.F.F.	ABOVE FINISHED FLOOR
ALUM.	ALUMINUM
B	
B.C.	BRICK COURSE
BD.	BOARD
BET.	BETWEEN
BIT.	BITUMINOUS
BLDG.	BUILDING
BM.	BEAM
B.O.	BOTTOM OF
C	
CAB.	CABINET
C.B.	CATCH BASIN
CCTV.	CLOSE CIRCUIT TELEVISION
C.J.	CONTROL JOINT
CL.	CLOSET
CLG.	CEILING
COL.	COLUMN
C.M.U.	CONCRETE MASONRY UNIT
COMM.	COMMUNICATION
CONC.	CONCRETE
CONST.	CONSTRUCTION
CORR.	CORRIDOR
C.M.T.	CERAMIC MOSAIC TILE
D	
DEMO.	DEMOLITION
DET.	DETAIL
DIA.	DIAMETER
DIM.	DIMENSION
DN.	DOWN
DTL.	DETAIL
DWG.	DRAWING
E	
E.J.	EXPANSION JOINT
EA.	EACH
ELEC.	ELECTRIC (AL,ALLY)
ELEV.	ELEVATOR/ELEVATION
EQ.	EQUAL
EQUIP.	EQUIPMENT
EWC.	ELECTRIC WATER COOLER
EXIST.	EXISTING
EXP.	EXPANSION
EXP.JT.	EXPANSION JOINT
F	
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
FIN.	FINISH
FIXT.	FIXTURE
FL.	FLOOR
FP	FIRE PROTECTION
FT.	FOOT (FEET)
FTG.	FOOTING
FHC.	FIRE HOSE CABINET
G	
GA.	GAUGE
GFRC	GLASS FIBER REINFORCED CONCRETE
GPH	GENERAL POPULATION HOUSING
G.W.B.	GYPSUM WALL BOARD
GYP.	GYPSUM
H	
HDWR	HARDWARE
HTG.	HEATING
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
HORIZ.P.	HIGH POINT
I	
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
J	
J.C.	JANITOR CLOSET
JT.	JOINT
L	
LAM.	LAMINATED
L.P.	LOW POINT
LTG.	LIGHTING
L.W.	LIGHT WEIGHT
M	
MAX.	MAXIMUM
MET.	METAL
MEZZ.	MEZZANINE
MIN.	MINIMUM
MISC.	MISCELLANEOUS
M.O.	MASONRY OPENING
MTD.	MOUNTED
N	
N.I.C.	NOT IN CONTRACT
N/C.	NO CEILING
NO.	NUMBER
NOM.	NOMINAL
NTS	NOT TO SCALE
O	
OPER.	OPERATED
O.C.	ON CENTER
OPNG.	OPENING
OPP.	OPPOSITE
O.H.	OVERHEAD
P	
PART.	PARTITION
PL. LAM.	PLASTIC LAMINATE
PLAST.	PLASTER
PLYWD.	PLYWOOD
PNL.	PANEL
PREFAB.	PREFABRICATED
PT.,PTD.	PAINTED
PVC.	POLYVINYL CHLORIDE
R	
RAD.	RADIATOR
RCP.	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REF.	REFERENCE
REFR.	REFRIGERATION
REINF.	REINFORCE
REQ'D	REQUIRED
REV.	REVISION(S)
RM.	ROOM
R.O.	ROUGH OPENING
R.V.	ROOF VENT
S	
SCHED.	SCHEDULE
SEC.	SECURITY
SECT.	SECTION
SHT.	SHEET
SIM.	SIMILAR
SPEC(S).	SPECIFICATIONS
SPR.	SPRINKLER
ST.,STL.	STEEL
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED
SYN.	SYNTHETIC
T	
TEMP.	TEMPERATURE
T.O.F.	TOP OF FRAME
T.O.	TOP OF
T.O.S.	TOP OF SLAB
TOIL.	TOILET
TV	TELEVISION
TYP.	TYPICAL
TERR.	TERRAZZO
U	
U..N.	UNLESS OTHERWISE NOTED
V	
VCT.	VINYL COMPOSITION TILE
VEST.	VESTIBULE
V.I.F.	VERIFY IN FIELD
W	
W/	WITH
W/O	WITHOUT
W.C.	WATER CLOSET
W.D.	WOOD

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2014 NEW YORK CITY BUILDING CODE AND NYC ENERGY CONSERVATION CODE 2016, UTILITY COMPANY REQUIREMENTS, THE BEST TRADE PRACTICES, AND ALL APPLICABLE LAWS, RULES, AND REGULATIONS.
2. BEFORE COMMENCING WORK, CONTRACTORS SHALL FILE ALL REQUIRED CERTIFICATES OF INSURANCES WITH THE CITY OF NEW YORK, OBTAIN ALL REQUIRED PERMITS AND PAY ALL FEES REQUIRED BY GOVERNING AGENCIES.
3. CONTRACTORS SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD PRIOR TO COMMENCING WORK, AND SHALL REPORT ANY DISCREPANCIES BETWEEN DRAWINGS AND FIELD CONDITIONS TO THE COMMISSIONER.
4. THE EXISTING BUILDING WILL BE OCCUPIED DURING CONSTRUCTION & INCIDENTAL WORK WILL TAKE PLACE IN ACTIVELY OPERATING FACILITY AREAS. THE WORK WILL BE SCHEDULED BY THE OWNER'S REPRESENTATIVE SO AS NOT TO INTERFERE WITH OPERATION OF THESE AREAS. THE CONTRACTORS ARE TO FAMILIARIZE THEMSELVES WITH THESE REQUIREMENTS & REQUIREMENTS FOR OPERATING WITHIN THE PREMISES AS OUTLINED IN THE GENERAL CONDITIONS & THE SPECIFIC REQUIREMENTS OF THE SPECIFICATIONS & NOTES ON DRAWINGS.
5. THE CONTRACTOR IS NOT TO SCALE DRAWINGS. ONLY WRITTEN DIMENSIONS ARE TO BE USED.
6. THE CONTRACTORS ARE RESPONSIBLE FOR PROPER CONSTRUCTION OF ANY AND EVERY PART OF THE WORK AND THE COMPLETION REGARDLESS OF THE LEVEL OF DETAIL SHOWN IN THESE DRAWINGS.
7. THE CONTRACTOR SHALL COORDINATE ALL WORK PROCEDURES WITH REQUIREMENTS OF THE COMMISSIONER.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL DESIGN AND INSTALL ADEQUATE SHORING AND BRACING FOR ALL STRUCTURAL AND REMOVAL TASKS. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR ANY DAMAGE OR INJURIES CAUSED DURING THE EXECUTION OF THE WORK. FOR DESIGN OF SHORING AND BRACING, THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN NEW YORK STATE.
9. EACH CONTRACTOR SHALL LAY OUT HIS/HER OWN WORK, AND SHALL PROVIDE ALL DIMENSIONS FOR HIS WORK AS REQUIRED FOR OTHER TRADES.
10. CONTRACTOR SHALL PATCH AND REPAIR ALL FLOORS, WALLS CEILINGS, ETC.. DAMAGED OR EXPOSED DUE TO HIS WORK OR REMOVALS AND FINISH TO MATCH ADJOINING SURFACES.
11. ADDITIONAL NOTES WHICH ARE APPLICABLE TO THIS PROJECT ARE FOUND THROUGHOUT THE CONTRACT DRAWINGS AND SPECIFICATIONS.
12. ALL TRADES SHALL COORDINATE WORK REQUIRING PENETRATIONS IN FIRE RATED CONSTRUCTION.

PROTECTION NOTES

1. CONTRACTOR SHALL SUBMIT A SITE SAFETY PLAN(S) TO THE COMMISSIONER' FOR REVIEW AND APPROVAL. THE PLAN(S) SHALL INCLUDE THE ENTIRE SITE, INCLUDING INTERIOR AND EXTERIOR AREAS, AND SHALL SHOW PHASED WORK PROTECTION.
2. THE SITE SAFETY PLAN(S) SHALL INCLUDE, BUT NOT BE LIMITED TO, SIDEWALK SHEDS, FENCES, EGRESS, SCAFFOLDING, FIRE PROTECTION ETC. THE PLAN(S) SHOULD ADDRESS ANY POTENTIAL INTERACTION BETWEEN THE BUILDING OCCUPANTS, THE GENERAL PUBLIC AND EXPOSURE TO THE CONSTRUCTION PROCESS.
3. THE CONTRACTOR SHALL INCLUDE IN THE SITE SAFETY PLAN THE LOCATIONS OF SIDEWALK PROTECTION SHEDS THAT WILL PROTECT THE SIDEWALKS AND OTHER PUBLIC AND PRIVATE AREAS FROM CONSTRUCTION OPERATIONS.
4. THE CONTRACTOR SHALL SHOW IN THE SITE SAFETY PLAN TEMPORARY CLOSURES AND ACCESS OF AREAS VULNERABLE TO CONSTRUCTION OPERATIONS.
5. THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS OF CHAPTER 33, "SAFEGUARDS DURING CONSTRUCTION" OF THE NYC BUILDING CODE, 2014.

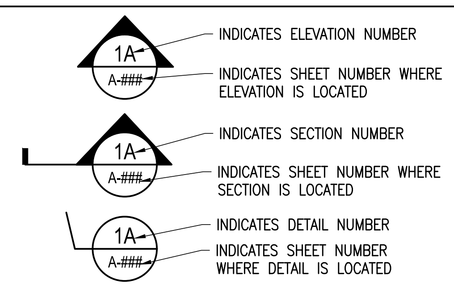
SAFETY OF PUBLIC AND PROPERTY

1. THE CONTRACTOR SHALL INSTITUTE AND MAINTAIN SAFETY MEASURES AND PROVIDE ALL EQUIPMENT OR TEMPORARY CONSTRUCTION NECESSARY TO SAFEGUARD ALL PERSONS AND PROPERTY AFFECTED.
2. STRUCTURES, DEVICES, OR CONSTRUCTION EQUIPMENT SHALL NOT BE LOADED IN EXCESS OF THEIR DESIGN CAPACITY.
3. BEFORE USING CONSTRUCTION EQUIPMENT OR DEVICES, SAME SHALL BE INSPECTED BY THE PERSON SUPERINTENDING THE WORK, AND DEFECTS OR UNSAFE CONDITIONS SHALL BE PROMPTLY CORRECTED BEFORE USE.
4. DETERMINE LOCATION, PROTECT AND SAFEGUARD ALL UTILITIES ON OR ADJACENT TO SITE. NOTIFY ALL UTILITY COMPANIES AS REQUIRED.
5. MAINTAIN FIRE PREVENTION, SANITARY AND SAFETY FACILITIES.
6. ALL MACHINERY, TOOLS, SERVICE LINES AND CONDUITS SHALL BE SHIELDED OR BARRICADED TO PROVIDE SAFETY AND PREVENT CONTACT BY THE PUBLIC.
7. AREAS USED BY THE PUBLIC SHALL BE MAINTAINED FREE FROM DEBRIS, EQUIPMENT, MATERIALS, ETC.

SUMMARY OF WORK

1. REMOVE EXISTING ROOFING ASSEMBLY TO TOP OF EXISTING ROOF DECK AND PROVIDE NEW SBS MODIFIED BITUMINOUS ROOFING ASSEMBLY WITH MIN R-30 TAPERED INSULATION, AT ALL ROOFS.
2. REMOVE EXISTING ROOF CURB AT SINGLE STORY TRUCK STORAGE AREA ROOF AND PROVIDE RAISED CURB AS SHOWN IN DRAWINGS.
3. REMOVE AND REPLACE PARAPETS AT CORNERS OF SECOND FLOOR ROOFS AS INDICATED IN DRAWINGS.
4. PROVIDE NEW PRECAST COPING WITH THRU WALL COPING FLASHING IN TOP OF ALL PARAPETS AS INDICATED.
5. PROVIDE STEEL DUNNAGE TO SUPPORT NEW ROOF TOP MECHANICAL EQUIPMENT AS INDICATED.
6. REMOVE AND REPLACE ROOF ACCESS HATCHES.
7. REMOVE EXISTING EQUIPMENT IN TRUCK WASH ROOM IN DISTRICT 17; FILL IN EXISTING TRENCHES, PATCH AND REPAIR EXISTING CONCRETE SLAB; PROVIDE 2 HOUR RATED GWB PARTITIONS FOR NEW ELECTRICAL ROOM AND STORAGE ROOM IN THIS SPACE. SEE CIVIL DRAWINGS FOR ADDITIONAL SCOPE OF WORK IN TRUCK WASH ROOM.
8. REMOVE AND REPLACE DETERIORATED METAL ROOF DECKS AS SHOWN IN STRUCTURAL DRAWINGS
9. REMOVE AND REPLACE PORTION OF EXISTING CEILING AT 2ND FLOOR OF DISTRICT 17 AND 18 FOR REMOVAL AND INSTALLATION OF MECHANICAL DUCTS AND EQUIPMENT
10. SEE MEP DRAWINGS FOR SCOPE OF MECHANICAL, ELECTRICAL AND PLUMBING WORK. COORDINATE ROOF REPLACEMENT AND STRUCTURAL SCOPE WITH MEP WORK.

SYMBOLS LIST/LEGEND



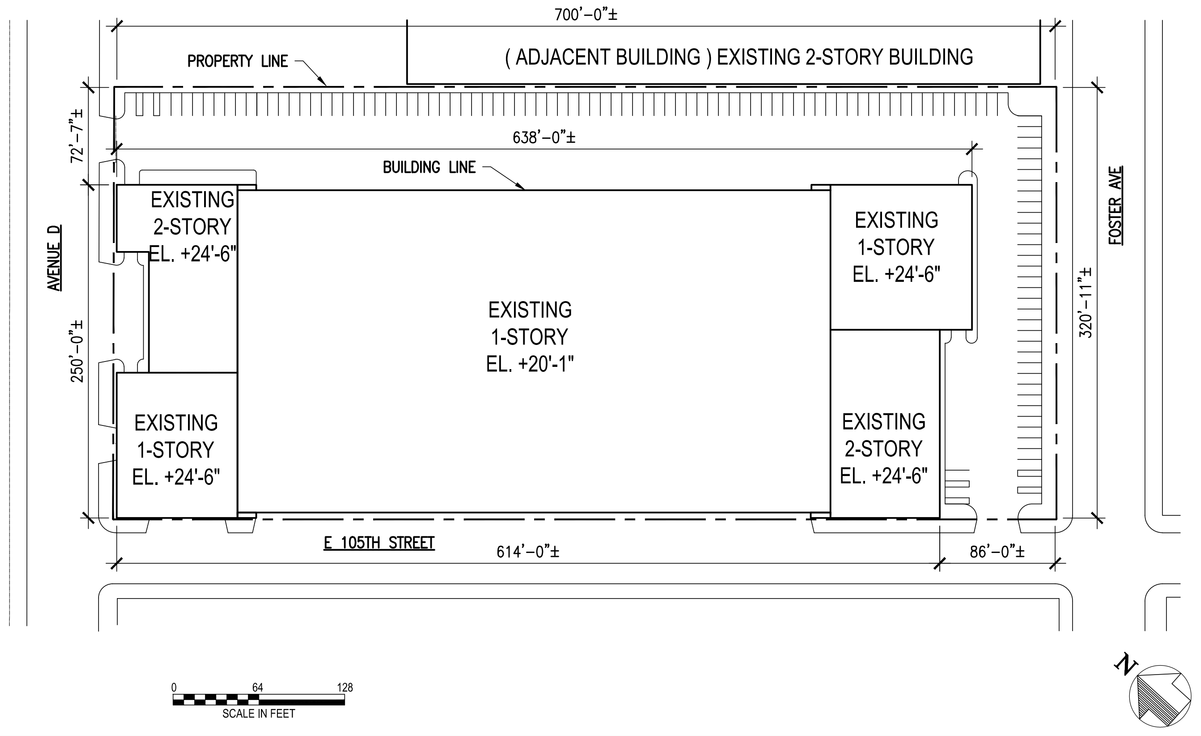
ZONING AND BUILDING CODE

ADDRESS:	10502 AVENUE D, BROOKLYN, NY 11236
ALTERNATE ADDRESS 1:	10501 FOSTER AVENUE, BROOKLYN, NY 11236
ALTERNATE ADDRESS 2:	401-483 EAST 105TH STREET, BROOKLYN, NY 11236
BLOCK NUMBER:	8138
LOT NUMBER:	1
ZONING DISTRICT:	M1-1 (LIGHT MANUFACTURING DISTRICT)
ZONING MAP:	17 D

	EXISTING		PROPOSED
	1968 NYC BUILDING CODE	2014 NYC BUILDING CODE	
OCCUPANCY CLASSIFICATION	B-1 STORAGE	S-2 STORAGE	NO CHANGE
CONSTRUCTION CLASSIFICATION	I-E :UNPROTECTED	II - B	NO CHANGE

NO CHANGE TO OCCUPANCY OR EGRESS

PLOT PLAN



BUILDING DEPT. NOTES

ALL CONSTRUCTION WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE 2014 ADMINISTRATIVE BUILDING CODE OF THE CITY OF NEW YORK AND ALL OTHER APPLICABLE ORDINANCES AND REGULATIONS OF ALL GOVERNING AGENCIES HAVING JURISDICTION OVER THE WORK.

ALL CONSTRUCTION, INCLUDING PLUMBING, MECHANICAL AND ELECTRICAL WORK, TO BE PERFORMED BY LICENSED CONTRACTORS AND ALL REQUIRED PERMITS AND CERTIFICATIONS SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF WORK.

NO CHANGE IN USE, EGRESS, OCCUPANCY, FIRE RATING.

ALL FLOORS IN THE BUILDING ARE OCCUPIED BY SINGLE TENANTS.

ALL MATERIALS TO COMPLY WITH NYC DEPARTMENT OF BUILDINGS FLAME SPREAD RATINGS.

CONTROLLED INSPECTIONS REQUIRED: REFER TO G-000

RELATED DOB NOW FILINGS

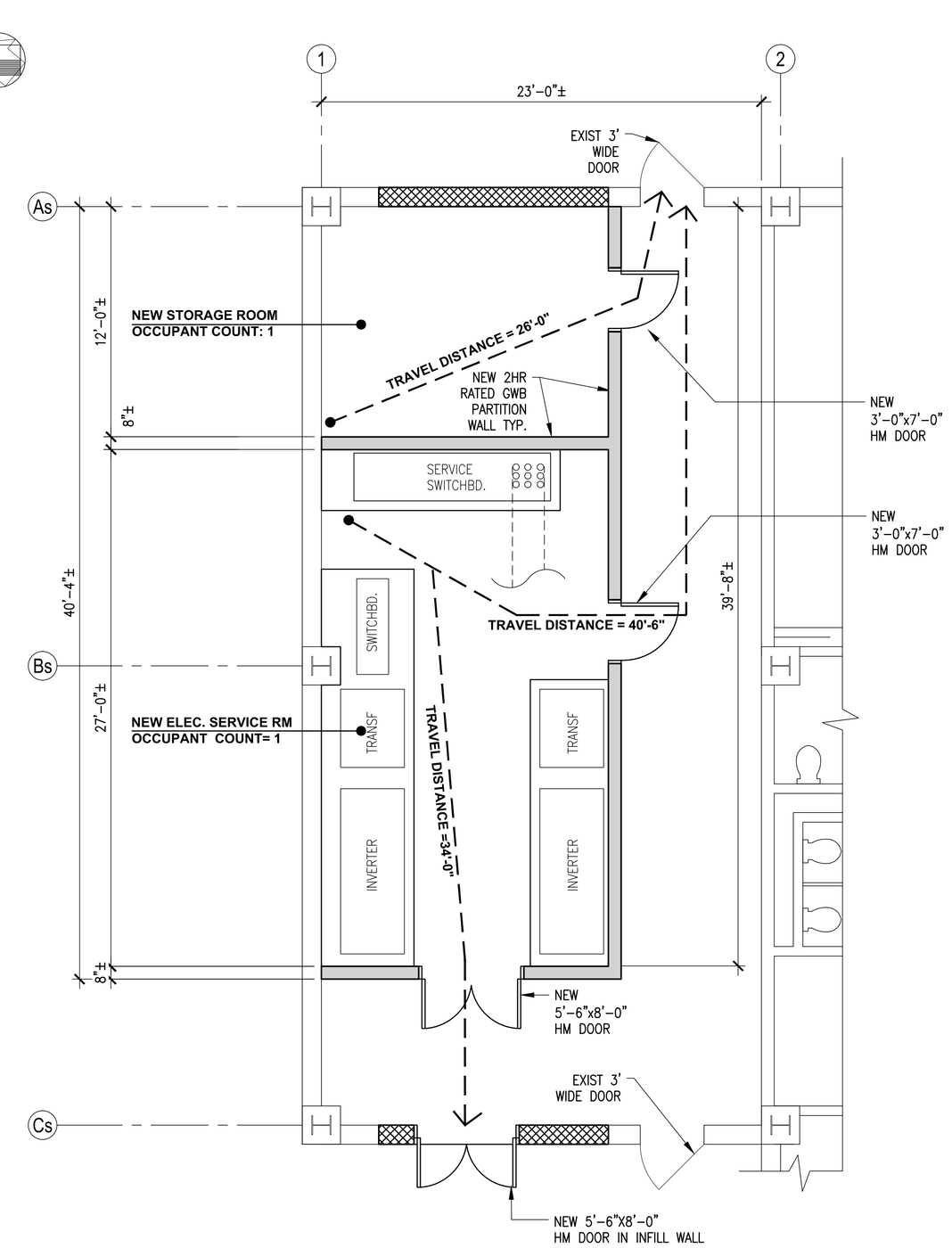
THE FOLLOWING APPLICATIONS RELATED TO THIS PROJECT HAVE BEEN FILED IN 'DOB NOW:

- B00345565
- B00345568
- B00345572

DEMOLITION NOTES

1. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN THE FIELD.
2. THE CONTRACTOR SHALL CONSULT ALL REFERENCE DRAWINGS AND OTHER DOCUMENTATION PROVIDED.
3. REMOVAL OF MECHANICAL, ELECTRICAL & PLUMBING EQUIPMENT AND ASSOCIATED MATERIALS SHALL BE COORDINATED WITH THE CONTRACTOR RESPONSIBLE FOR THOSE REMOVALS.
4. ALL DEMOLITION WORK SHALL BE COORDINATED WITH HAZARDOUS MATERIAL ABATEMENT. NO REMOVALS OR DEMOLITION SHALL BE DONE TO MATERIAL OR CONSTRUCTION CONTAINING HAZARDOUS MATERIAL PRIOR TO ABATING.
5. THE CONTRACTOR SHALL CONFIRM REMOVAL OR ANY ITEMS NOT INDICATED IN DRAWINGS WITH COMMISSIONER, PRIOR TO REMOVAL.
6. CONTRACTOR TO PROVIDE PHYSICAL IMPACT AND WEATHER/WATER PROTECTION FOR THE BUILDING UTILITY CONNECTIONS AND EQUIPMENT LOCATED AT THE ROOF(S) AND WITHIN THE BUILDING. UTILITY CONNECTIONS SHALL REMAIN OPERATIONAL DURING DEMOLITION AND CONSTRUCTION. CONTRACTOR SHALL SUBMIT PROPOSED PROTECTION PLAN, MATERIALS AND INSTALLATION TO THE COMMISSIONER FOR APPROVAL PRIOR TO BEGINNING THE WORK.
7. FOR ADDITIONAL DEMOLITION/REMOVAL INFORMATION SEE REMOVAL DRAWINGS DM-101 THRU DM-202

TRUCK WASH AREA - DISTRICT 17 - ENLARGED EGRESS PLAN



TRAVEL DISTANCE (TABLE 6-1 ,2014 NYC BC)
MAX ALLOWED FOR UNSPRINKLERED = 100 FEET
MAX TRAVEL DISTANCE IN LAYOUT = 40 FEET

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96 Morton Street, NY, New York 10014-3309

VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
GENERAL NOTES, ABBREVIATIONS, SYMBOL LIST AND LEGEND

SEAL & SIGNATURE
REGISTERED ARCHITECT SINITHI SABANAYAGAM 035580 STATE OF NEW YORK
09/27/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	K. HYLAND
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	G-100.00

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was New York Long Island State Plane FIPSZONE 3104. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3182
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the Department of Information Technology and Telecommunication, City of New York (DoITT). This information was derived from digital orthophotos produced at a scale of 1:1,200 with 2-foot pixel resolution from photography dated April 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or deannexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

The AE Zone category has been divided by a **Limit of Moderate Wave Action (LiMWA)**. The LiMWA represents the approximate landward limit of the 1.5- foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

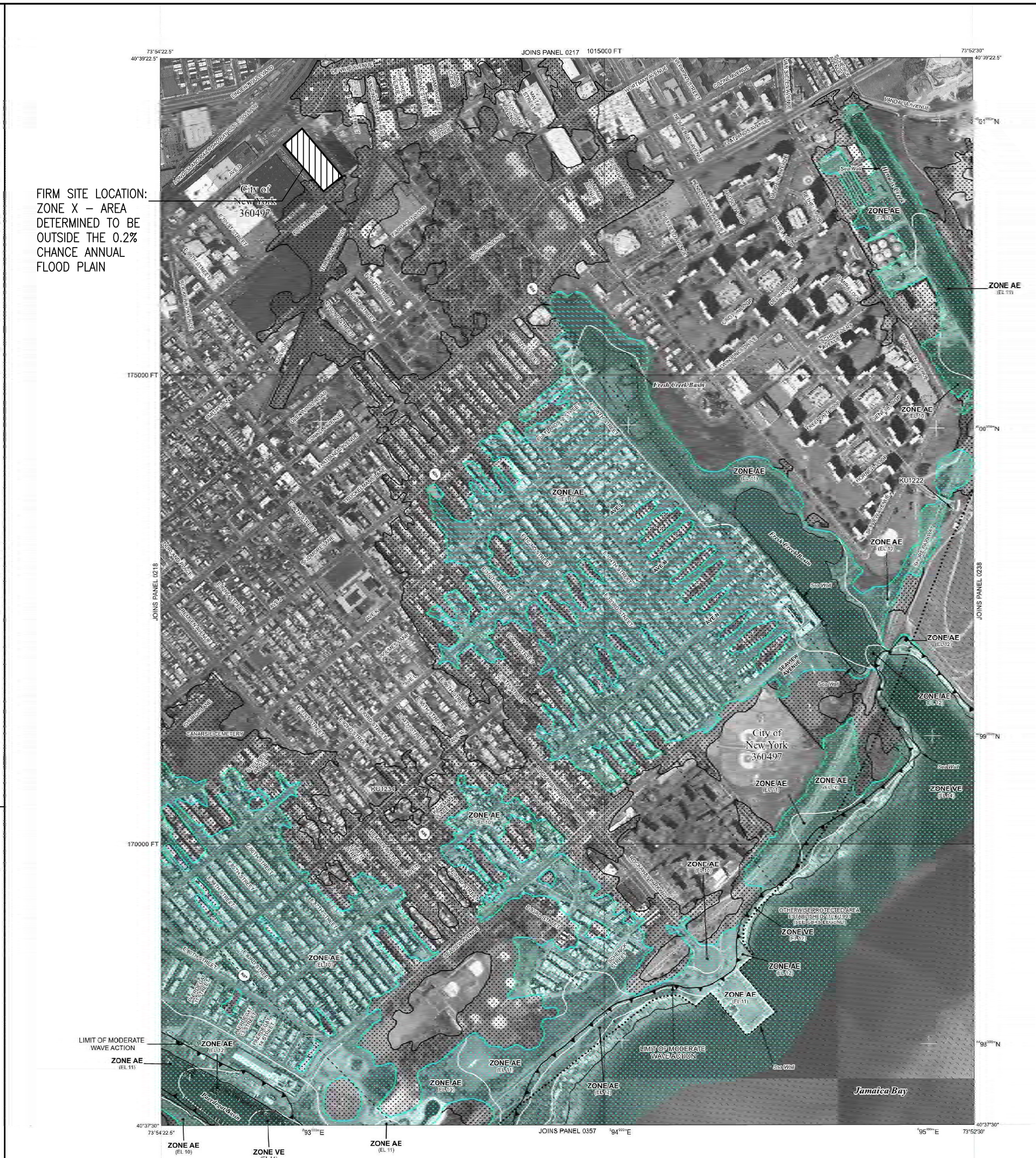
If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND

11-16-1991 Otherwise Protected Area (OPA)

FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMBER 16, 1991, IN DESIGNATED OPAs WITHIN THE CBRS.

Boundaries of the John H. Chafee Coastal Barrier Resources System (CBRS) shown on this FIRM were transferred from the official CBRS source map(s) for this area and are depicted on this FIRM for informational purposes only. The official CBRS maps are enacted by Congress via the Coastal Barrier Resources Act, as amended, and maintained by the U.S. Fish and Wildlife Service (FWS). The official CBRS maps used to determine whether or not an area is located within the CBRS are available for download at http://www.fws.gov. For an official determination of whether or not an area is located within the CBRS, or for any questions regarding the CBRS, please contact the FWS field office for this area at (631) 776-1401.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
- Limit of Moderate Wave Action
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- Culvert, Flume, Penstock or Aqueduct
- Road or Railroad Bridge
- Footbridge
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4378000 N — 1000-meter Universal Transverse Mercator grid values, zone 18
- 600000 FT — 5000-foot grid values: New York State Plane coordinate system, Long Island zone (FIPSZONE 3104), Lambert Conformal Conic projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

INITIAL NFIP MAP DATE
June 28, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS
June 11, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE
November 16, 1983

FLOOD INSURANCE RATE MAP REVISIONS

For descriptions of revisions see Notice to Users page in the Flood Insurance Study report.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0219G

FIRM
FLOOD INSURANCE RATE MAP

CITY OF,
NEW YORK
NEW YORK
BRONX, RICHMOND, NEW YORK, QUEENS, AND KINGS COUNTIES

PANEL 219 OF 457

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NEW YORK, CITY OF	360497	0219	G

- NOTE -

THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

PRELIMINARY
DECEMBER 5, 2013

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
3604970219G

MAP REVISED

Federal Emergency Management Agency

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VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC **Department of Design and Construction**

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
FLOOD MAP

SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/27/19

DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: K. HYLAND
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
G-101.00

NYCECC CITATION	PROVISION	ITEM DESCRIPTION	CODE PRESCRIPTIVE VALUE	COMPLIANCE CONFIRMATION
C 402.1	BUILDING ENVELOPE REQUIREMENTS: GENERAL (PRESCRIPTIVE) CLIMATE ZONE 4A			
C 402.2.1	ROOF ASSEMBLY	MEET MINIMUM CONTINUOUS INSULATION REQUIREMENTS (TABLE C402.2)	R-30 c.i. MINIMUM R-30 RIGID INSULATION	INSULATION LAYOUT PLAN AND TR-8 INSPECTIONS TO ENSURE COMPLIANCE
C 402.2.1.1	ROOF SOLAR REFLECTANCE AND THERMAL EMITTANCE	MEET AT LEAST ONE REQUIREMENT OF TABLE C402.2.1.1	INITIAL SOLAR REFLECTANCE INDEX OF 0.82	ROOF REFLECTANCE INDEX SPECIFIED AT 82 MIN.
C 402.1.4	OPAQUE SWINGING EXTERIOR DOORS	MEET MAXIMUM U FACTOR VALUES PER CLIMATE ZONE (TABLE C402.1.4)	U-0.61	DOOR MANUFACTURERS TEST CERTIFICATES TO BE SUBMITTED
C 402.5.2	AIR LEAKAGE OF FENESTRATION – SWINGING DOORS	DO NOT EXCEED MAXIMUM AIR LEAKAGE RATE FOR EXTERIOR DOOR ASSEMBLY (TABLE C402.5.2)	MAX 0.20 CFM/SF	DOOR MANUFACTURERS TEST CERTIFICATES TO BE SUBMITTED

2016 NYCECC COMPLIANCE STATEMENT:

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, ALL WORK UNDER THIS APPLICATION IS IN COMPLIANCE WITH THE 2016 NYCECC

REFER TO EN-001 FOR ADDITIONAL 2016 NYCECC COMPLIANCE ANALYSES



R.A. / P.E. SIGN AND SEAL

2016 NYCECC TABULAR ANALYSIS - COMMERCIAL LIGHTING

NYCECC CITATION	PROVISION	ITEM DESCRIPTION	PROPOSED DESIGN VALUE	CODE PRESCRIPTIVE VALUE (ECC)	SUPPORTING DOCUMENTATION
C405.2	LIGHTING CONTROLS (MANDATORY)	INTERIOR LIGHTING CONTROLS INCLUDE OCCUPANCY SENSOR WITH MANUAL ON AND AUTOMATIC SHUTOFF.	COMBINATION SWITCH/VACANCY SENSOR IS PROVIDED WITHIN NEWLY CREATED STORAGE ROOM. MANUAL SWITCH PROVIDED WITHIN A NEWLY CREATED ELECTRICAL SERVICE ROOM(EXEMPT FROM AUTO CONTROL DUE TO SAFETY).	LIGHTING SYSTEMS SHALL BE PROVIDED WITH CONTROLS AS SPECIFIED IN SECTIONS C405.2.1, C405.2.2, C405.2.3, C405.2.4 AND C405.2.5. EXCEPTIONS: LIGHTING CONTROLS ARE NOT REQUIRED FOR THE FOLLOWING: 1. AREAS DESIGNATED AS SECURITY OR EMERGENCY AREAS THAT ARE REQUIRED TO BE CONTINUOUSLY LIGHTED. 2. INTERIOR EXIT STAIRWAYS, INTERIOR EXIT RAMPS AND EXIT PASSAGEWAYS. 3. EMERGENCY EGRESS LIGHTING THAT IS NORMALLY OFF.	SEE DRAWING A-111 (REFLECTED CEILING PLAN)
C405.2.1	OCCUPANT SENSOR CONTROLS	OCCUPANT SENSOR CONTROL IS PROVIDED IN STORAGE ROOM	VACANCY SENSORS PROVIDED WITH 20 MINUTE SHUT OFF LIMIT	OCCUPANT SENSOR CONTROLS IN SPACES OTHER THAN WAREHOUSES SPECIFIED IN SECTION C405.2.1 SHALL COMPLY WITH THE FOLLOWING: 1. AUTOMATICALLY TURN OFF LIGHTS WITHIN 20 MINUTES OF ALL OCCUPANTS LEAVING THE SPACE. 2. BE MANUAL ON OR CONTROLLED TO AUTOMATICALLY TURN THE LIGHTING ON TO NOT MORE THAN 50 PERCENT POWER. EXCEPTIONS: 1. FULL AUTOMATIC-ON CONTROLS SHALL BE PERMITTED TO CONTROL LIGHTING IN OPEN PLAN OFFICES, PUBLIC CORRIDORS, STAIRWAYS, RESTROOMS, PRIMARY BUILDING ENTRANCE AREAS AND LOBBIES, AND AREAS WHERE MANUAL-ON OPERATION WOULD ENDANGER THE SAFETY OR SECURITY OF THE ROOM OR BUILDING OCCUPANTS. 2. MANUAL-ON CONTROLS SHALL BE REQUIRED FOR CLASSROOMS (NOT INCLUDING SHOP CLASSROOMS, LABORATORY CLASSROOMS, AND PRESCHOOL CLASSROOMS), CONFERENCE/MEETING ROOMS, EMPLOYEE LUNCH AND BREAK ROOMS, AND OFFICES SMALLER THAN 200 SQUARE FEET (18.5 M^2) IN AREA. SUCH SENSORS AND CONTROLS SHALL NOT HAVE AN OVERRIDE SWITCH THAT CONVERTS FROM MANUAL-ON TO AUTOMATIC-ON FUNCTIONALITY, AND MAY HAVE A GRACE PERIOD OF UP TO 30 SECONDS TO TURN ON THE LIGHTING AUTOMATICALLY AFTER THE SENSOR HAS TURNED OFF THE LIGHTING IF OCCUPANCY IS DETECTED. 3. SHALL INCORPORATE A MANUAL CONTROL TO ALLOW OCCUPANTS TO TURN LIGHTS OFF.	SEE DRAWING A-111 (REFLECTED CEILING PLAN)
C405.2.2.3	MANUAL CONTROLS	MANUAL CONTROL AT STORAGE ROOM	MANUAL CONTROLS PROVIDED AS REQUIRED	MANUAL CONTROLS FOR LIGHTS SHALL COMPLY WITH THE FOLLOWING: 1. SHALL BE READILY ACCESSIBLE TO OCCUPANTS. 2. SHALL BE LOCATED WHERE THE CONTROLLED LIGHTS ARE VISIBLE, OR SHALL IDENTIFY THE AREA SERVED BY THE LIGHTS AND INDICATE THEIR STATUS.	SEE DRAWING A-111 FOR LOCATION OF SWITCH/VACANCY SENSOR
C405.3	EXIT SIGNS	FIVE NEW LED EXIT SIGNS TO BE PROVIDED	5W PER SIDE	1. INTERNALLY ILLUMINATED EXIT SIGNS SHALL NOT EXCEED 5 WATTS PER SIDE.	SEE DRAWING A-111 (LIGHTING FIXTURE SCHEDULE)
C405.4	INTERIOR LIGHTING POWER REQUIREMENTS	INTERIOR LIGHTING POWER REQUIREMENTS FOR STORAGE ROOM AND ELECTRICAL ROOM	STORAGE ROOM: 0.59 W/SF ELECTRICAL/MECHANICAL ROOM: 0.39 W/SF LPD VALUE FOR SPACES-BY-SPACE IS LESS THAN THE INTERIOR LIGHTING POWER CALCULATED UNDER SECTION C405.4.2. SEE DRAWING A-111.	1. STORAGE ROOM: 0.63 W/SF 2. ELECTRICAL/MECHANICAL ROOM: 0.95 W/SF 3. THE TOTAL CONNECTED INTERIOR LIGHTING POWER SHALL BE DETERMINED IN ACCORDANCE WITH EQUATION 4-9.	SEE DRAWING A-111 (LIGHTING FIXTURE SCHEDULE)

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A CONSTRUCTION CONSULTING FIRM

DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
2016 NYC ECC TABULAR ANALYSIS

SEAL & SIGNATURE



DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DAROSA
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	EN-100.00

COMcheck Software Version 4.1.1.0

Interior Lighting Compliance Certificate

Project Information

Energy Code: 2016 New York City Energy Conservation Code
Project Title: DSNY-Brooklyn 17/18
Project Type: Alteration

Construction Site:
10502 Avenue D
Brooklyn, NY 11236

Owner/Agent:
NYC DDC
30-30 Thompson AVe

Designer/Contractor:
Syska Hennessy Group
1515 Broadway
15th Floor
New York, NY 10036

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B X C)
1-Common Space Types:Storage >=50 - <=1000 sq.ft.	225	0.63	142
2-Common Space Types:Electrical/Mechanical	315	0.95	299
		Total Allowed Watts =	441

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Common Space Types:Storage >=50 - <=1000 sq.ft. (225 sq.ft.)				
LED 1: LED Panel 44W;	1	3	45	135
Common Space Types:Electrical/Mechanical (315 sq.ft.)				
LED 1: LED Panel 44W;	1	4	45	180
		Total Proposed Watts =		315

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2016 New York City Energy Conservation Code requirements in COMcheck Version 4.1.1.0 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

COMcheck Software Version 4.1.1.0

Mechanical Compliance Certificate

Project Information

Energy Code: 2016 New York City Energy Conservation Code
Project Title: DSNY-Brooklyn 17/18
Location: New York, New York
Climate Zone: 4a
Project Type: Alteration

Construction Site:
10502 Avenue D
Brooklyn, NY 11236

Owner/Agent:
NYC DDC
30-30 Thompson AVe

Designer/Contractor:
Syska Hennessy Group
1515 Broadway
15th Floor
New York, NY 10036

Mechanical Systems List

Quantity System Type & Description

1 RTU-1 (Multiple-Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 500 kBtu/h
Proposed Efficiency = 81.00% Et, Required Efficiency: 80.00 % Et
Cooling: 1 each - Single Package DX Unit, Capacity = 438 kBtu/h, Air-Cooled Condenser, Air Economizer
Proposed Efficiency = 12.10 EER, Required Efficiency: 9.80 EER + 11.4 IEER
Fan System: RTU-1 | District 17 Office -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 1 Supply, Multi-Zone VAV, 9000 CFM, 2.0 motor nameplate hp, 70.0 fan efficiency grade

1 RTU-2 (Multiple-Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 1000 kBtu/h
Proposed Efficiency = 81.00% Et, Required Efficiency: 80.00 % Et
Cooling: 1 each - Single Package DX Unit, Capacity = 507 kBtu/h, Air-Cooled Condenser, Air Economizer
Proposed Efficiency = 10.40 EER, Required Efficiency: 9.80 EER + 11.4 IEER
Fan System: RTU-2 | District 18 Office -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 2 Supply, Multi-Zone VAV, 12000 CFM, 2.0 motor nameplate hp, 70.0 fan efficiency grade

1 HV-1 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 120 kBtu/h
Proposed Efficiency = 82.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Fan System: HV-1 | District 17 Office -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 3 Supply, Constant Volume, 1400 CFM, 1.1 motor nameplate hp, 70.0 fan efficiency grade

1 HV-2 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 200 kBtu/h
Proposed Efficiency = 82.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE
Fan System: HV-2 | District 18 Office -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 4 Supply, Constant Volume, 2400 CFM, 1.5 motor nameplate hp, 70.0 fan efficiency grade

2 MU-1,2 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 800 kBtu/h
Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et

Quantity System Type & Description

Fan System: MU | GARAGE -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 5 Supply, Constant Volume, 8500 CFM, 7.5 motor nameplate hp, 70.0 fan efficiency grade

16 MU-3 THRU 18 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 800 kBtu/h
Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et
Fan System: MU | GARAGE -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 5 Supply, Constant Volume, 8500 CFM, 7.5 motor nameplate hp, 70.0 fan efficiency grade

1 ACCU-1 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 81 kBtu/h,
Proposed Efficiency = 3.60 COP, Required Efficiency = 3.30 COP
Cooling Mode: Capacity = 72 kBtu/h,
Proposed Efficiency = 12.50 EER, Required Efficiency: 11.00 EER + 12.0 IEER
Fan System: ACCU | ELEC CLOSET -- Compliance (Motor nameplate HP method) : Passes

Fans:
FAN 7 Supply, Constant Volume, 7000 CFM, 3.0 motor nameplate hp, 72.0 fan efficiency grade

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2016 New York City Energy Conservation Code requirements in COMcheck Version 4.1.1.0 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

COMcheck Software Version 4.1.1.0

Inspection Checklist

Energy Code: 2016 New York City Energy Conservation Code

Requirements: 100.0% were addressed directly in the COMcheck software
Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
C403.2.4.5, C403.2.4.6 [FO9][1]	Snow/ice melting system sensors for future connection to controls. Freeze protection systems have automatic controls installed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.6.3 [PL7][1]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.6.3 [PL7][2]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.6.3 [PL7][3]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.6.3 [PL7][3]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.6.3 [PL7][1]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.6.3 [PL7][2]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.6.3 [PL7][3]	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C404.7 [PL8][1]	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME41][1]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐Complies ☐Does Not ☐Not Applicable	Requirement will be met.
C403.2.12.1 [ME65][2]	HVAC fan systems at design conditions do not exceed allowab e fan system motor nameplate hp or fan system bhp.	☐Complies ☐Does Not ☐Not Applicable	Requirement will be met. *See the Mechanical Systems list for values.*
C403.2.12.1 [ME65][3]	HVAC fan systems at design conditions do not exceed allowab e fan system motor na neplate hp or fan system bhp.	☐Complies ☐Does Not ☐Not Applicable	Requirement will be met. *See the Mechanical Systems list for values.*
C403.2.12.3 [ME117][2]	Fans have efficiency grade (FEG) >= 67. This total efficiency of the fan at the design point of operation <= 15% of maximum total efficiency of the fan.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.12.3 [ME117][3]	Fans have efficiency grade (FEG) >= 67. This total efficiency of the fan at the design point of operation <= 15% of maximum total efficiency of the fan.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.13 [ME71][2]	Unenclosed spaces that are heated use only radiant heat.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.3 [ME55][2]	HVAC equipment efficiency verified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.2.4.4 [ME112][2]	Zone isolation devices and controls installed where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	Requirement will be met.
C403.2.4.4 [ME112][3]	Zone isolation devices and controls installed where applicable.	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	Requirement will be met.
C403.2.4.7 [ME113][2]	Fault detection and diagnostics installed with air-cooled unitary DX units having economizers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.7 [ME113][3]	Fault detection and diagnostics installed with air-cooled unitary DX units having economizers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.6.1 [ME59][2]	Demand control ventilatio s provided for spaces >500 ft2 and >25 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.2.6.2 [ME115][2]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.7 [ME57][2]	Exhaust air energy recovery on systems meeting Table C403.2.7(1) and C403.2.7(2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Systems serving spaces that are not cooled and heated to 60°F.
C403.2.8 [ME116][2]	Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.9 [ME60][2]	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occu during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.9 [ME103][2]	Ducts and plenums sealed based on static pressure and location.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.9.1.3 [ME11][2]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.9.1.3 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.9.1.3 [ME11][2]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.9.1.3 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.9.1.3 [ME11][2]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.9.1.3 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.3 [ME62][2]	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.3 [ME62][3]	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.1.1 [ME75][2]	Hydronic and multizone HVAC system controls areVAV fans driven by mechanical or electrical variable s.eed drive per Table C403.4.1.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.1.1 [ME75][3]	Hydronic and multizone HVAC system controls areVAV fans driven by mechanical or electrical variable s.eed drive per Table C403.4.1.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.1.2 [ME67][2]	VAV fans have static pressure sensors located so controller setpoint <=1.2 w c..	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	Requirement will be met.
C403.4.1.2 [ME67][3]	VAV fans have static pressure sensors located so controller setpoint <=1.2 w c..	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	Requirement will be met.
C403.4.1.3 [ME24][2]	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.1.3 [ME24][3]	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.2.3.2.1 [ME121][2]	Closed-circuit cooling tower within heat pump loop have either automatic bypass valve or lower leakage positive closure dampers. Open-circuit tower within heat pump loop have automatic valve to bypass all heat pump water flow around ths tower. Open- or closed-circuit cooling towers used in conjunction with a separate heat exchanger have heat loss by shutting down the circulation pump on the cooling tower loop.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.4.4.6 [ME110][2]	Mult ple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. *See the Mechanical Systems list for values.*

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.4.4.6 [ME110][2]	Mult ple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. *See the Mechanical Systems list for values.*
C403.4.4.6 [ME110][3]	Mult ple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Systems where the design exhaust airflow is more than 70% of design outdoor air intake flow. *See the Mechanical Systems list for values.*
C403.4.4.6 [ME110][3]	Mult ple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Systems where the design exhaust airflow is more than 70% of design outdoor air intake flow. *See the Mechanical Systems list for values.*
C403.4.4.6 [ME110][3]	Mult ple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	**Exception:** Systems where the design exhaust airflow is more than 70% of design outdoor air intake flow. *See the Mechanical Systems list for values.*
C403.4.4.6 [ME110][3]	Mult ple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	**Exception:** Requirement does not apply. *See the Mechanical Systems list for values.*
C408.2.2.1 [ME53][2]	Air outlets a nd zone terminal devices have means for air balancing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1)	2 Medium Impact (Tier 2)	3 Low Impact (Tier 3)

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
MECHANICAL COMPLIANCE

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · LICENSED PROFESSIONAL ENGINEER · 074416

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: SL
CHECKED BY: SL
DRAWING NUMBER:
EN-002.00

Plotted: 9/27/2019 8:02:08 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\EN-002.00_DDC33000.DWG - akhan

Section # & Req.ID	Rough-in Electrical Inspection	Complies?	Comments/Assumptions
C405.2.1 [EL15][1]	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.1 [EL18][1]	Occupancy sensors installed in required spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.1, C405.2.2.3 [EL23][2]	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.2.1 [EL22][2]	Automatic controls to shut off all building lighting installed in all buildings.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.3 [EL16][1]	Daylight zones provided with individual controls that control the lights independent of general area lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.3, C405.2.3.1, C405.2.3.2 [EL20][1]	Primary sidelighted areas are equipped with required lighting controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.3, C405.2.3, C405.2.3.3 [EL21][1]	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped with required lighting controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.4 [EL4][1]	Separate lighting control devices for specific uses installed per approved lighting plans.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.4 [EL8][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.3 [EL6][1]	Exit signs do not exceed 5 watts per face.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][1]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C303.3, C408.2.5.3 [FI8][1]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.2 [FI27][1]	HVAC systems and equipment capacity does not exceed calculated loads.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1 [FI47][1]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1 [FI47][1]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1 [FI47][1]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1 [FI47][1]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1 [FI47][1]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1 [FI47][1]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1.1 [FI42][1]	Heat pump controls prevent supplemental electric resistance heat from coming on when not needed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C403.2.4.1.2 [FI38][1]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.1.3 [FI20][1]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.2 [FI39][1]	Each zone equipped with setback controls using automatic time clock or programmable control system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.2.1, C403.2.4.2.2 [FI40][1]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	Requirement will be met.
C403.2.4.3 [FI41][1]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3 [FI41][1]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3 [FI41][1]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3 [FI41][1]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3 [FI41][1]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Appl cable	Requirement will be met.
C403.2.4.3 [FI41][1]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.4.1 [FI18][1]	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Interior Lighting fixture schedule for values.*

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.1 [FI28][1]	Commissioning plan developed by approved agency. Lighting controls shall be commissioned in accordance with C408.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.3.1 [FI31][1]	HVAC equipment has been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.3.2 [FI10][1]	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.3.3 [FI32][1]	Economizers have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.1 [FI7][1]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.1 [FI16][1]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.3 [FI43][1]	An air and/or hydronic system balancing report is provided for HVAC systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.4 [FI30][1]	Final commissioning report due to building owner within 30 months (for new buildings > 500,000 ft2) or 18 months (for R-2 and all other buildings) of receipt of certificate of occupancy.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT

DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:

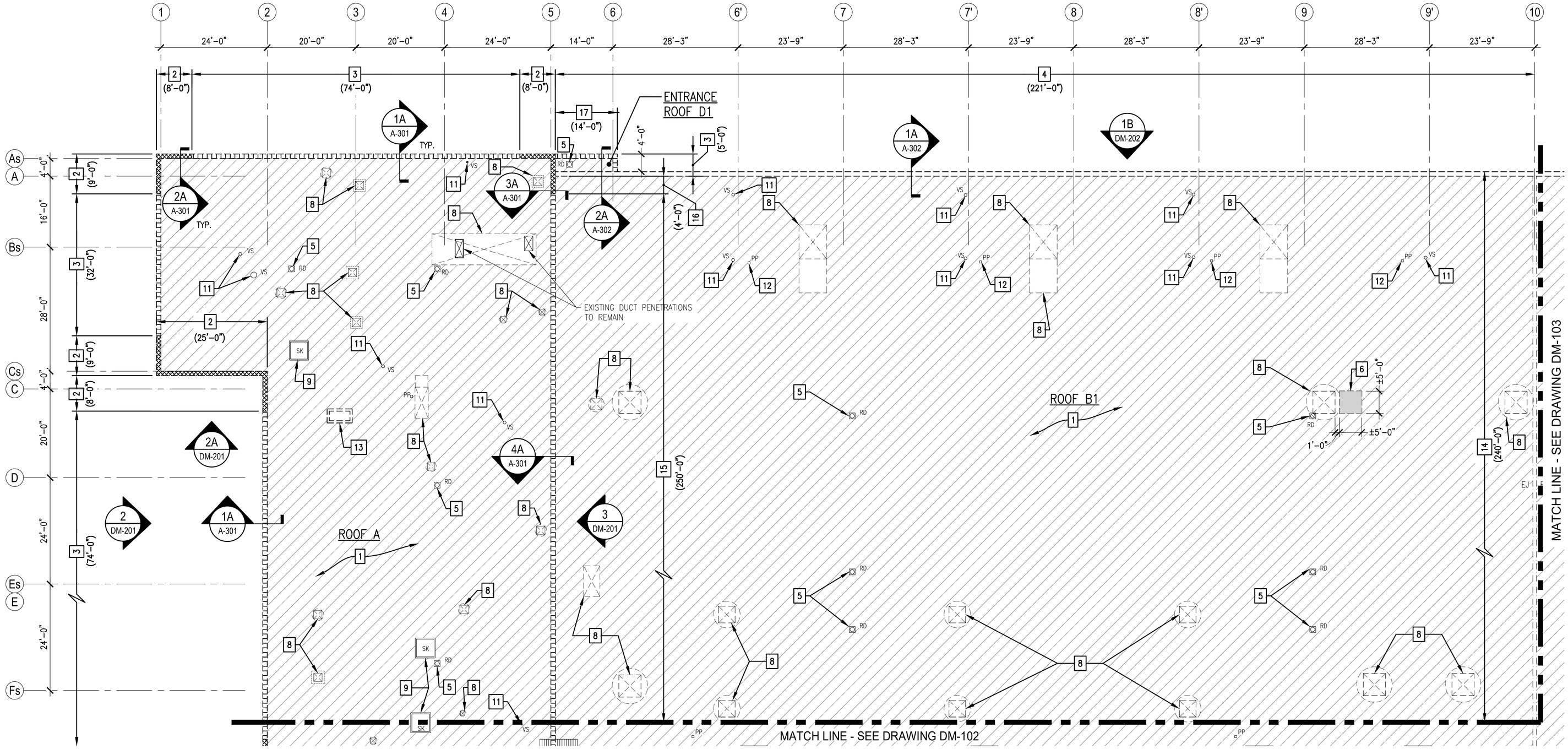
MECHANICAL COMPLIANCE

SEAL & SIGNATURE

STATE OF NEW YORK — SETH TITTERTON — LICENSED PROFESSIONAL ENGINEER — 074116

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: SL
CHECKED BY: SL
DRAWING NUMBER:
EN-003.00

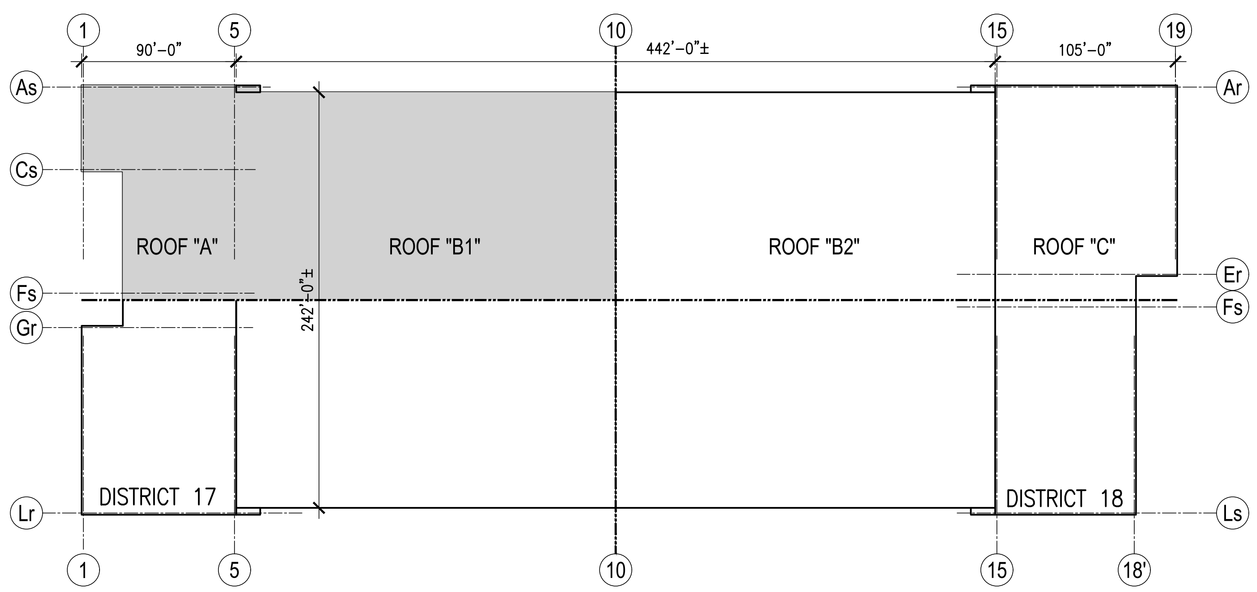
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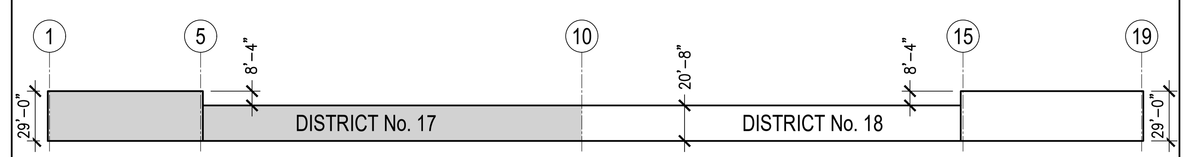
1A DM-101 PARTIAL ROOF PLAN (DISTRICT 17) - REMOVALS

Scale: 0 4 12 24 feet

BUILDING KEY PLAN



BUILDING SCHEMATIC SECTION



REMOVAL NOTES

1. FOR DECK REMOVAL AND REPLACEMENT LOCATIONS NOT SHOWN ON ARCHITECTURAL DRAWINGS; SEE STRUCTURAL DRAWINGS S–101 THRU S–104
   - AT AREAS OF DECK REMOVAL/REPLACEMENT, REMOVE AND REINSTALL EXISTING VENTS, ROOF DRAINS, ETC.

REMOVAL KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REMOVE EXISTING BALLASTED ROOFING ASSEMBLY (INCLUDING RIGID INSULATION AND WOOD BLOCKING) TO TOP OF EXISTING STEEL DECK; REMOVE ALL ASSOCIATED CAP AND BASE FLASHINGS, EXPANSION JOINT COVERS, PITCH POCKETS, CRICKETS AND CANTS	N/A
2		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING.	2A/A–301
3		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING	1A/A–301
4		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK MASONRY CURB AT ROOF EDGE.	1A/A–302
5	RD	REMOVE EXISTING ROOF DRAIN; REFER TO PLUMBING DWGS (1)	N/A
6		REMOVE PORTION OF EXIST. METAL DECK FOR INSTALLATION OF NEW MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL DRAWINGS FOR OPENING SIZE	N/A
7		NOT USED	
8	OR	REMOVE EXISTING EQUIPMENT CURBS; SEE MECH DRAWINGS FOR EQUIPMENT REMOVAL	N/A
9	SK	EXISTING SKYLIGHT TO REMAIN; REMOVE FLASHINGS AROUND SKYLIGHT CURB	N/A
10		NOT USED	
11	VS	REMOVE EXISTING FLASHING AT EXISTING VENT STACKS	N/A
12	PP	REMOVE EXISTING PITCH POCKETS AT PIPE PENETRATIONS	N/A
13		REMOVE EXISTING 2 PIECE CAP FLASHING A CHIMNEY	N/A
14	EJ	REMOVE EXISTING EXPANSION JOINT COVER AND FILLER	N/A
15		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	4A/A301
16		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	3/A–301
17		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AND 3 COURSES OF FACE BRICK AT ENTRANCE ROOF.	2/A–302

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

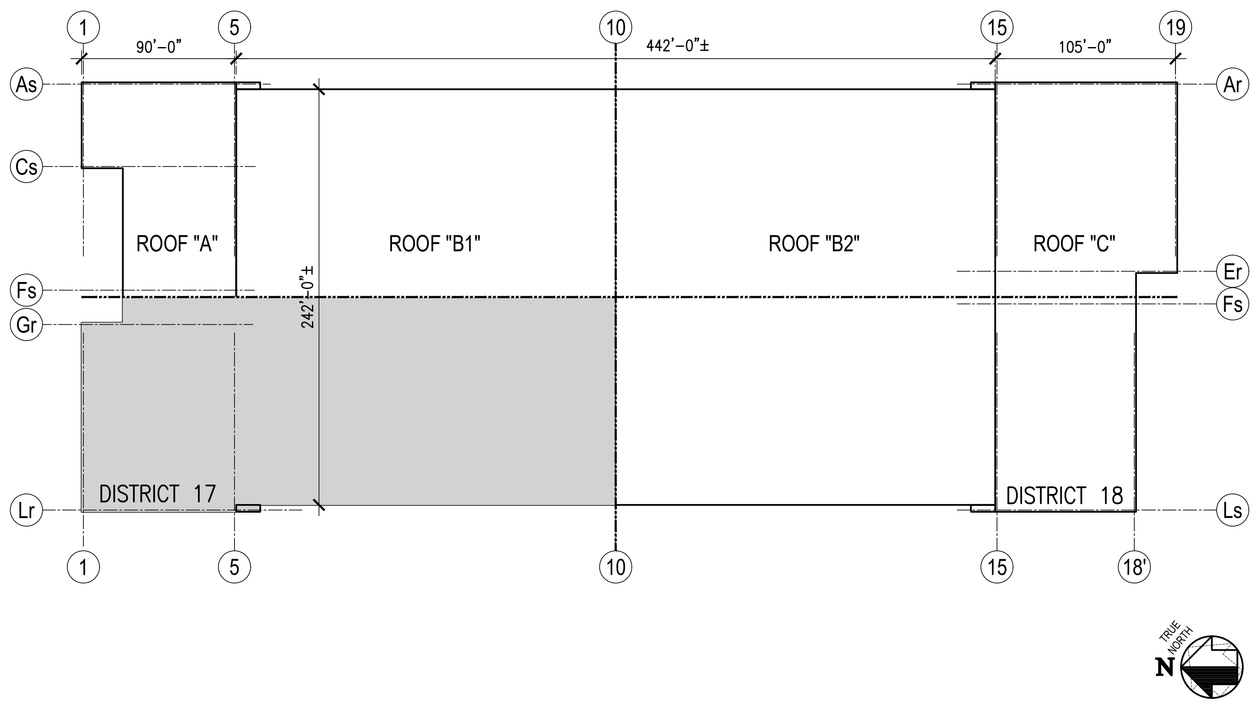
LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN REMOVALS 1 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
DM-101.00

BUILDING KEY PLAN

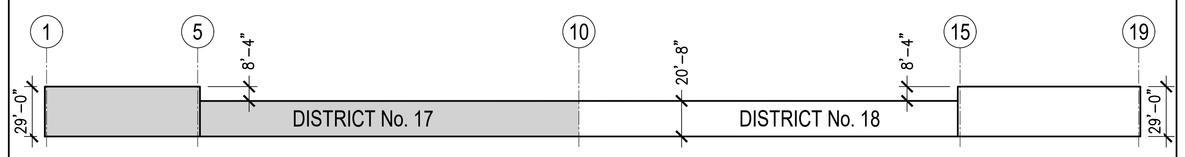


REMOVAL KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REMOVE EXISTING BALLASTED ROOFING ASSEMBLY (INCLUDING RIGID INSULATION AND WOOD BLOCKING) TO TOP OF EXISTING STEEL DECK; REMOVE ALL ASSOCIATED CAP AND BASE FLASHINGS, EXPANSION JOINT COVERS, PITCH POCKETS, CRICKETS AND CANTS	N/A
2		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING.	2A/A–301
3		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING	1A/A–301
4		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK MASONRY CURB AT ROOF EDGE.	1A/A–302
5	RD	REMOVE EXISTING ROOF DRAIN; REFER TO PLUMBING DWGS (1)	N/A
6		REMOVE PORTION OF EXIST. METAL DECK FOR INSTALLATION OF NEW MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL DRAWINGS FOR OPENING SIZE	N/A
7		REMOVE EXISTING ROOF HATCH	N/A
8	OR	REMOVE EXISTING EQUIPMENT CURBS; SEE MECH DRAWINGS FOR EQUIPMENT REMOVAL	N/A

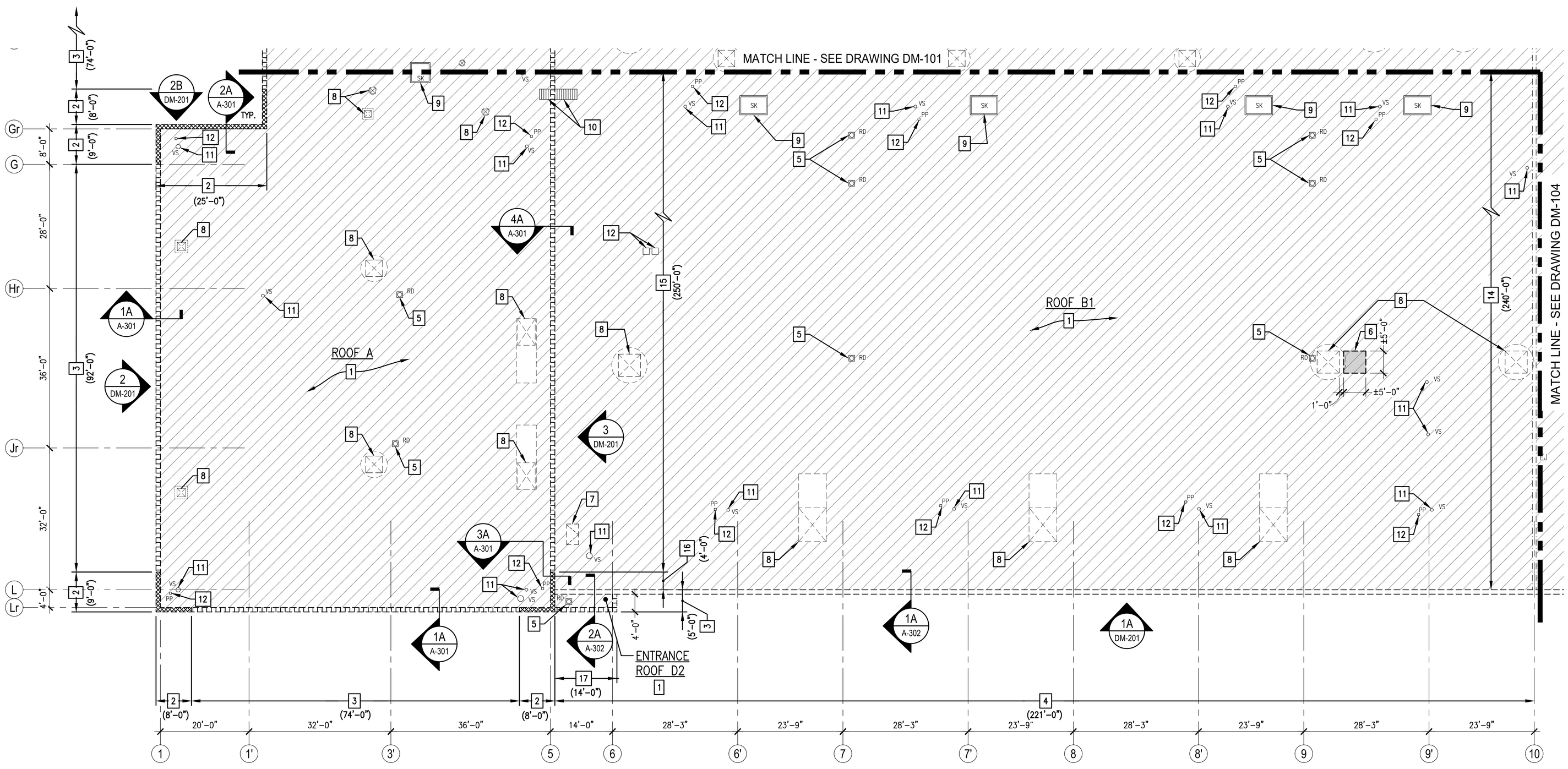
No.	SYMBOL	DESCRIPTION	DETAIL
9	SK	EXISTING SKYLIGHT TO REMAIN; REMOVE FLASHINGS AROUND SKYLIGHT CURB	N/A
10		REMOVE/REINSTALL EXISTING ROOF SHIPS LADDER W/CROSSOVER PLATFORM	1/1–402
11	VS	REMOVE EXISTING FLASHING AT EXISTING VENT STACKS	N/A
12	PP	REMOVE EXISTING PITCH POCKETS AT PIPE PENETRATIONS	N/A
13		NOT USED	
14	EJ	REMOVE EXISTING EXPANSION JOINT COVER AND FILLER	N/A
15		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	4A/A301
16		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	3/A–301
17		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AND 3 COURSES OF FACE BRICK AT ENTRANCE ROOF.	2/A–302

BUILDING SCHEMATIC SECTION



REMOVAL NOTES

1. FOR DECK REMOVAL AND REPLACEMENT LOCATIONS NOT SHOWN ON ARCHITECTURAL DRAWINGS; SEE STRUCTURAL DRAWINGS S–101 THRU S–104
   - AT AREAS OF DECK REMOVAL/REPLACEMENT, REMOVE AND REINSTALL EXISTING VENTS, ROOF DRAINS, ETC.



1B DM-102 PARTIAL ROOF PLAN (DISTRICT 17) - REMOVALS

Scale: 0 4 12 24 feet

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DDB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

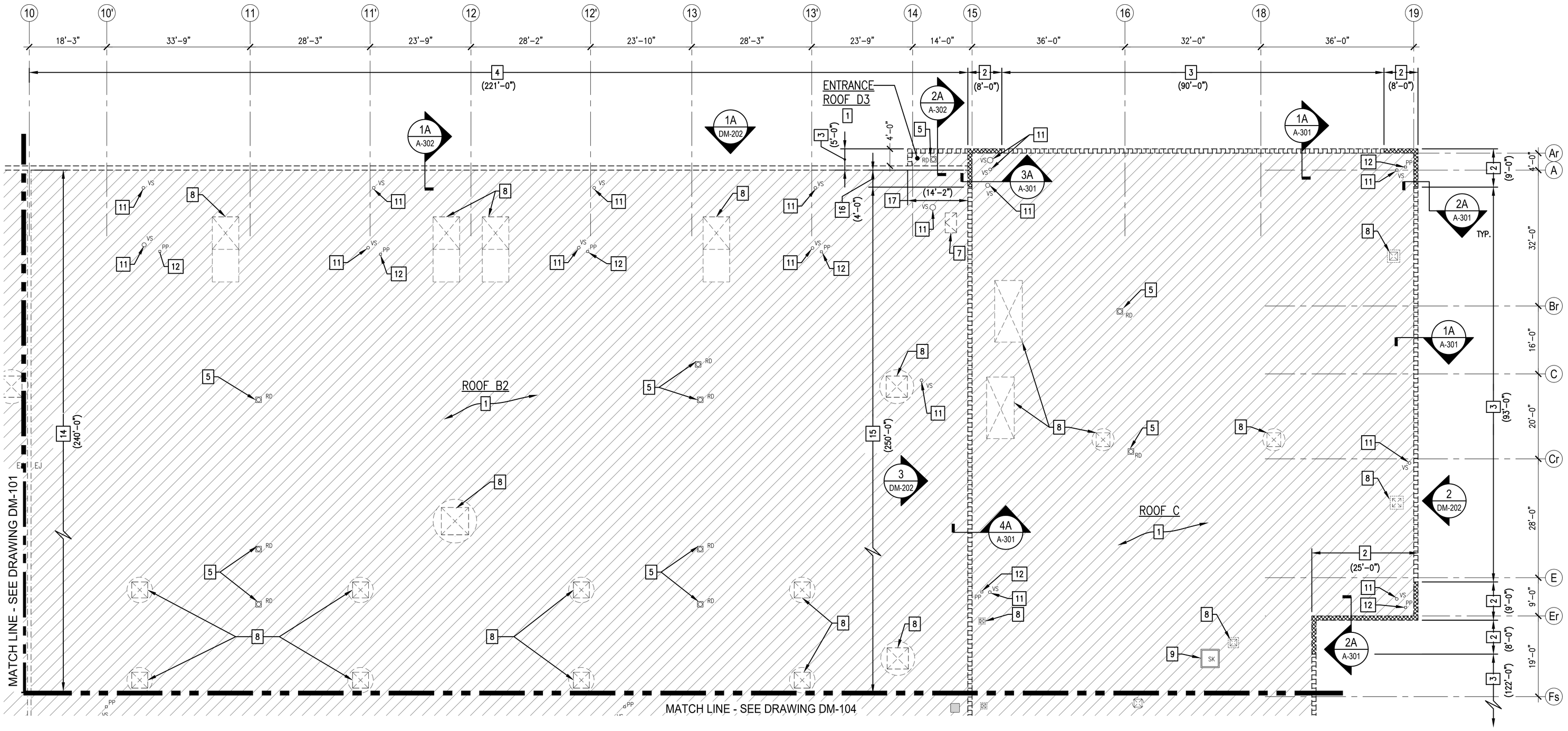
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN
REMOVALS
2 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
DM-102.00



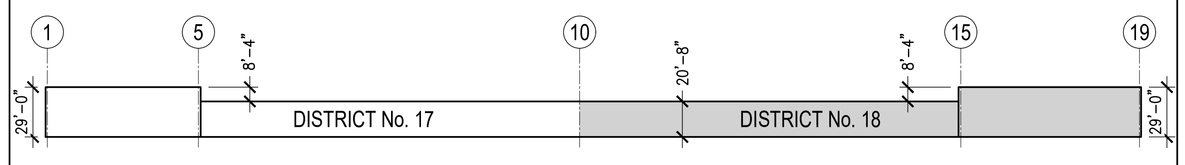
2A DM-103 PARTIAL ROOF PLAN (DISTRICT 18) - REMOVALS

Scale: 0 4 12 24 feet

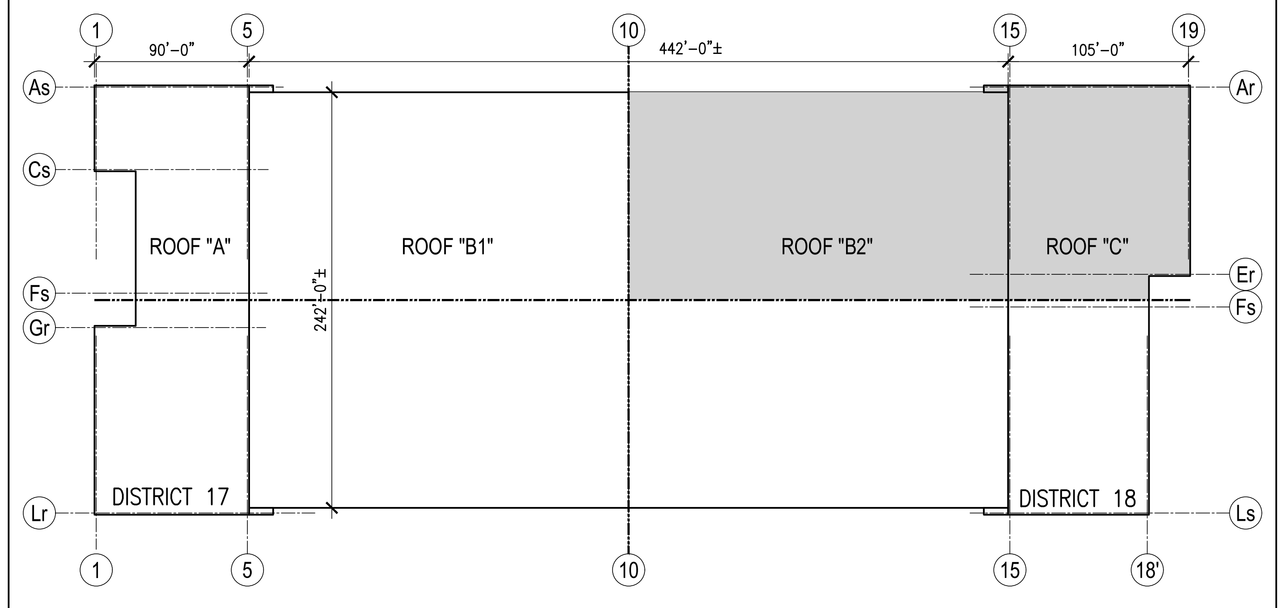
REMOVAL NOTES

1. FOR DECK REMOVAL AND REPLACEMENT LOCATIONS NOT SHOWN ON ARCHITECTURAL DRAWINGS; SEE STRUCTURAL DRAWINGS S–101 THRU S–104
   - AT AREAS OF DECK REMOVAL/REPLACEMENT, REMOVE AND REINSTALL EXISTING VENTS, ROOF DRAINS, ETC.

BUILDING SCHEMATIC SECTION



BUILDING KEY PLAN



REMOVAL KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REMOVE EXISTING BALLASTED ROOFING ASSEMBLY (INCLUDING RIGID INSULATION AND WOOD BLOCKING) TO TOP OF EXISTING STEEL DECK; REMOVE ALL ASSOCIATED CAP AND BASE FLASHINGS, EXPANSION JOINT COVERS, PITCH POCKETS, CRICKETS AND CANTS	N/A
2		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING.	2A/A–301
3		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING	1A/A–301
4		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK MASONRY CURB AT ROOF EDGE.	1A/A–302
5	RD	REMOVE EXISTING ROOF DRAIN; REFER TO PLUMBING DWGS. (1)	N/A
6		NOT USED	
7		REMOVE EXISTING ROOF HATCH	N/A
8	OR	REMOVE EXISTING EQUIPMENT CURBS; SEE MECH DRAWINGS FOR EQUIPMENT REMOVAL	N/A

No.	SYMBOL	DESCRIPTION	DETAIL
9	SK	EXISTING SKYLIGHT TO REMAIN; REMOVE FLASHINGS AROUND SKYLIGHT CURB	N/A
10		NOT USED	
11	VS	REMOVE EXISTING FLASHING AT EXISTING VENT STACKS	N/A
12	PP	REMOVE EXISTING PITCH POCKETS AT PIPE PENETRATIONS	N/A
13		NOT USED	
14	EJ	REMOVE EXISTING EXPANSION JOINT COVER AND FILLER	N/A
15		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	4A/A301
16		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	3/A–301
17		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AND 3 COURSES OF FACE BRICK AT ENTRANCE ROOF.	2/A–302

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER: S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN REMOVALS 3 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER: DM-103.00

REMOVAL KEY NOTES

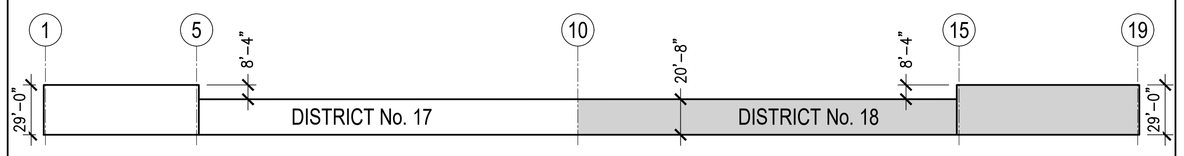
No.	SYMBOL	DESCRIPTION	DETAIL
1		REMOVE EXISTING BALLASTED ROOFING ASSEMBLY (INCLUDING RIGID INSULATION AND WOOD BLOCKING) TO TOP OF EXISTING STEEL DECK; REMOVE ALL ASSOCIATED CAP AND BASE FLASHINGS, EXPANSION JOINT COVERS, PITCH POCKETS, CRICKETS AND CANTS	N/A
2		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING.	2A/A–301
3		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING	1A/A–301
4		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK MASONRY CURB AT ROOF EDGE.	1A/A–302
5	RD	REMOVE EXISTING ROOF DRAIN; REFER TO PLUMBING DWGS (1)	N/A
6		REMOVE PORTION OF EXIST. METAL DECK FOR INSTALLATION OF NEW MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL DRAWINGS FOR OPENING SIZE	N/A
7		NOT USED	
8	OR	REMOVE EXISTING EQUIPMENT CURBS; SEE MECH DRAWINGS FOR EQUIPMENT REMOVAL	N/A

No.	SYMBOL	DESCRIPTION	DETAIL
9	SK	EXISTING SKYLIGHT TO REMAIN; REMOVE FLASHINGS AROUND SKYLIGHT CURB	N/A
10		REMOVE/REINSTALL EXISTING ROOF SHIPS LADDER W/CROSSOVER PLATFORM	1/1–402
11	VS	REMOVE EXISTING FLASHING AT EXISTING VENT STACKS	N/A
12	PP	REMOVE EXISTING PITCH POCKETS AT PIPE PENETRATIONS	N/A
13		REMOVE EXISTING 2 PIECE CAP FLASHING A CHIMNEY	N/A
14	EJ	REMOVE EXISTING EXPANSION JOINT COVER AND FILLER	N/A
15		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	4A/A301
16		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	3/A–301
17		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AND 3 COURSES OF FACE BRICK AT ENTRANCE ROOF.	2/A–302

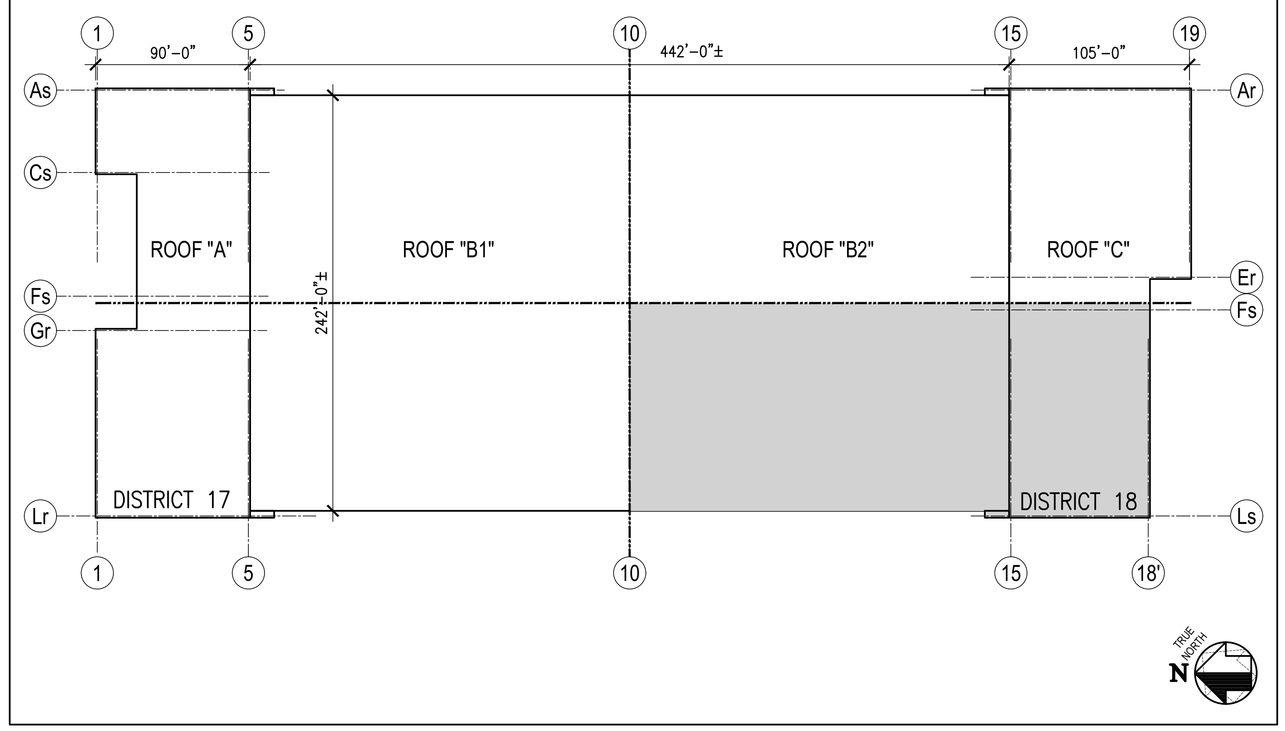
REMOVAL NOTES

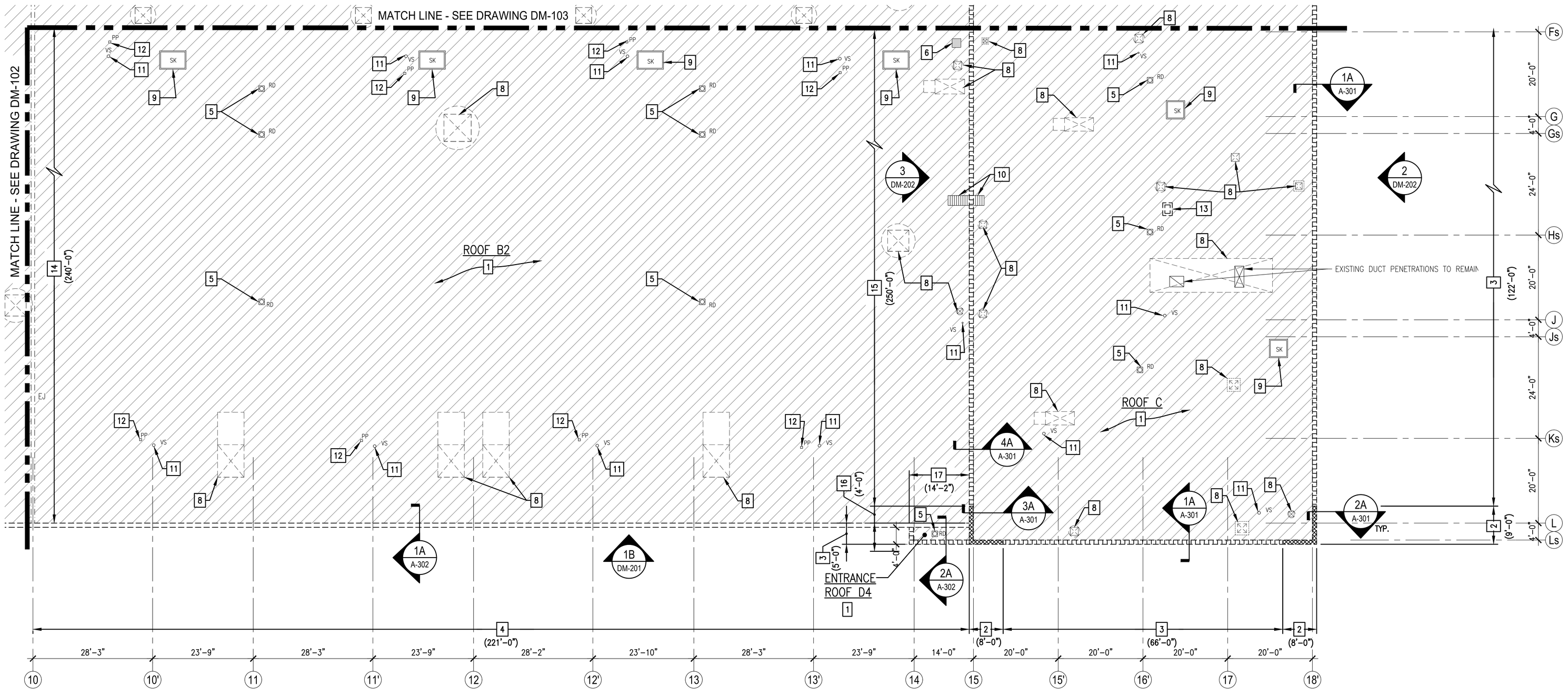
1. FOR DECK REMOVAL AND REPLACEMENT LOCATIONS NOT SHOWN ON ARCHITECTURAL DRAWINGS; SEE STRUCTURAL DRAWINGS S–101 THRU S–104
   - AT AREAS OF DECK REMOVAL/REPLACEMENT, REMOVE AND REINSTALL EXISTING VENTS, ROOF DRAINS, ETC.

BUILDING SCHEMATIC SECTION



BUILDING KEY PLAN





2B DM-104 PARTIAL ROOF PLAN (DISTRICT 18) - REMOVALS

Scale: 0 4 12 24 feet

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DDB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

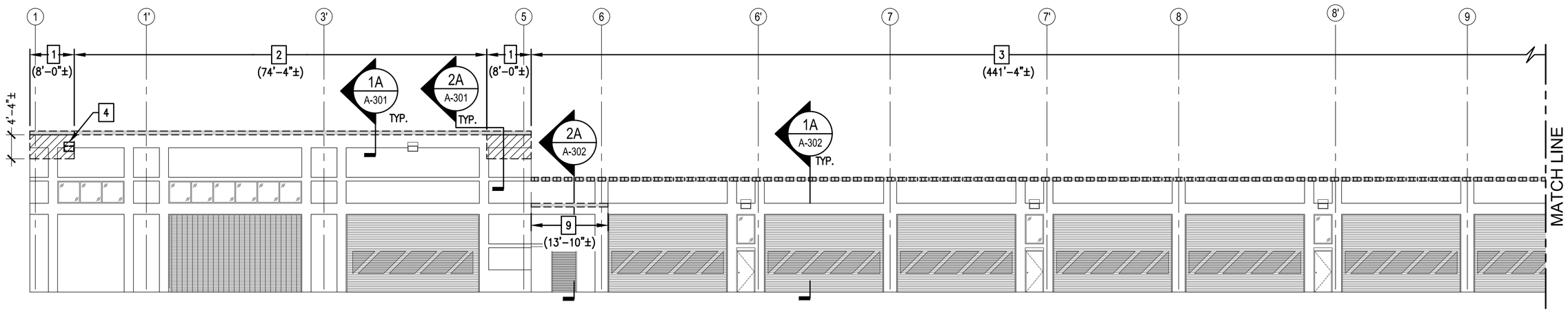
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN
REMOVALS
4 OF 4

SEAL & SIGNATURE

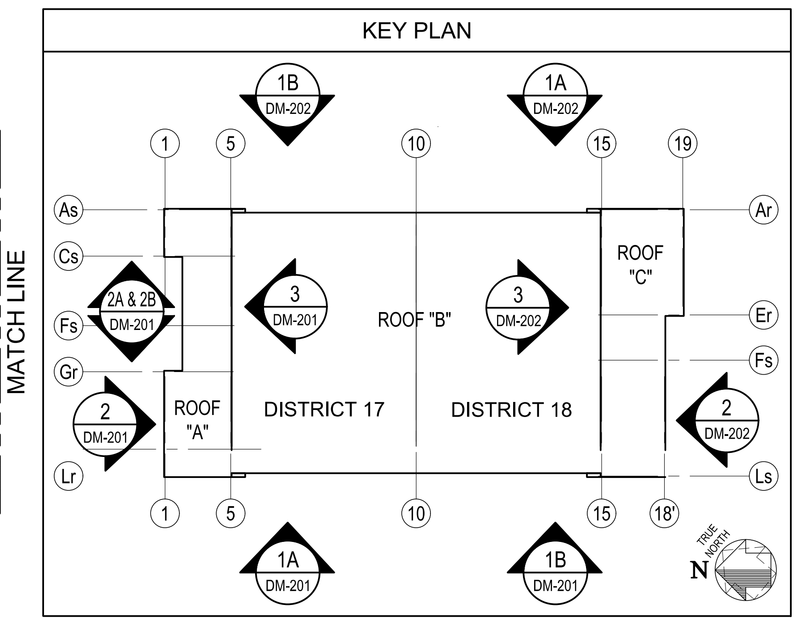
DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
DM-104.00

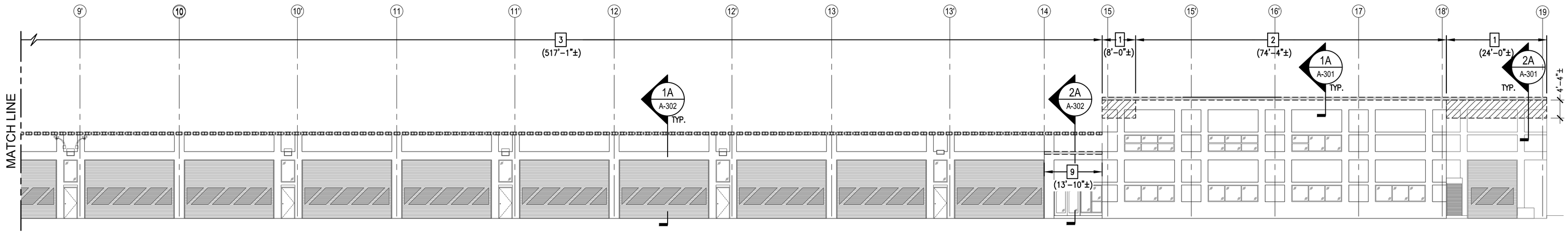


1A DM-201 DISTRICT 17 WEST ELEVATION - REMOVALS

Scale: 0 4 8 16 feet

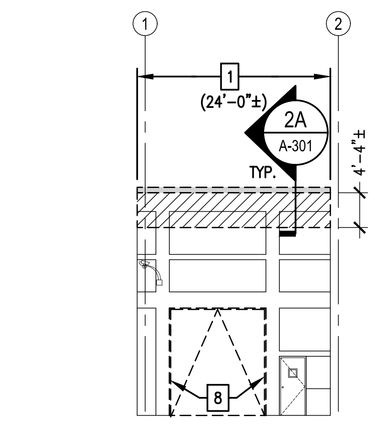
KEY PLAN





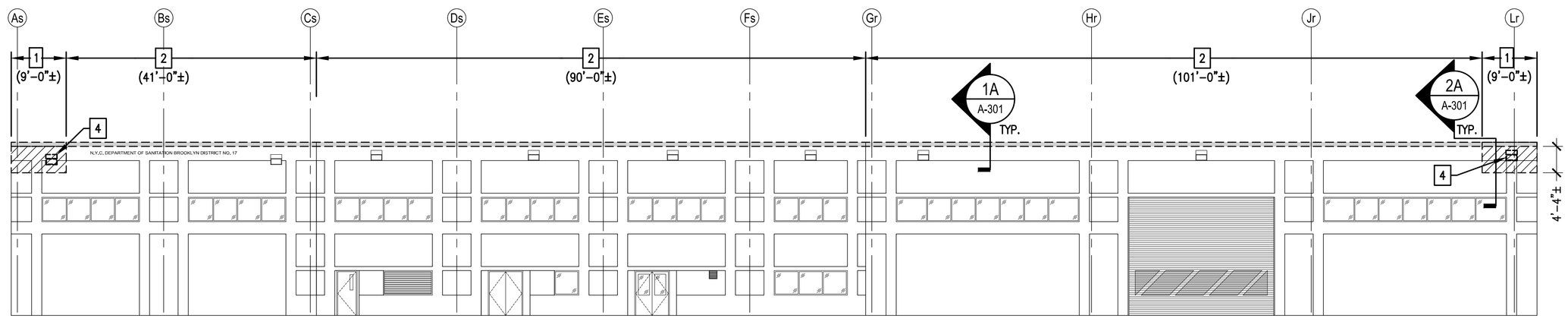
1B DM-201 DISTRICT 18 WEST ELEVATION - REMOVALS

Scale: 0 4 8 16 feet



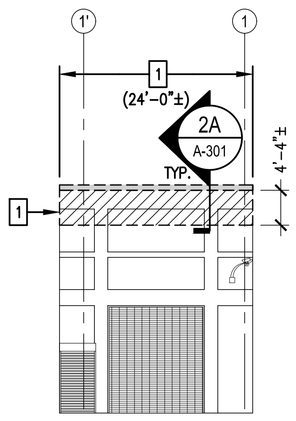
2A DM-201 DISTRICT 17 PARTIAL WEST ELEVATION - REMOVALS

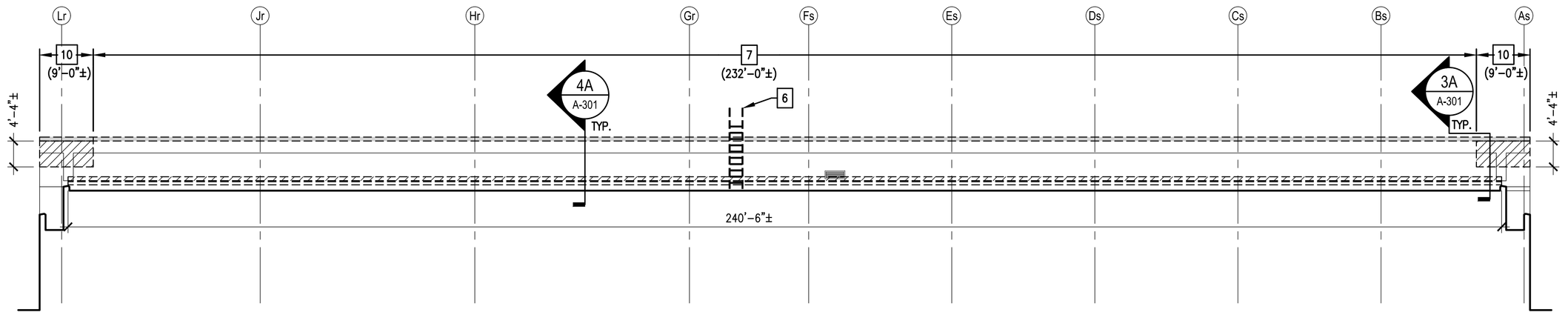
Scale: 0 4 8 16 feet



2 DM-201 DISTRICT 17 NORTH ELEVATION - REMOVALS

Scale: 0 4 8 16 feet





2B DM-201 DISTRICT 17 PARTIAL EAST ELEVATION - REMOVALS

Scale: 0 4 8 16 feet

3 DM-201 DISTRICT 17 SOUTH ELEVATION - REMOVALS

Scale: 0 4 8 16 feet

REMOVAL KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REMOVE EXISTING MASONRY PARAPET AND 2-PIECE INTERLOCKING BRICK COPING.	2A/A-301
2		REMOVE 2-PIECE INTERLOCKING BRICK COPING.	1A/A-301
3		REMOVE EXISTING 2-PIECE INTERLOCKING BRICK MASONRY CURB AT ROOF EDGE	1A/A-302
4		REMOVE AND REINSTALL EXISTING WALL MOUNTED LIGHT FIXTURES	N/A
5		NOT USED	
6		REMOVE/REINSTALL EXISTING ROOF SHIPS LADDER W/CROSSOVER PLATFORM	1/A-402
7		REMOVE EXISTING 2-PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	4A/A301
8	N/A	REMOVE EXISTING OVERHEAD ROLL-UP DOOR, FRAME AND MISCELLANEOUS PARTS	N/A
9		REMOVE EXISTING 2-PIECE INTERLOCKING BRICK COPING AND 3 COURSES OF FACE BRICK AT ENTRANCE ROOF.	2/A-302
10		REMOVE EXISTING MASONRY PARAPET AND 2-PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	3/A-301

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

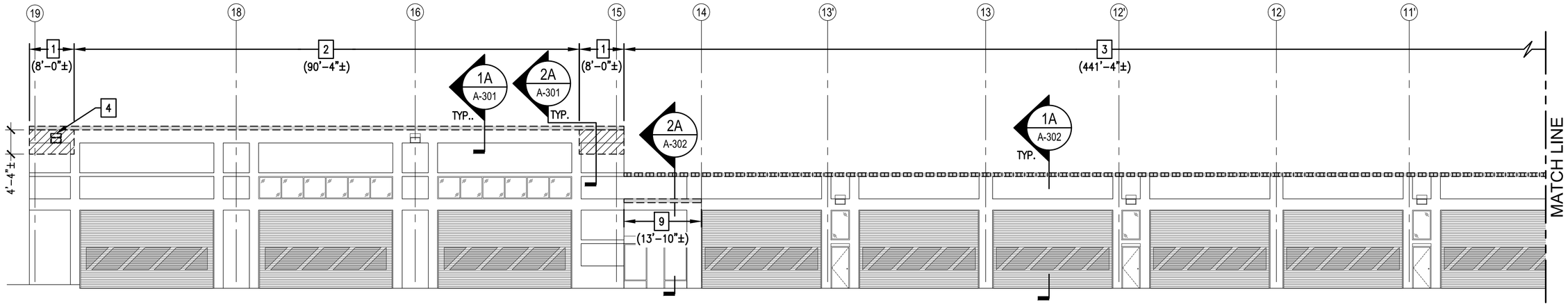
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
WEST AND NORTH ELEVATIONS REMOVALS

SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/27/19

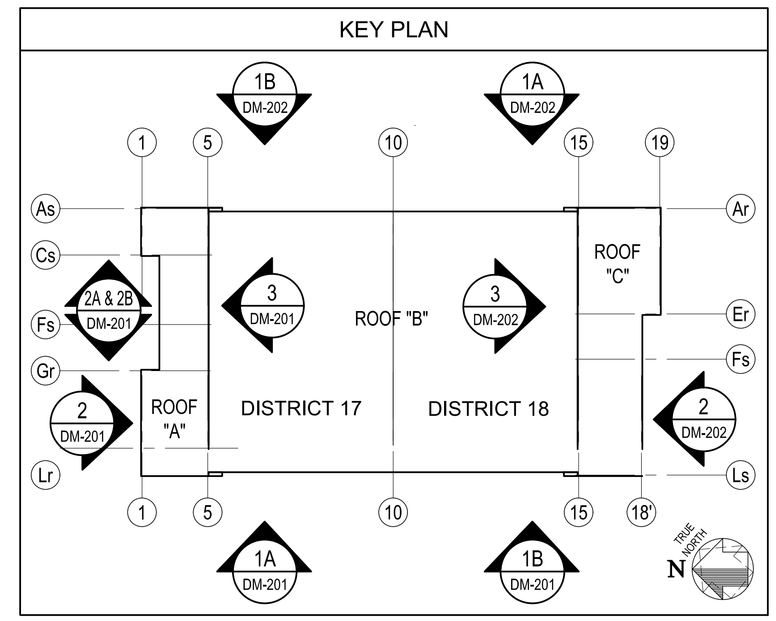
DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
DM-201.00

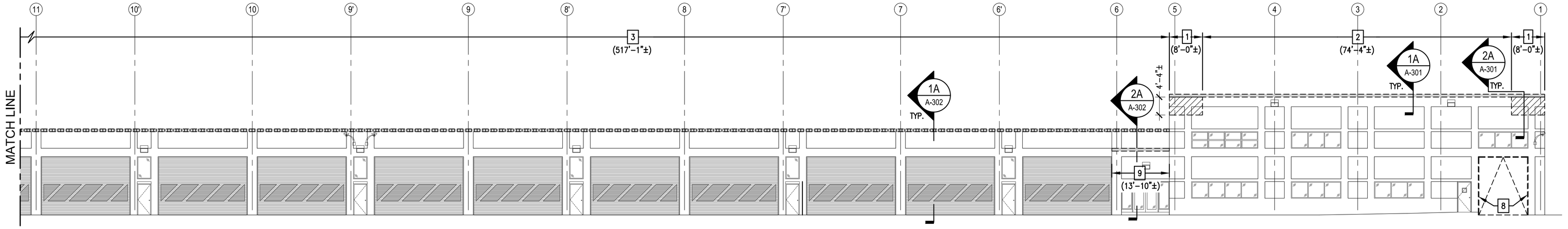


1A DM-202 DISTRICT 18 EAST ELEVATION - REMOVALS

Scale: 0 4 8 16 feet

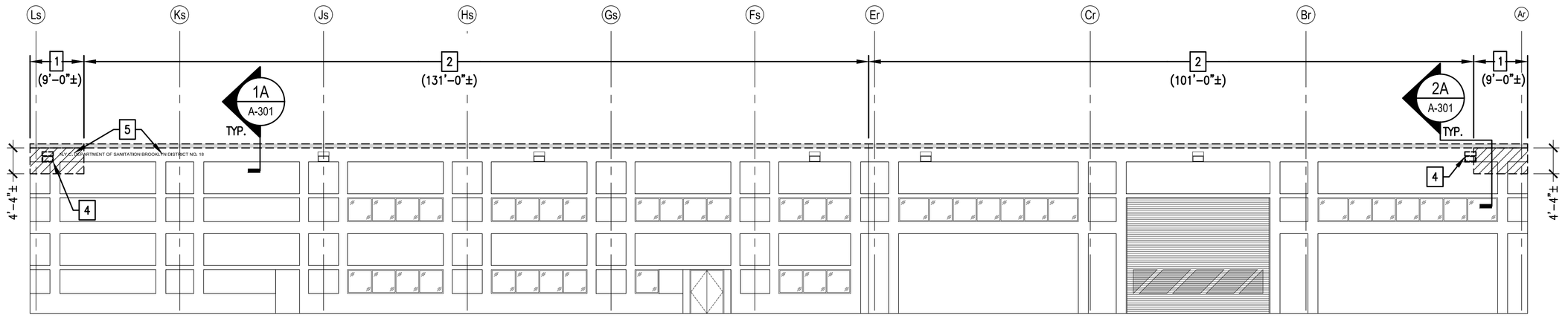
KEY PLAN





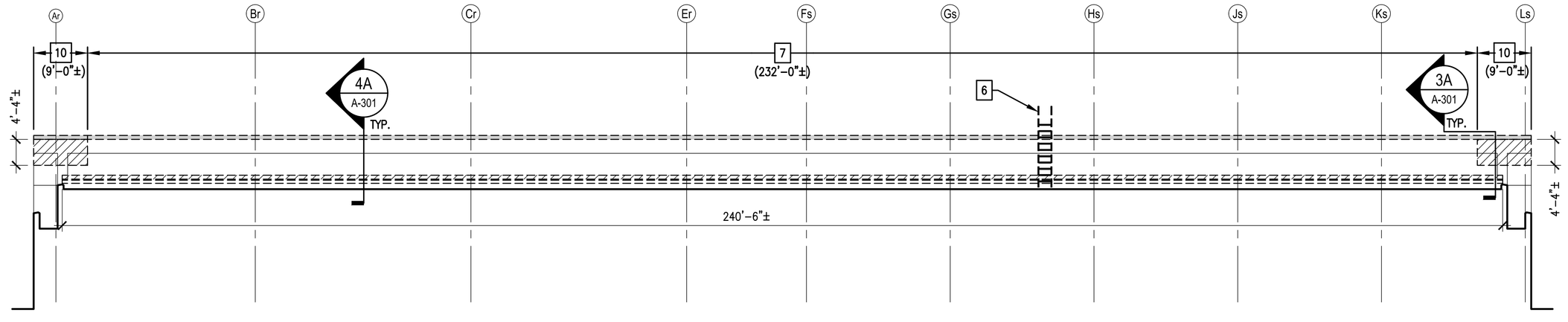
1B DM-202 DISTRICT 17 EAST ELEVATION - REMOVALS

Scale: 0 4 8 16 feet



2 DM-202 DISTRICT 18 SOUTH ELEVATION - REMOVALS

Scale: 0 4 8 16 feet



3 DM-202 DISTRICT 18 NORTH ELEVATION - REMOVALS

Scale: 0 4 8 16 feet

REMOVAL KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING.	2A/A–301
2		REMOVE 2–PIECE INTERLOCKING BRICK COPING.	1A/A–301
3		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK MASONRY CURB AT ROOF EDGE	1A/A–302
4		REMOVE AND REINSTALL EXISTING WALL MOUNTED LIGHT FIXTURES	N/A
5	N/A	REMOVE AND REINSTALL BUILDING LETTERING AT LOCATION OF PARAPET REMOVAL	N/A
6		REMOVE/REINSTALL EXISTING ROOF SHIPS LADDER W/CROSSOVER PLATFORM	1/A–402
7		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	4A/A301
8	N/A	REMOVE EXISTING OVERHEAD ROLL–UP DOOR, FRAME AND MISCELLANEOUS PARTS	N/A
9		REMOVE EXISTING 2–PIECE INTERLOCKING BRICK COPING AND 3 COURSES OF FACE BRICK AT ENTRANCE ROOF.	2/A–302
10		REMOVE EXISTING MASONRY PARAPET AND 2–PIECE INTERLOCKING BRICK COPING AT HIGH ROOF AND 3 COURSES OF FACE BRICK AT LOW ROOF.	3/A–301

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:

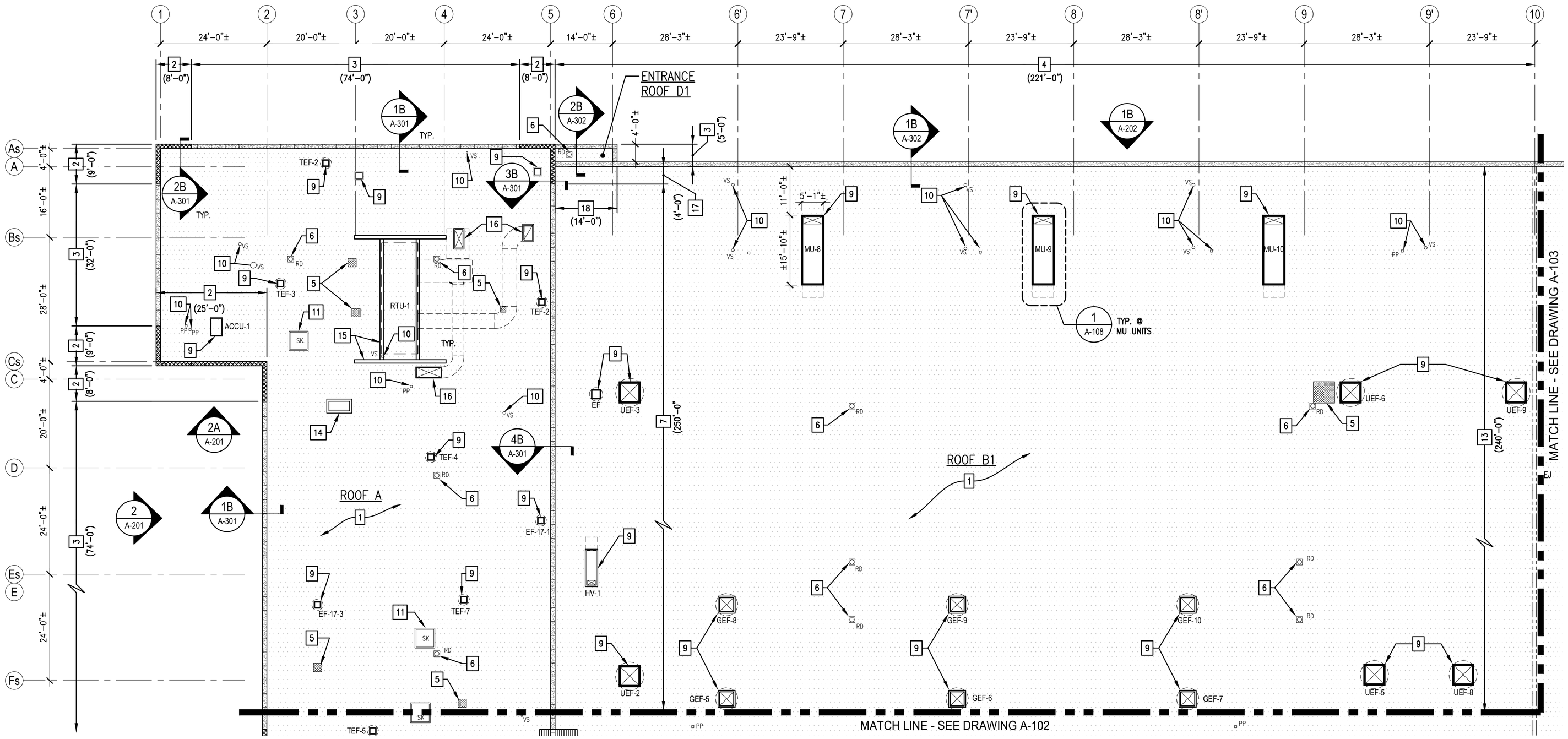
EAST AND SOUTH ELEVATIONS REMOVALS

SEAL & SIGNATURE

REGISTERED ARCHITECT SRINTHI SABANAYAGAM 035580 STATE OF NEW YORK 09/30/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM

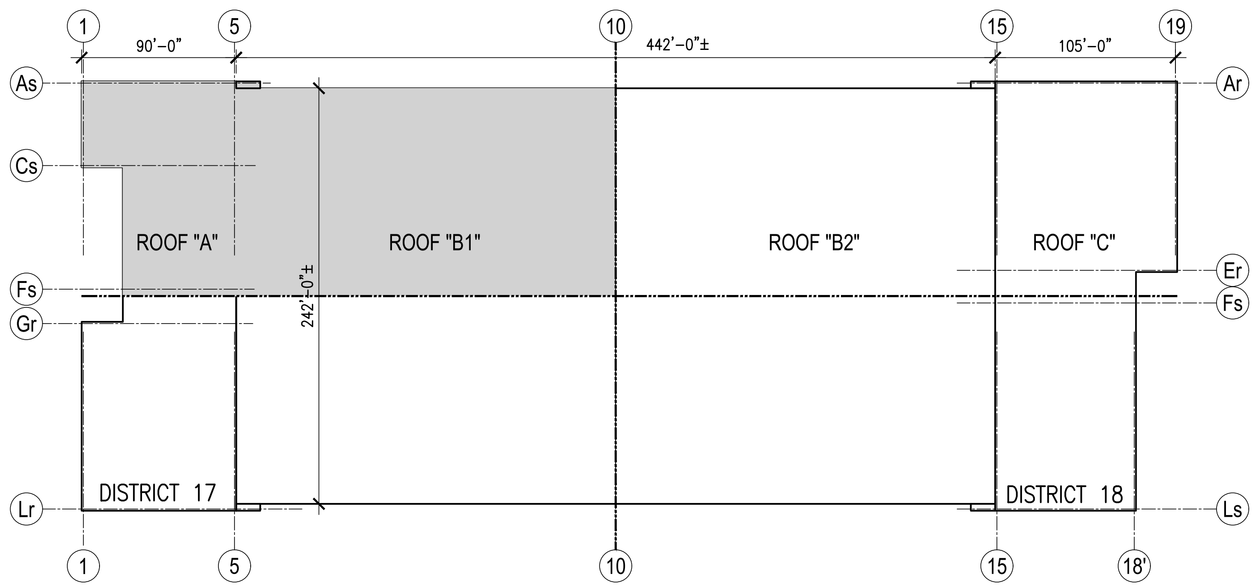
DRAWING NUMBER:
DM-202.00



1 A-101 PARTIAL ROOF PLAN (DISTRICT 17) - CONSTRUCTION

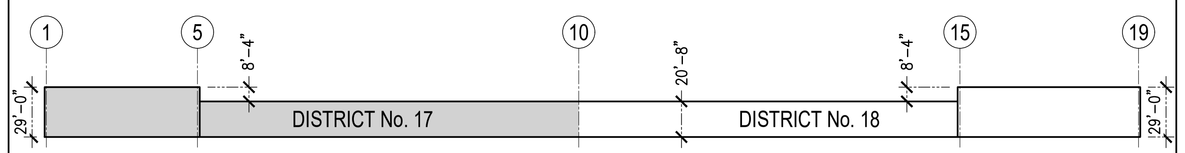
Scale: 0 4 12 24 feet

BUILDING KEY PLAN



08/30/2021

BUILDING SCHEMATIC SECTION



NOTES

1. SURFACE MOUNTED SOLAR PANELS AND ROOF PAVERS NOT SHOWN FOR CLARITY. SEE DRAWINGS A-105 AND A-106; COORDINATE FOR SOLAR PANEL INSTALLATION.
2. FOR ROOF SLOPE LAYOUT SEE DRAWING A-107.
3. FOR ADDITIONAL DECK REPLACEMENT LOCATIONS SEE STRUCTURAL DRAWINGS S-101 THRU S-104

CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		PROVIDE SBS MODIFIED BITUMEN ROOFING OVER TAPERED INSULATION WITH MIN SLOPE 1/8"=1'-0"	1/A-401
2		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS	2B/A-301
3		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET	1B/A-301
4		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE ROOF CURB	1B/A-302
5		PROVIDE METAL DECK CLOSURE AT ROOF OPENINGS OF REMOVED/RELOCATED MECHANICAL EQUIPMENT COORDINATE WITH MECHANICAL DRAWINGS	5/S-105
6	RD	PROVIDE NEW ROOF DRAIN; REFER TO PLUMBING DWGS AND DETAIL 3/A401 /1	3/A-401
7		PROVIDE FACE BRICK, CMU BACKUP & PRECAST COPING STONE AT UPPER ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING AT LOWER ROOF	4B/A-301
8		NOT USED	
9	OR	PROVIDE FLASHING AROUND NEW EQUIPMENT CURBS / RAILS, SEE MECHANICAL DRAWINGS FOR ADDITIONAL EQUIPMENT INFORMATION	5/A-401
10	VS OR PP	PROVIDE LIQUID APPLIED FLASHING AROUND EXISTING/NEW ROOF VENTS AND PIPE PENETRATIONS	6/A-401
11	SK	PROVIDE LIQUID APPLIED FLASHING AT EXISTING SKYLIGHTS	7/A-401
12		NOT USED	
13	EJ	PROVIDE EXPANSION JOINT WITH COMPRESSIBLE FILLER	8/A-401
14		PROVIDE LIQUID APPLIED FLASHING AT EXISTING CMU CHIMNEY STACK	11/A-401
15		PROVIDE STEEL DUNNAGE PLATFORM FOR MECHANICAL UNITS. SEE STRUCTURAL DRAWING S-105 FOR ADDITIONAL INFORMATION	10/A-401
16		PROVIDE NEW ROOF CURB AND FLASHING AROUND EXISTING DUCT PENETRATION OPENINGS; COORDINATE WITH MECHANICAL DRAWINGS	9/A-401
17		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS AT UPPER ROOF. PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING AT LOWER ROOF	3B/A-301
18		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET AT ENTRANCE ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING	2B/A-302

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DDB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

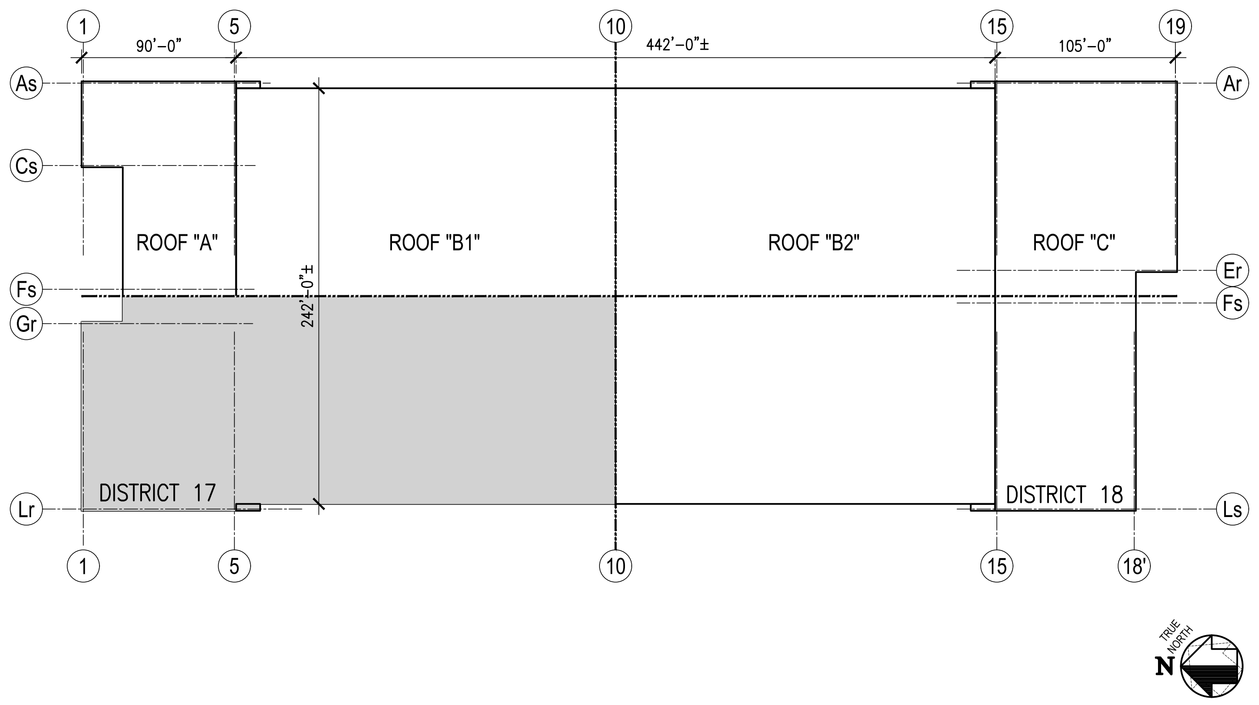
LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN CONSTRUCTION 1 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
A-101.00

BUILDING KEY PLAN



CONSTRUCTION KEY NOTES

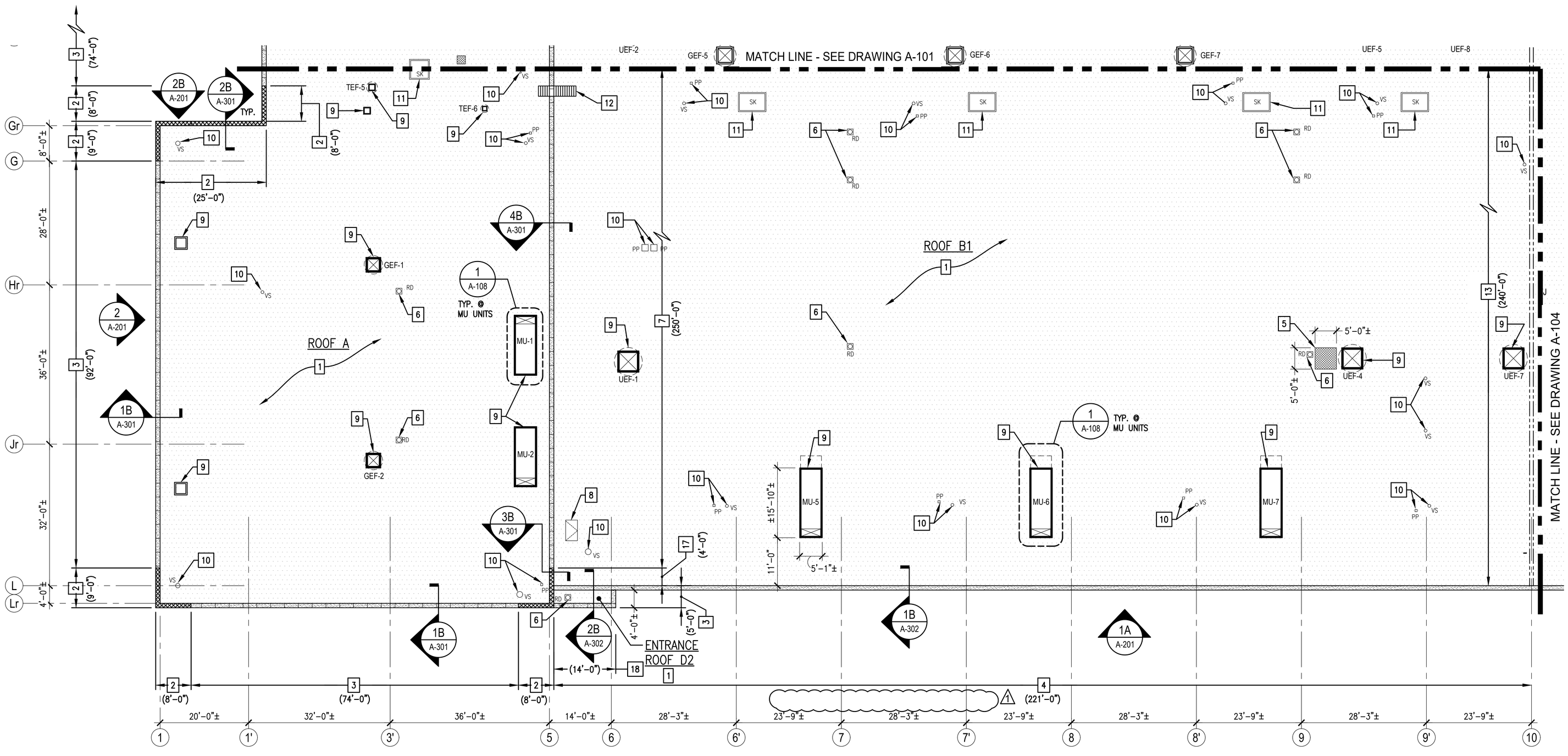
No.	SYMBOL	DESCRIPTION	DETAIL
1		PROVIDE SBS MODIFIED BITUMEN ROOFING OVER TAPERED INSULATION WITH MIN SLOPE 1/8"=1'–0"	1/A–401
2		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS	2B/A–301
3		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET	1B/A–301
4		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE ROOF CURB	1B/A–302
5		PROVIDE METAL DECK CLOSURE AT ROOF OPENINGS OF REMOVED/RELOCATED MECHANICAL EQUIPMENT COORDINATE WITH MECHANICAL DRAWINGS	5/S–105
6	RD	PROVIDE NEW ROOF DRAIN; REFER TO PLUMBING DWGS AND DETAIL 3/A401	3/A–401
7		PROVIDE FACE BRICK, CMU BACKUP & PRECAST COPING STONE AT UPPER ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING AT LOWER ROOF	4B/A–301
8		PROVIDE INSULATED ALUMINUM ROOF HATCH WITH GUARDRAILS AT EXISTING ROOF OPENING	N/A
9	OR	PROVIDE FLASHING AROUND NEW EQUIPMENT CURBS / RAILS, SEE MECHANICAL DRAWINGS FOR ADDITIONAL EQUIPMENT INFORMATION	5/A–401

No.	SYMBOL	DESCRIPTION	DETAIL
10	VS OR PP	PROVIDE LIQUID APPLIED FLASHING AROUND EXISTING/NEW ROOF VENTS AND PIPE PENETRATIONS	6/A–401
11	SK	PROVIDE LIQUID APPLIED FLASHING AT EXISTING SKYLIGHTS	7/A–401
12		REINSTALL EXISTING ROOF SHIPS LADDER W/CROSSOVER PLATFORM AT NEW SUPPORTS	1/A–402
13	EJ	PROVIDE EXPANSION JOINT WITH COMPRESSIBLE FILLER	8/A–401
14		PROVIDE LIQUID APPLIED FLASHING AT EXISTING CMU CHIMNEY STACK	11/A–401
15		NOT USED	
16		NOT USED	
17		NOT USED	
18		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET AT ENTRANCE ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING	2B/A–302

BUILDING SCHEMATIC SECTION

NOTES

1. SURFACE MOUNTED SOLAR PANELS AND ROOF PAVERS NOT SHOWN FOR CLARITY. SEE DRAWINGS A–105 AND A–106; COORDINATE FOR SOLAR PANEL INSTALLATION.
2. FOR ROOF SLOPE LAYOUT SEE DRAWING A–107.
3. FOR ADDITIONAL DECK REPLACEMENT LOCATIONS SEE STRUCTURAL DRAWINGS S–101 THRU S–104



1 A-102 PARTIAL ROOF PLAN (DISTRICT 17) - CONSTRUCTION

Scale: 0 4 12 24 feet

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

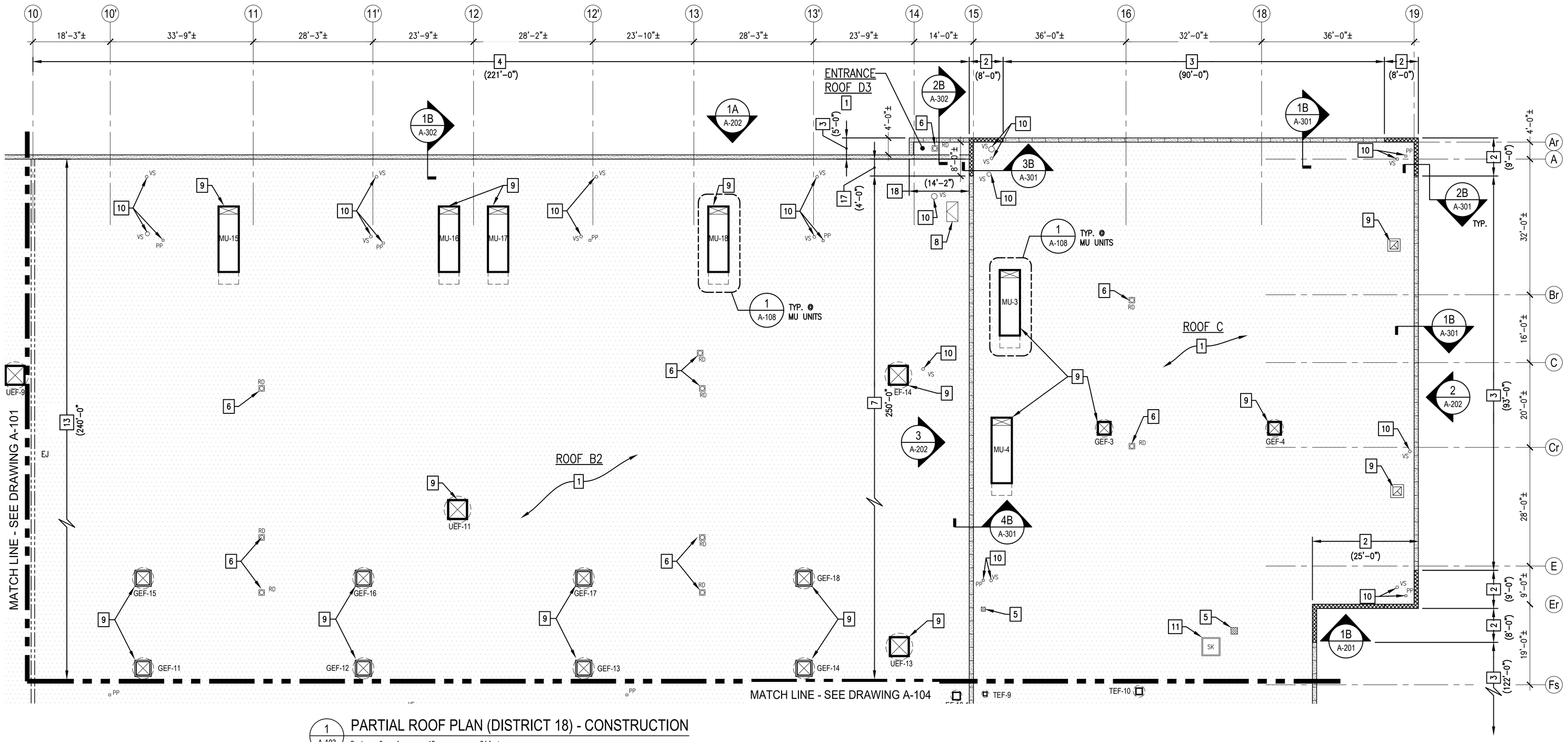
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN CONSTRUCTION 2 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
A-102.00



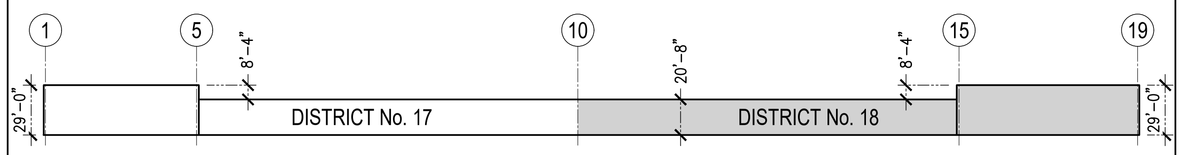
1 A-103 PARTIAL ROOF PLAN (DISTRICT 18) - CONSTRUCTION

Scale: 0 4 12 24 feet

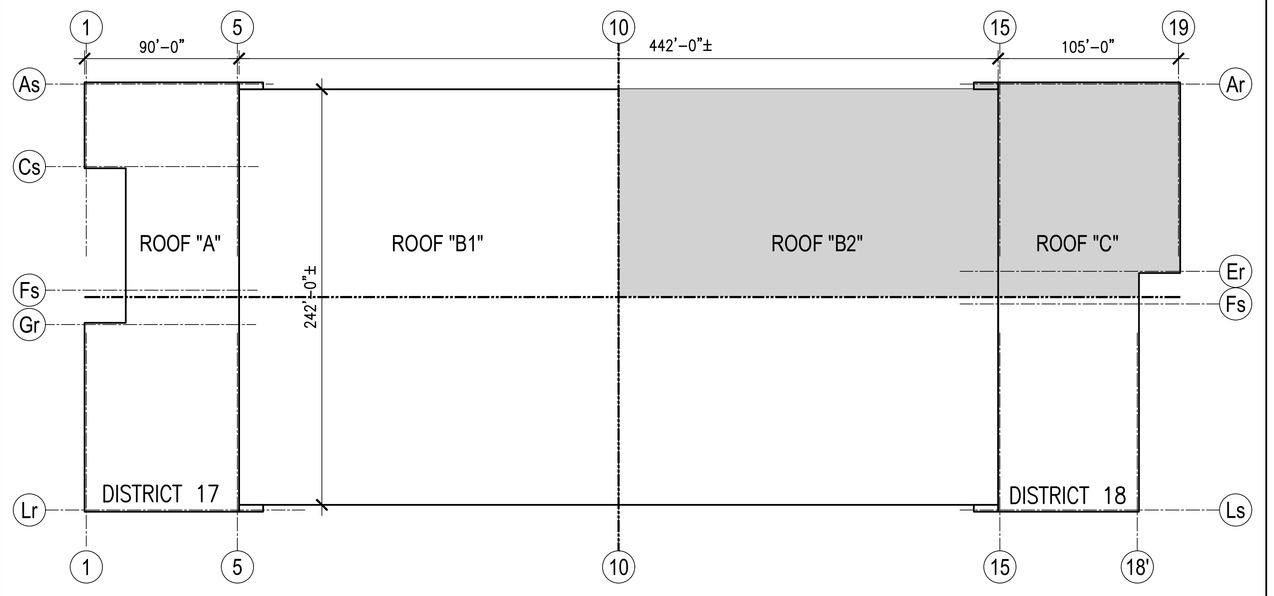
NOTES

1. SURFACE MOUNTED SOLAR PANELS AND ROOF PAVERS NOT SHOWN FOR CLARITY. SEE DRAWINGS A–105 AND A–106; COORDINATE FOR SOLAR PANEL INSTALLATION.
2. FOR ROOF SLOPE LAYOUT SEE DRAWING A–107.
3. FOR ADDITIONAL DECK REPLACEMENT LOCATIONS SEE STRUCTURAL DRAWINGS S–101 THRU S–104

BUILDING SCHEMATIC SECTION



BUILDING KEY PLAN



CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		PROVIDE SBS MODIFIED BITUMEN ROOFING OVER TAPERED INSULATION WITH MIN SLOPE 1/8"=1'–0"	1/A–401
2		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS	2B/A–301
3		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET	1B/A–301
4		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE ROOF CURB	1B/A–302
5		PROVIDE METAL DECK CLOSURE AT ROOF OPENINGS OF REMOVED/RELOCATED MECHANICAL EQUIPMENT COORDINATE WITH MECHANICAL DRAWINGS	5/S–105
6	RD	PROVIDE NEW ROOF DRAIN; REFER TO PLUMBING DWGS AND DETAIL 3/A401 (1)	3/A–401
7		PROVIDE FACE BRICK, CMU BACKUP & PRECAST COPING STONE AT UPPER ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING AT LOWER ROOF	4B/A–301
8		PROVIDE INSULATED ALUMINUM ROOF HATCH WITH GUARDRAILS AT EXISTING ROOF OPENING	N/A
9	OR	PROVIDE FLASHING AROUND NEW EQUIPMENT CURBS / RAILS, SEE MECHANICAL DRAWINGS FOR ADDITIONAL EQUIPMENT INFORMATION	5/A–401

No.	SYMBOL	DESCRIPTION	DETAIL
10	VS OR PP	PROVIDE LIQUID APPLIED FLASHING AROUND EXISTING/NEW ROOF VENTS AND PIPE PENETRATIONS	6/A–401
11	SK	PROVIDE LIQUID APPLIED FLASHING AT EXISTING SKYLIGHTS	7/A–401
12		NOT USED	
13	EJ	PROVIDE EXPANSION JOINT WITH COMPRESSIBLE FILLER	8/A–401
14		NOT USED	
15		NOT USED	
16		NOT USED	
17		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS AT UPPER ROOF. PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING AT LOWER ROOF	3B/A–301
18		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET AT ENTRANCE ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING	2B/A–302

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VJ ASSOCIATES
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DOB BSCAN STICKER

DOB APPROVAL STAMP

DDB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF PLAN CONSTRUCTION 3 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
A-103.00

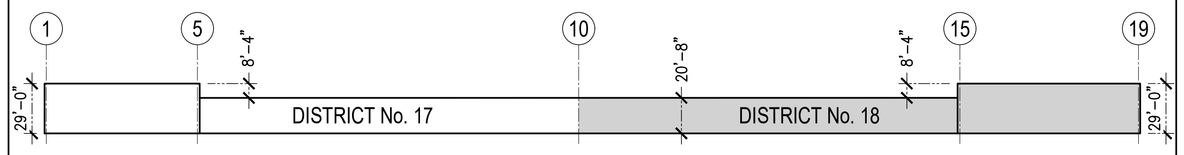
CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		PROVIDE SBS MODIFIED BITUMEN ROOFING OVER TAPERED INSULATION WITH MIN SLOPE 1/8"=1'–0"	1/A–401
2		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS	2B/A–301
3		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET	1B/A–301
4		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE ROOF CURB	1B/A–302
5		PROVIDE METAL DECK CLOSURE AT ROOF OPENINGS OF REMOVED/RELOCATED MECHANICAL EQUIPMENT COORDINATE WITH MECHANICAL DRAWINGS	5/S–105
6	RD	PROVIDE NEW ROOF DRAIN; REFER TO PLUMBING DWGS AND DETAIL 3/A401	3/A–401
7		PROVIDE FACE BRICK, CMU BACKUP & PRECAST COPING STONE AT UPPER ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING AT LOWER ROOF	4B/A–301
8		NOT USED	
9	OR	PROVIDE FLASHING AROUND NEW EQUIPMENT CURBS / RAILS, SEE MECHANICAL DRAWINGS FOR ADDITIONAL EQUIPMENT INFORMATION	5/A–401
10	VS OR PP	PROVIDE LIQUID APPLIED FLASHING AROUND EXISTING/NEW ROOF VENTS AND PIPE PENETRATIONS	6/A–401
11	SK	PROVIDE LIQUID APPLIED FLASHING AT EXISTING SKYLIGHTS	7/A–401
12		REINSTALL EXISTING ROOF SHIPS LADDER W/CROSSOVER PLATFORM AT NEW SUPPORTS	1/A–402
13	EJ	PROVIDE EXPANSION JOINT WITH COMPRESSIBLE FILLER	8/A–401
14		PROVIDE LIQUID APPLIED FLASHING AT EXISTING CMU CHIMNEY STACK	11/A–401
15		PROVIDE STEEL DUNNAGE PLATFORM FOR MECHANICAL UNITS. SEE STRUCTURAL DRAWING S–105 FOR ADDITIONAL INFORMATION	10/A–401
16		PROVIDE NEW ROOF CURB AND FLASHING AROUND EXISTING DUCT PENETRATION OPENINGS; COORDINATE WITH MECHANICAL DRAWINGS	9/A–401
17		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS AT UPPER ROOF. PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING AT LOWER ROOF	3B/A–301
18		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE PARAPET AT ENTRANCE ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU–WALL FLASHING	2B/A–302

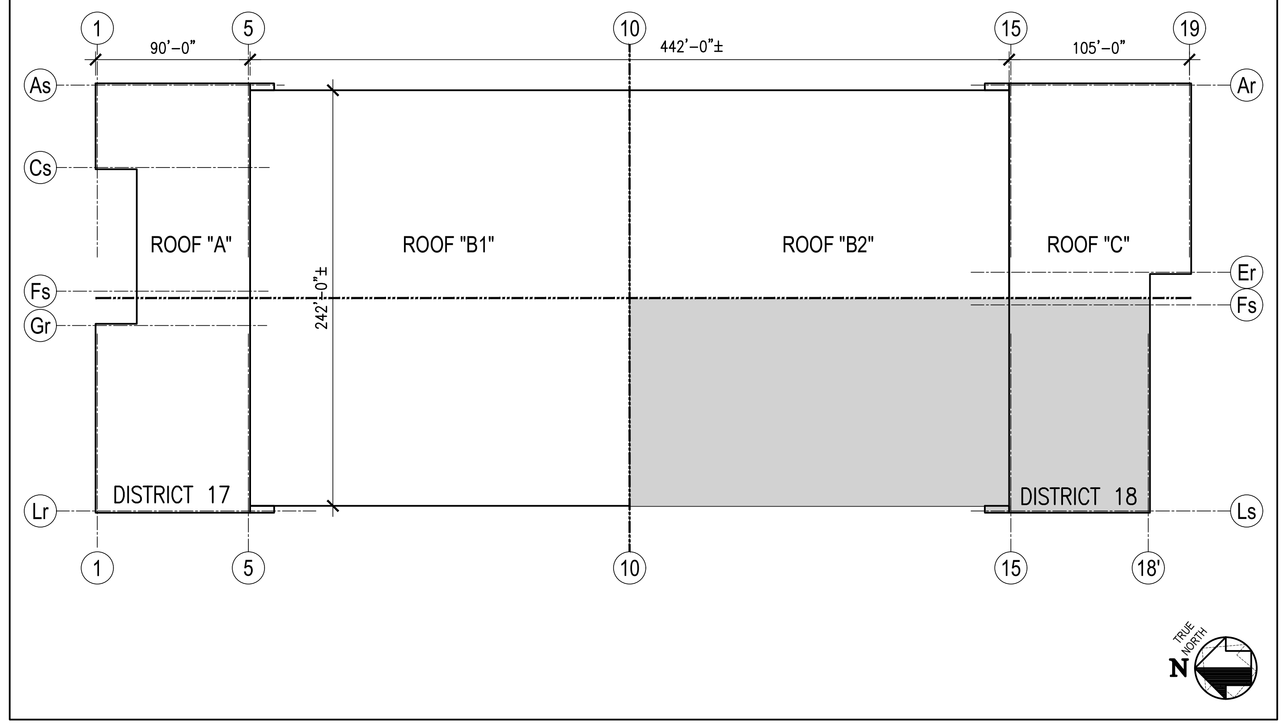
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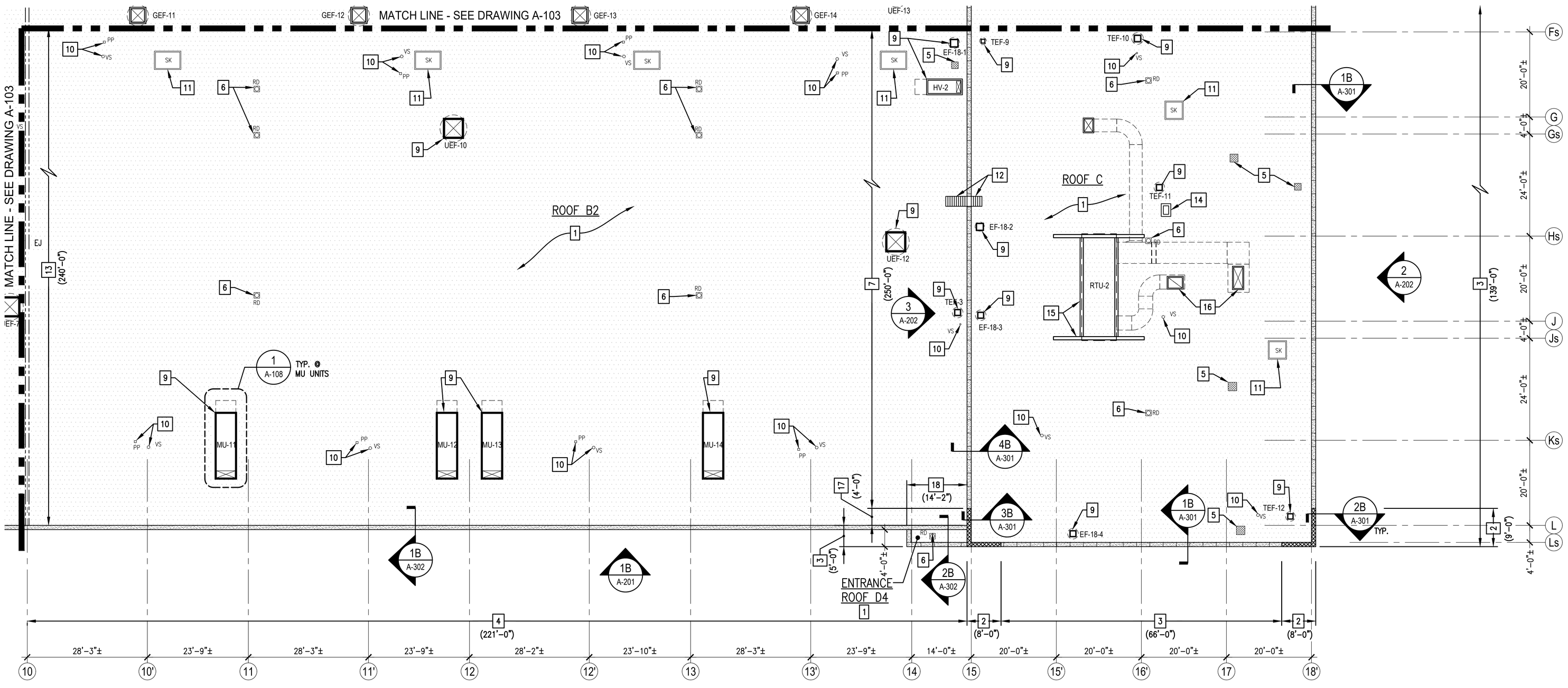
1. SURFACE MOUNTED SOLAR PANELS AND ROOF PAVERS NOT SHOWN FOR CLARITY. SEE DRAWINGS A–105 AND A–106; COORDINATE FOR SOLAR PANEL INSTALLATION.
2. FOR ROOF SLOPE LAYOUT SEE DRAWING A–107.
3. FOR ADDITIONAL DECK REPLACEMENT LOCATIONS SEE STRUCTURAL DRAWINGS S–101 THRU S–104

BUILDING SCHEMATIC SECTION



BUILDING KEY PLAN





1 A-104 PARTIAL ROOF PLAN (DISTRICT 18) - CONSTRUCTION

Scale: 0 4 12 24 feet

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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER: S136-383N

PROJECT

DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

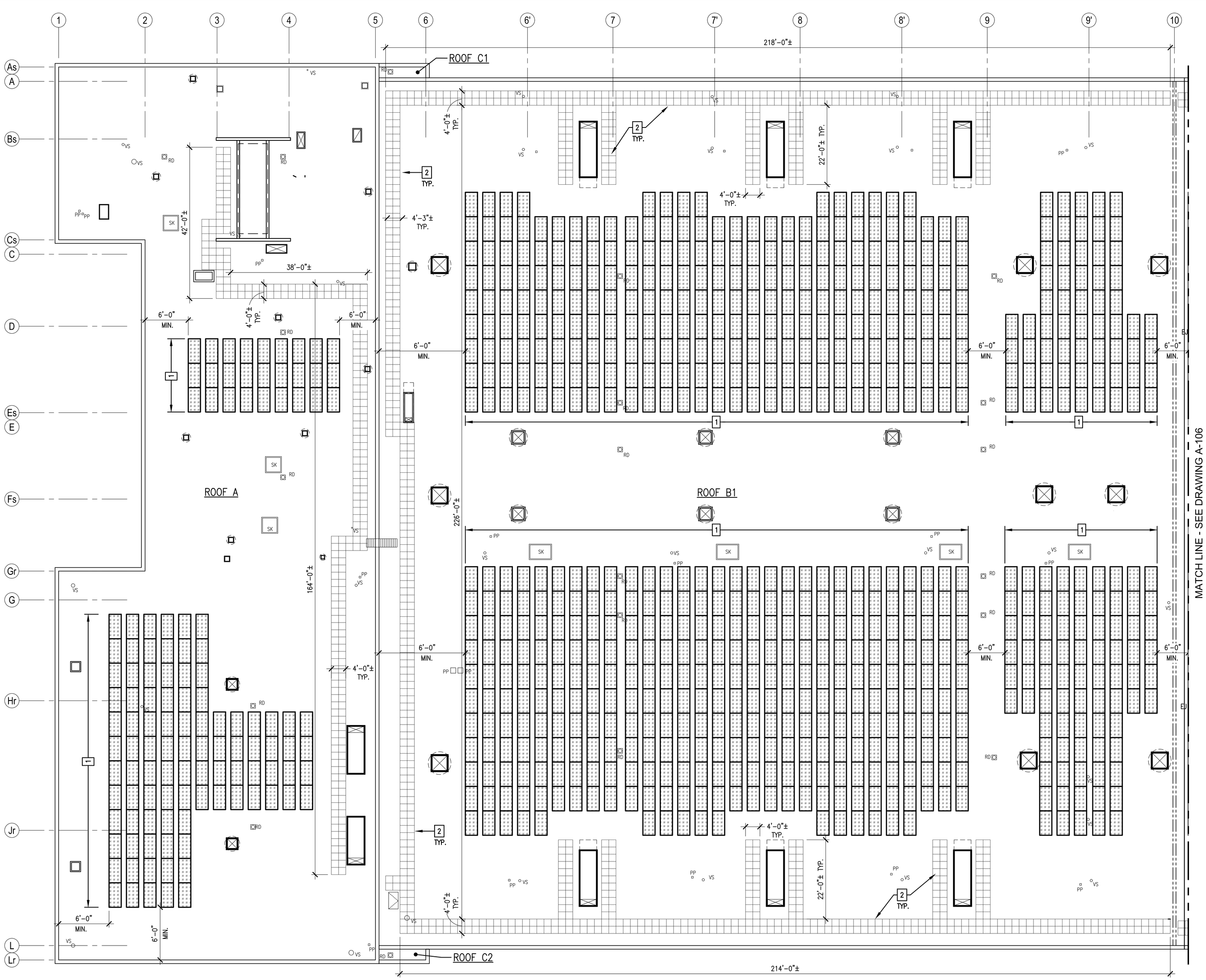
LOT: 1 BLOCK: 8138

DRAWING TITLE:

ROOF PLAN CONSTRUCTION 4 OF 4

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER: A-104.00



1 A-105 PARTIAL ROOF PLAN (DISTRICT 17) - SOLAR PANEL AND ROOF PAVER LAYOUT

Scale: 0 4 12 24 feet

NOTES

1. DRAWINGS A-105 AND A-106 FOR SOLAR PANEL AND ROOF PAVER INFORMATION ONLY; SEE DRAWINGS A-101 THRU A-104 FOR THE ROOF SCOPE OF WORK.

CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		NEW SURFACE MOUNTED PHOTO VOLTAIC PANELS AND SUPPORTS. LOCATIONS SHOWN ON THE DRAWINGS TO BE VERIFIED TO AVOID COVERING ROOF DRAINS, VENTS, ETC. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION	SEE DWG. E-505
2		PROVIDE ROOF WALKWAY PAVERS	N/A

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DDB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

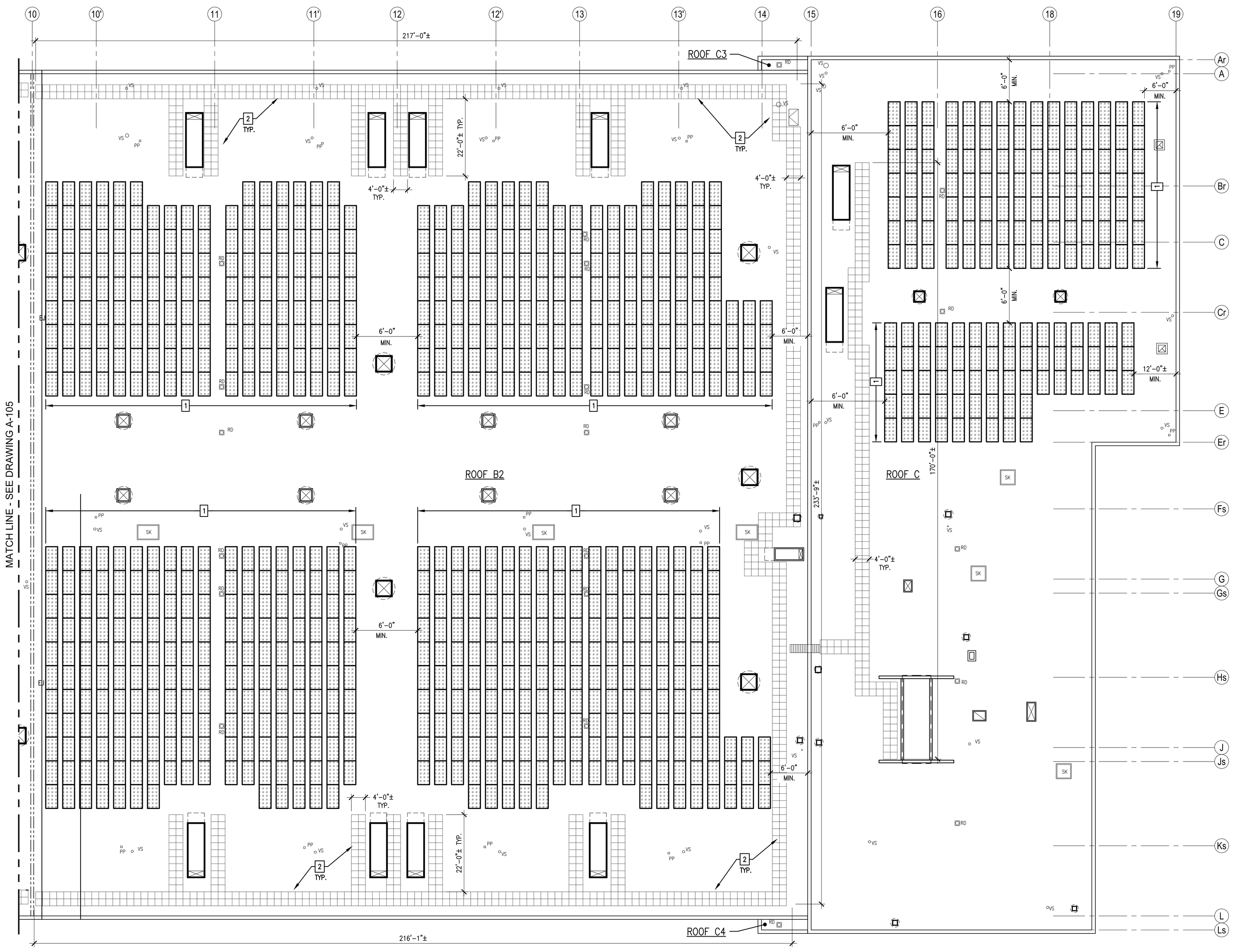
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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
PARTIAL ROOF PLAN SOLAR PANEL AND ROOF PAVER LAYOUT 1 OF 2

SEAL & SIGNATURE
REGISTERED ARCHITECT SINTHIL SABANAYAGAM 035580 STATE OF NEW YORK 09/27/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	A-105.00



1 / A-106 PARTIAL ROOF PLAN (DISTRICT 18) - SOLAR PANEL AND ROOF PAVER LAYOUT

Scale: 0 4 12 24 feet

NOTES

1. DRAWINGS A-105 AND A-106 FOR SOLAR PANEL AND ROOF PAVER INFORMATION ONLY; SEE DRAWINGS A-101 THRU A-104 FOR THE ROOF SCOPE OF WORK.

CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		NEW SURFACE MOUNTED PHOTO VOLTAIC PANELS AND SUPPORTS. LOCATIONS SHOWN ON THE DRAWINGS TO BE VERIFIED TO AVOID COVERING ROOF DRAINS, VENTS, ETC. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION	SEE DWG. E-505
2		PROVIDE ROOF WALKWAY PAVERS	N/A

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	ISSUED FOR BID	09/30/2019

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

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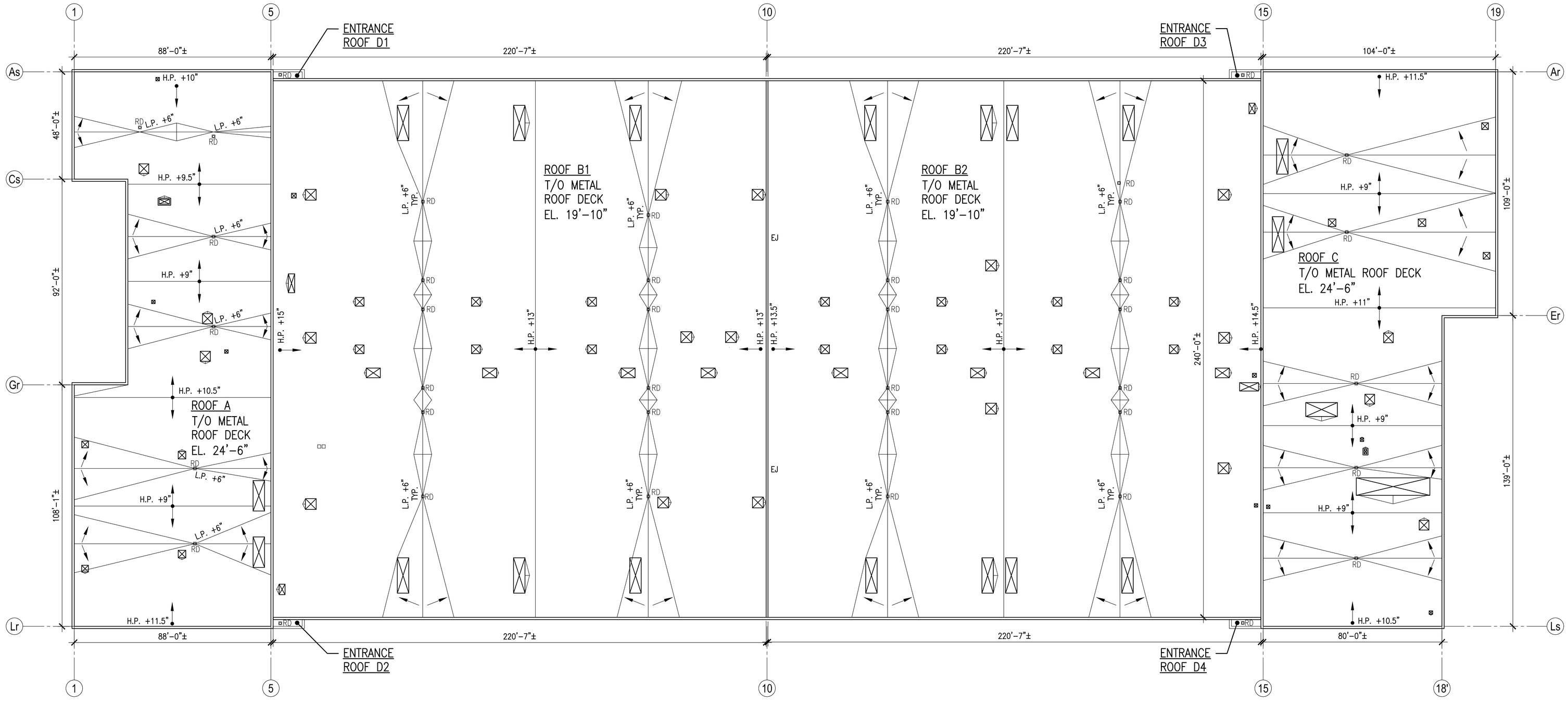
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DRAWING TITLE:
PARTIAL ROOF PLAN SOLAR PANEL AND ROOF PAVER LAYOUT 2 OF 2

SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK 09/27/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM

DRAWING NUMBER:
A-106.00



1 / A-107 ROOF SLOPE LAYOUT

Scale: 0 10 20 40 feet

TRUE NORTH N

SYMBOL LEGEND	
SYMBOL	DESCRIPTION
⊠	ROOF EQUIPMENT CURBS FOR MECHANICAL EQUIPMENT, CHIMNEYS, SKYLIGHTS, ETC. SOME LOCATIONS WILL REQUIRE CANTS; COORDINATE WITH TAPERED INSULATION LAYOUT
▫ RD	ROOF DRAIN LOCATIONS
EJ	EXPANSION JOINT
→	⅛" PER FOOT ROOF SLOPE DIRECTION
⌒	PROVIDE ROOF CRICKETS AT ALL MECHANICAL EQUIPMENT CURBS/RAILS, SKYLIGHTS AND CHIMNEYS AS REQUIRED

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

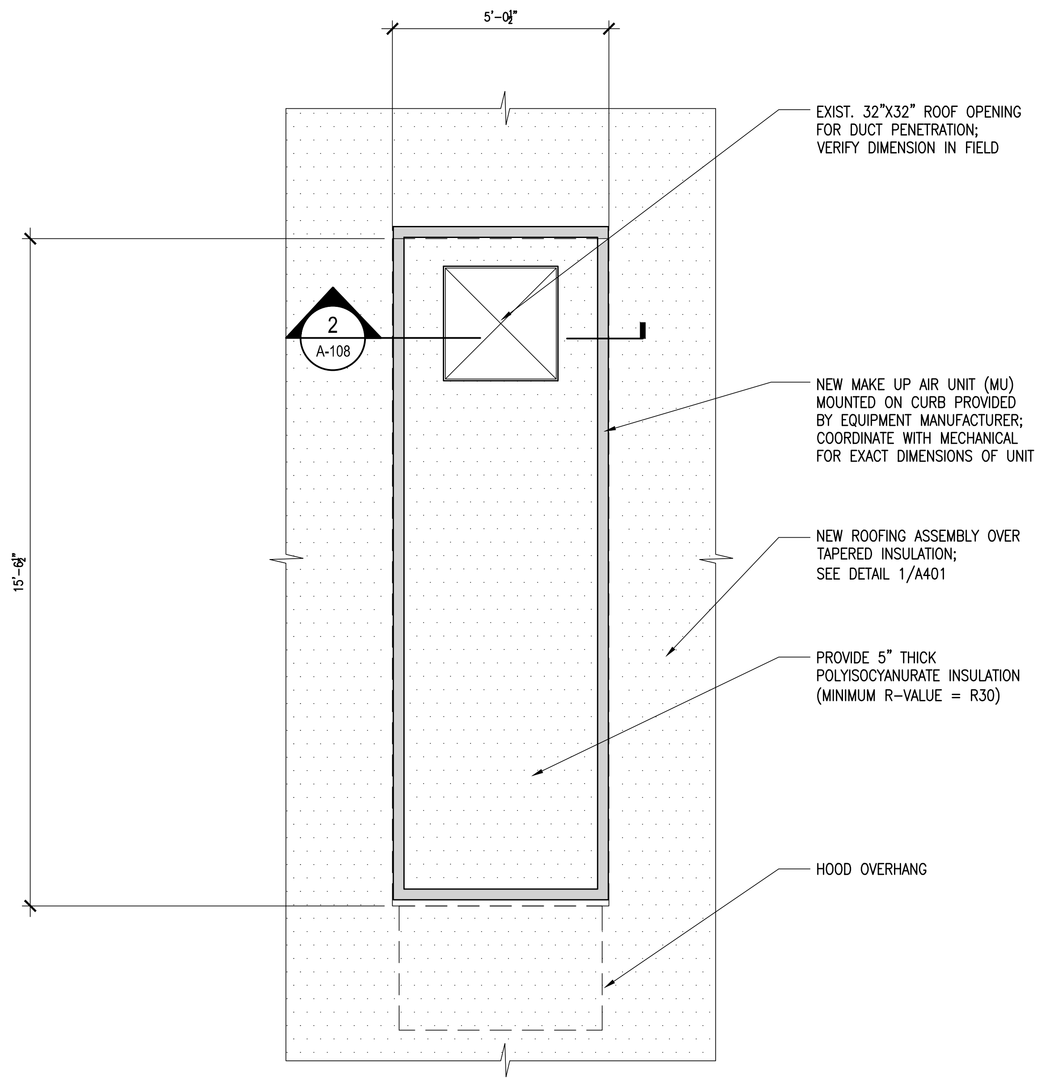
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FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF SLOPE LAYOUT

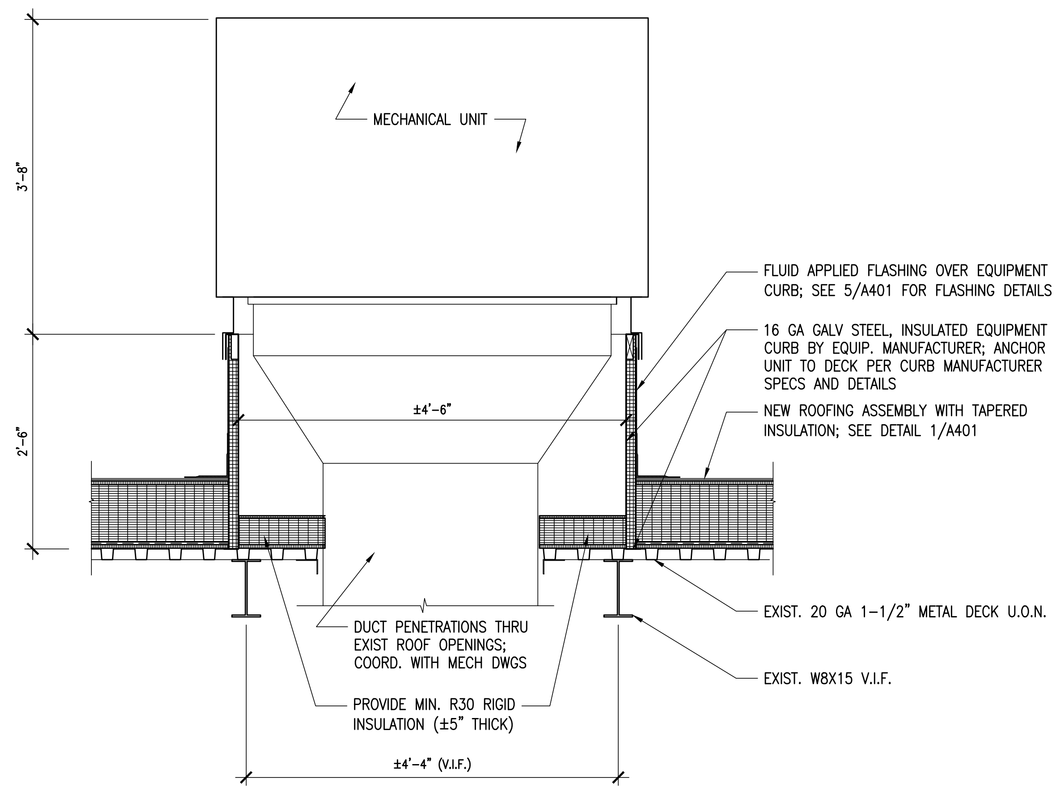
SEAL & SIGNATURE
REGISTERED ARCHITECT SINTHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/27/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	A-107.00



TYP ENLARGED PLAN DETAIL AT MAKE UP AIR (MU) UNITS

1 / A-108 Scale: 0 4 8 16 feet



TYPICAL DETAIL AT MAKE UP AIR (MU) UNITS

2 / A-108 Scale: 0 .5 1 2 feet

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NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

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DIVISION OF BUILDINGS

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

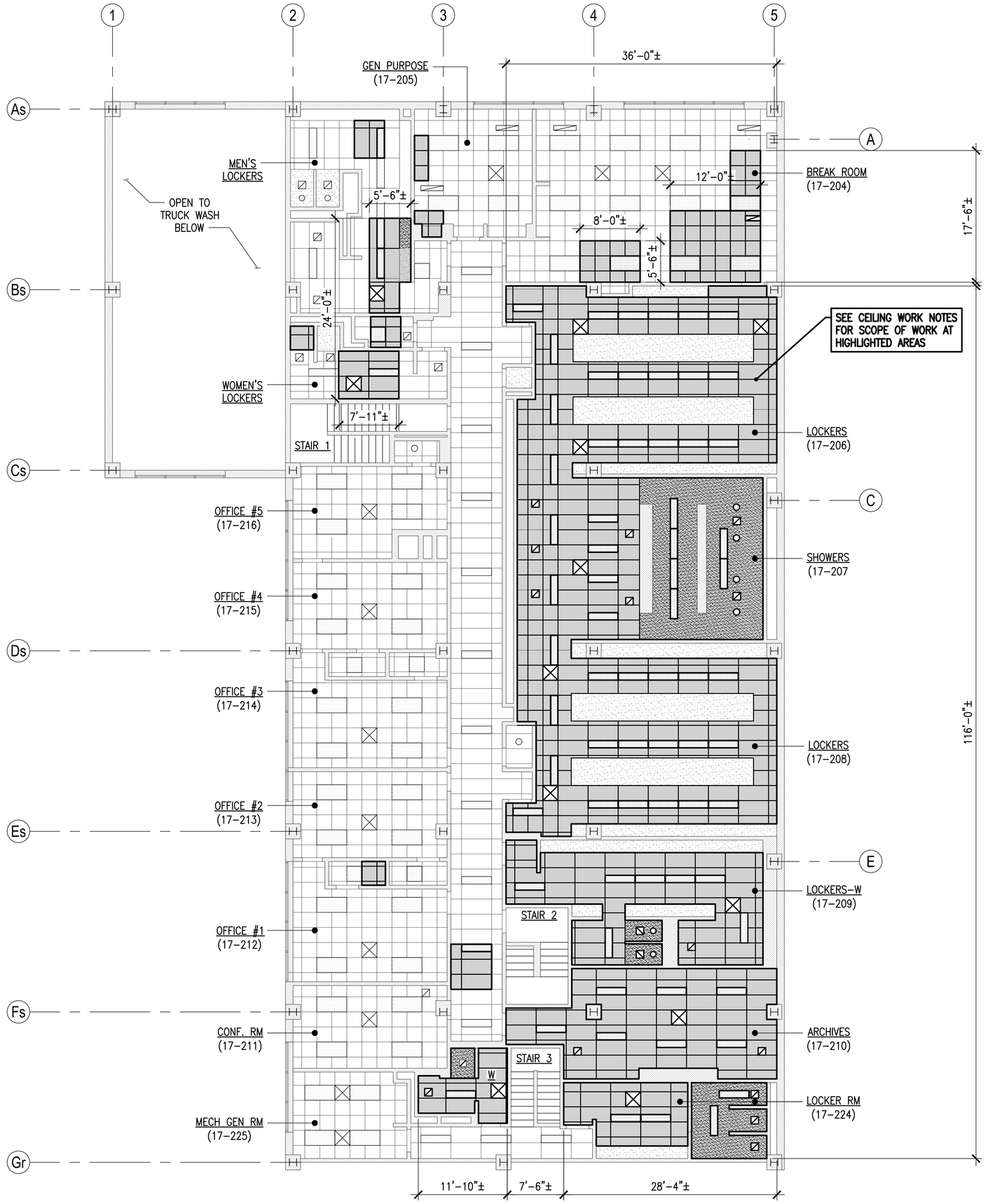
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FOR THE: DEPARTMENT OF SANITATION

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DRAWING TITLE:
ROOF PARTIAL ENLARGED PLANS AND SECTIONS

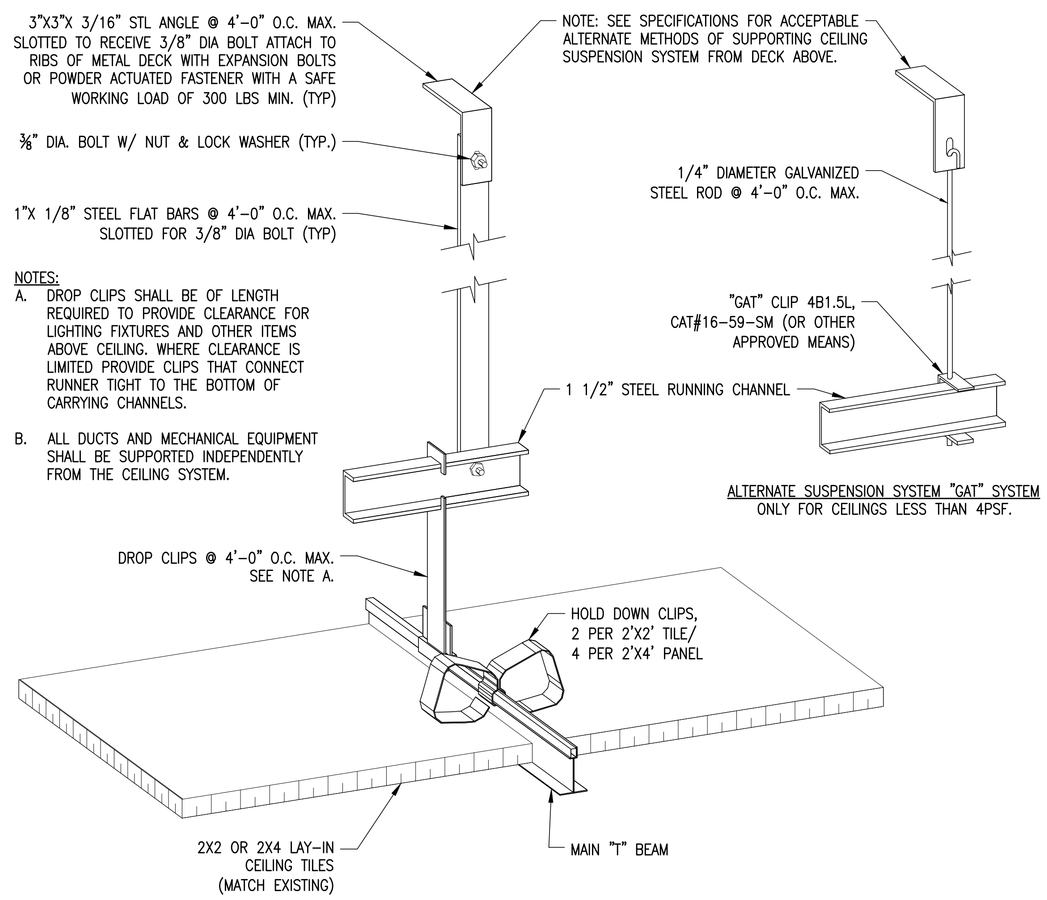
SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/30/20

DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER: A-108.00



1 / A-109 SECOND FLOOR REFLECTED CEILING PLAN - DISTRICT 17

Scale: 0 4 12 24 feet



2 / A-109 ACOUSTICAL LAY-IN TILE SUSPENDED CEILING - AXONOMETRIC

Scale: 0 2 4 8 inches

SYMBOL LEGEND

SYMBOL	DESCRIPTION
	EXISTING 2X4, 2X2, 1X4 & RECESSED LIGHT FIXTURES TO REMAIN
	EXISTING RETURN AIR DUCTS TO REMAIN (SIZE VARIES)
	EXISTING SUPPLY AIR DUCTS TO REMAIN (24"x24")
	EXISTING 2X4 AND 2X2 ACOUSTICAL CEILING TILES AND GRID TO REMAIN
	EXISTING SUSPENDED GYPSUM BOARD CEILING / SOFFIT TO REMAIN

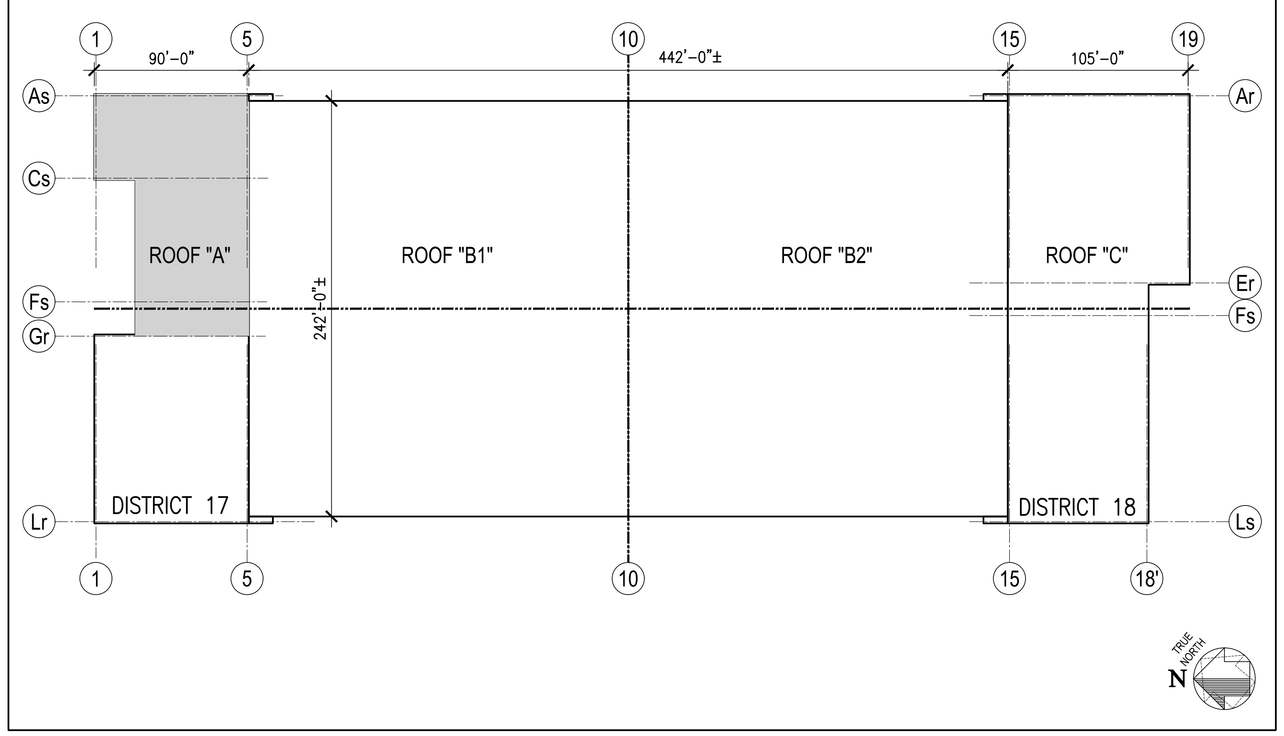
SYMBOL	DESCRIPTION
	REMOVE AND REINSTALL EXISTING 1X4, 2X4, 2X2 & RECESSED LIGHT FIXTURES
	INSTALL RETURN AIR DUCTS TO MATCH EXISTING SIZE AND LOCATIONS
	SUPPLY AIR DUCTS TO MATCH EXISTING SIZE AND LOCATIONS
	REMOVE AND REPLACE EXISTING, HUNG ACOUSTIC CEILING TILES, GRIDS AND SUPPORTS TO ALLOW FOR MECHANICAL WORK. SEE DETAIL 2/A-109
	REMOVE AND REPLACE EXISTING SUSPENDED GYPSUM BOARD CEILINGS AND SUPPORTS TO ALLOW FOR MECHANICAL WORK. SEE DETAIL 2/A-110

CEILING WORK NOTES

AT HIGHLIGHTED AREAS:

1. REMOVE EXISTING HUNG GYPSUM BOARD CEILINGS, ACOUSTIC CEILING TILES, GRIDS AND SUPPORTS TO ALLOW FOR MECHANICAL WORK.
2. PROVIDE NEW ACOUSTIC CEILINGS WITH NEW BLACK IRON SUPPORTS AFTER MEHCANICAL WORK.
3. REMOVE AND REINSTALL EXISTING LIGHT FIXTURES IN AFFECTED AREA OF WORK. SEE ELEC DWGS.
4. PROVIDE NEW MECHANICAL DIFFUSERS AT AREAS OF NEW CEILINGS; SEE MECHANICAL DWGS.
5. HEIGHT AND LAYOUT OF NEW CEILINGS TO MATCH EXISTING.
6. COORDINATE WITH MECHANICAL WORK FOR EXACT EXTENT OF CEILING REPLACEMENT.

BUILDING KEY PLAN



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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

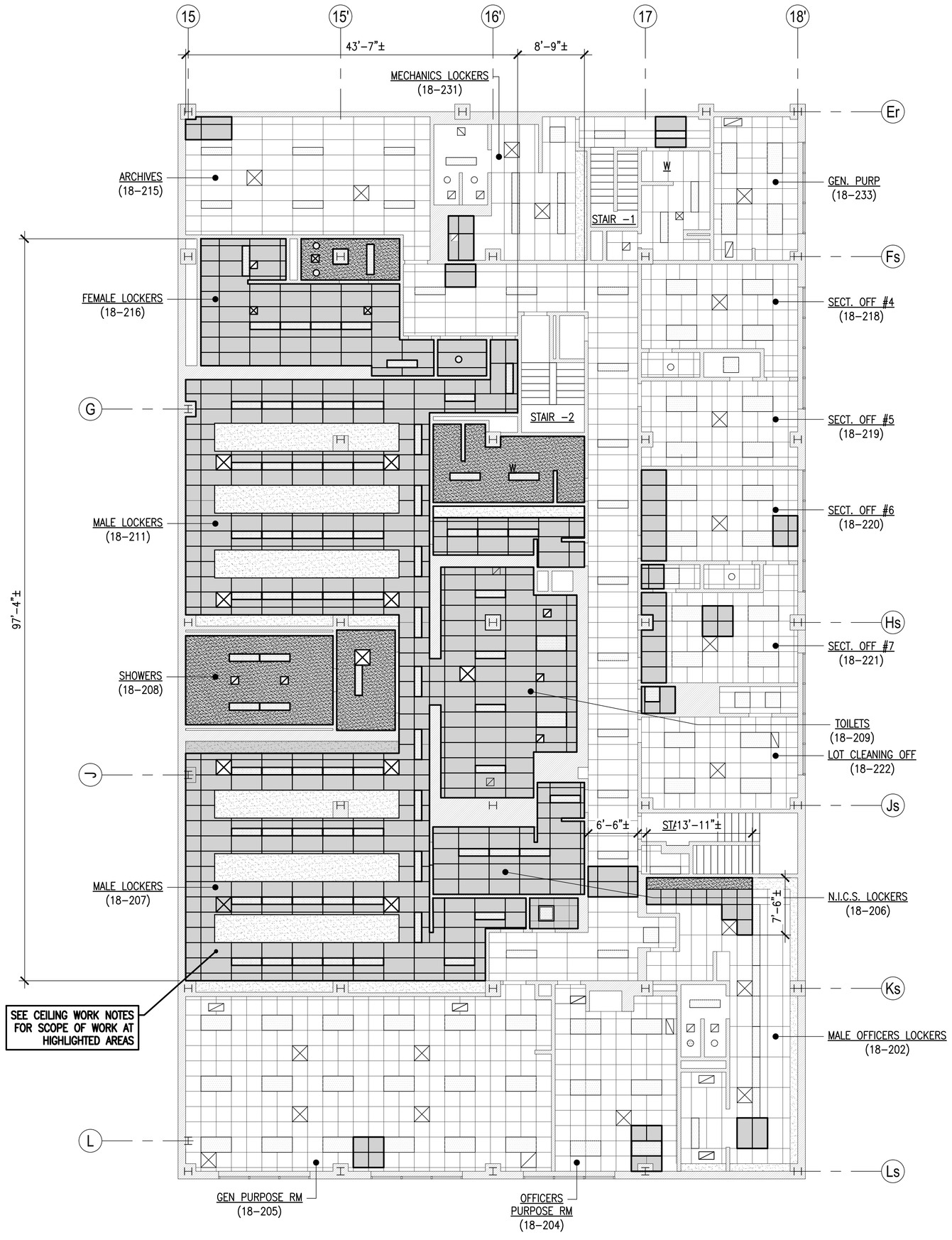
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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
REFLECTED CEILING PLANS DISTRICT 17

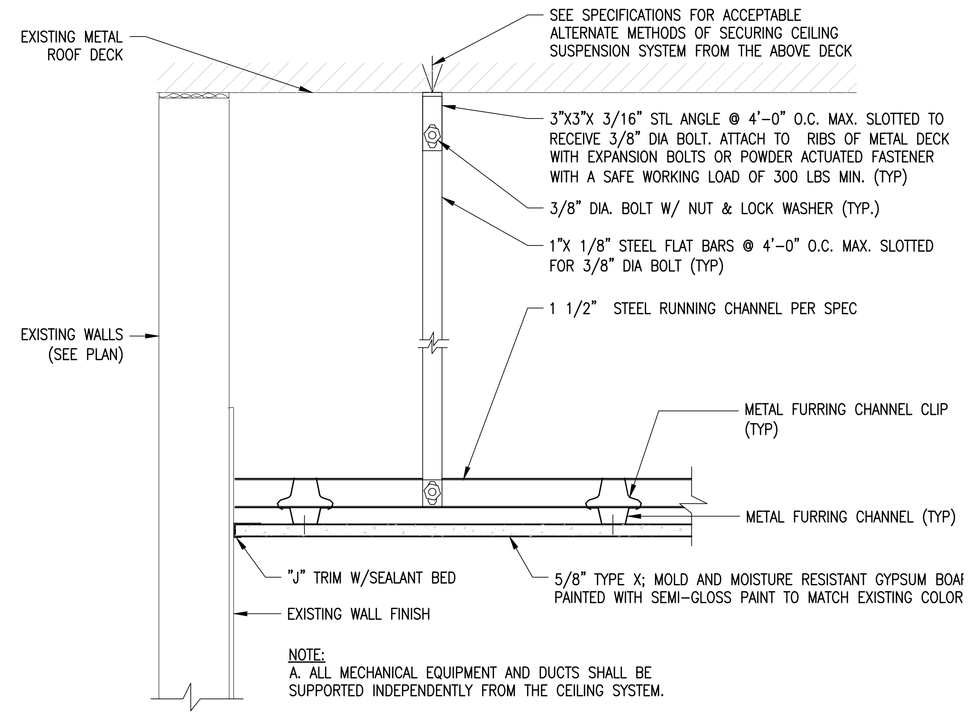
SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/09/20

DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
A-109.00



1 / A-110 SECOND FLOOR REFLECTED CEILING PLAN - DISTRICT 18

Scale: 0 4 12 24 feet



2 / A-110 GYPSUM BOARD SUSPENDED CEILING DETAIL

Scale: 0 2 4 8 inches

SYMBOL LEGEND

SYMBOL	DESCRIPTION
	EXISTING 2X4, 2X2, 1X4 & RECESSED LIGHT FIXTURES TO REMAIN
	EXISTING RETURN AIR DUCTS TO REMAIN (SIZE VARIES)
	EXISTING SUPPLY AIR DUCTS TO REMAIN (24"x24")
	EXISTING 2X4 AND 2X2 ACOUSTICAL CEILING TILES AND GRID TO REMAIN
	EXISTING SUSPENDED GYPSUM BOARD CEILING / SOFFIT TO REMAIN

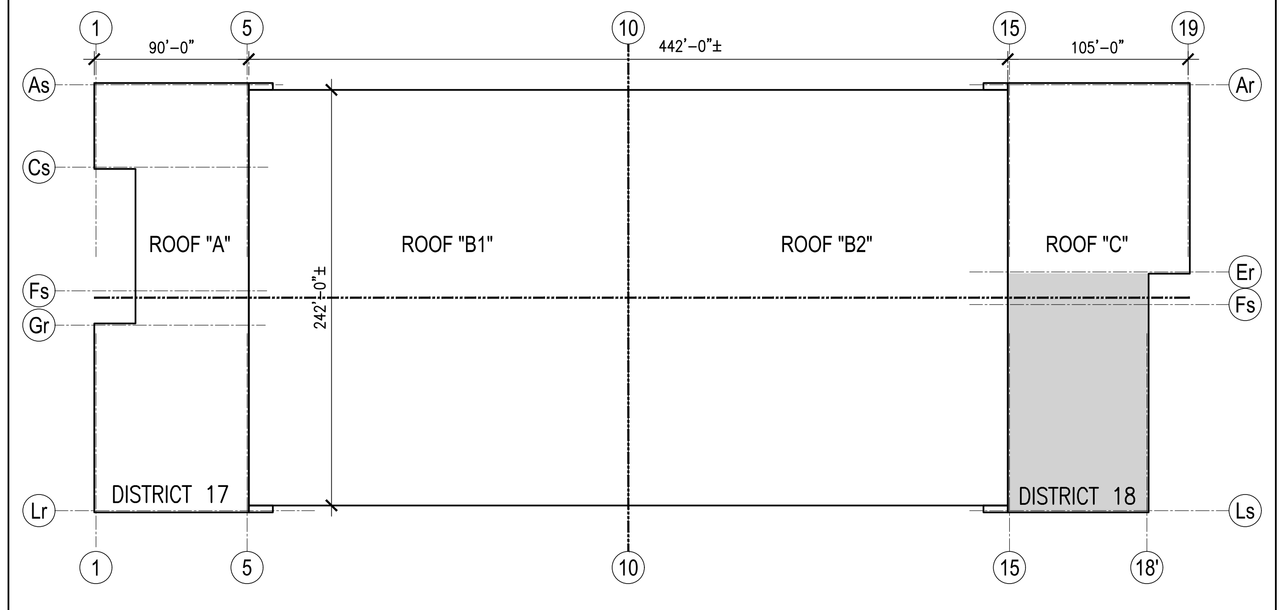
SYMBOL	DESCRIPTION
	REMOVE AND REINSTALL EXISTING 1X4, 2X4, 2X2 & RECESSED LIGHT FIXTURES
	INSTALL RETURN AIR DUCTS TO MATCH EXISTING SIZE AND LOCATIONS
	SUPPLY AIR DUCTS TO MATCH EXISTING SIZE AND LOCATIONS
	REMOVE AND REPLACE EXISTING, HUNG ACOUSTIC CEILING TILES, GRIDS AND SUPPORTS TO ALLOW FOR MECHANICAL WORK. SEE DETAIL 2/A-109
	REMOVE AND REPLACE EXISTING SUSPENDED GYPSUM BOARD CEILINGS AND SUPPORTS TO ALLOW FOR MECHANICAL WORK. SEE DETAIL 2/A-110

CEILING WORK NOTES

AT HIGHLIGHTED AREAS:

1. REMOVE EXISTING HUNG GYPSUM BOARD CEILINGS, ACOUSTIC CEILING TILES, GRIDS AND SUPPORTS TO ALLOW FOR MECHANICAL WORK.
2. PROVIDE NEW ACOUSTIC CEILINGS WITH NEW BLACK IRON SUPPORTS AFTER MEHCANICAL WORK.
3. REMOVE AND REINSTALL EXISTING LIGHT FIXTURES IN AFFECTED AREA OF WORK. SEE ELEC DWGS.
4. PROVIDE NEW MECHANICAL DIFFUSERS AT AREAS OF NEW CEILINGS; SEE MECHANICAL DWGS.
5. HEIGHT AND LAYOUT OF NEW CEILINGS TO MATCH EXISTING.
6. COORDINATE WITH MECHANICAL WORK FOR EXACT EXTENT OF CEILING REPLACEMENT.

BUILDING KEY PLAN



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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

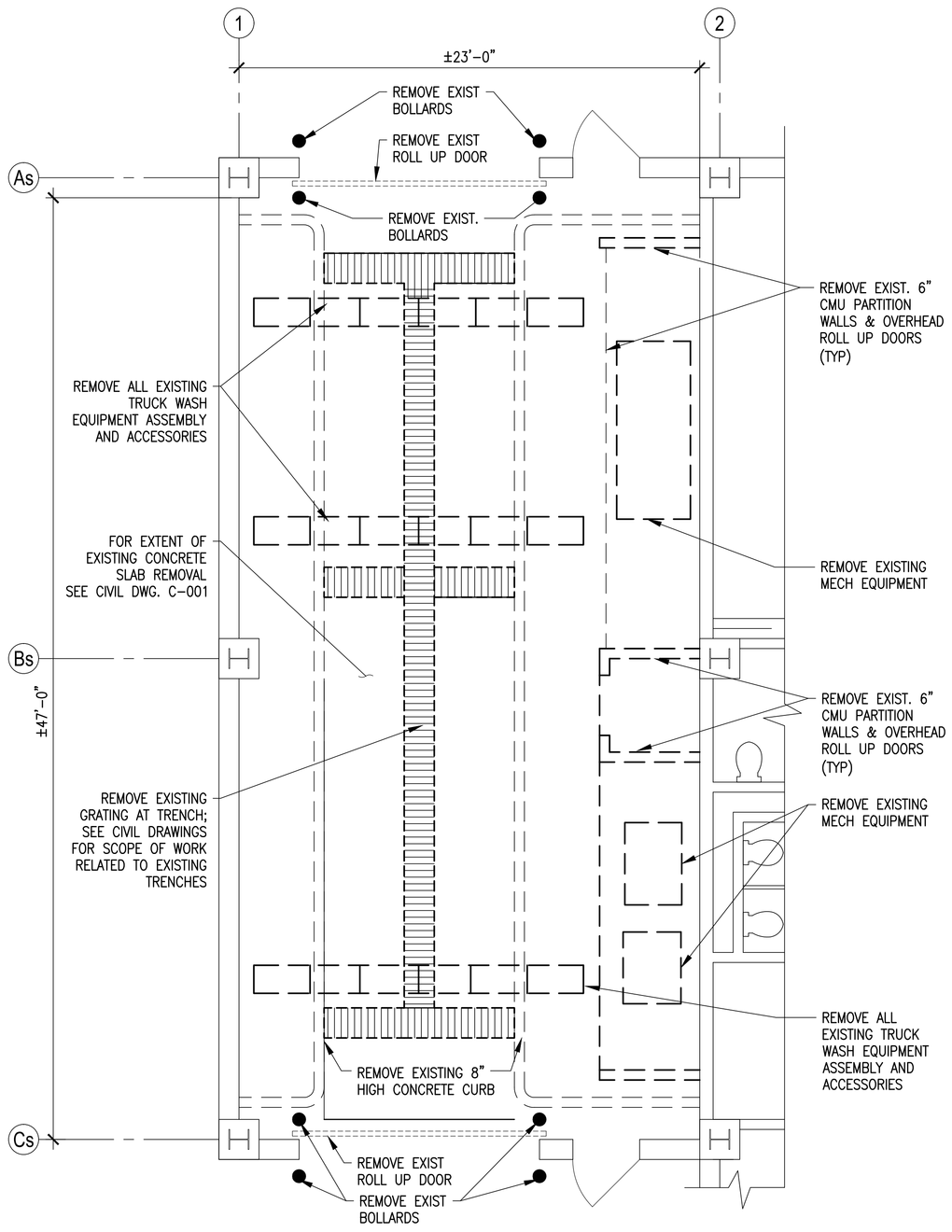
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
REFLECTED CEILING PLANS DISTRICT 18

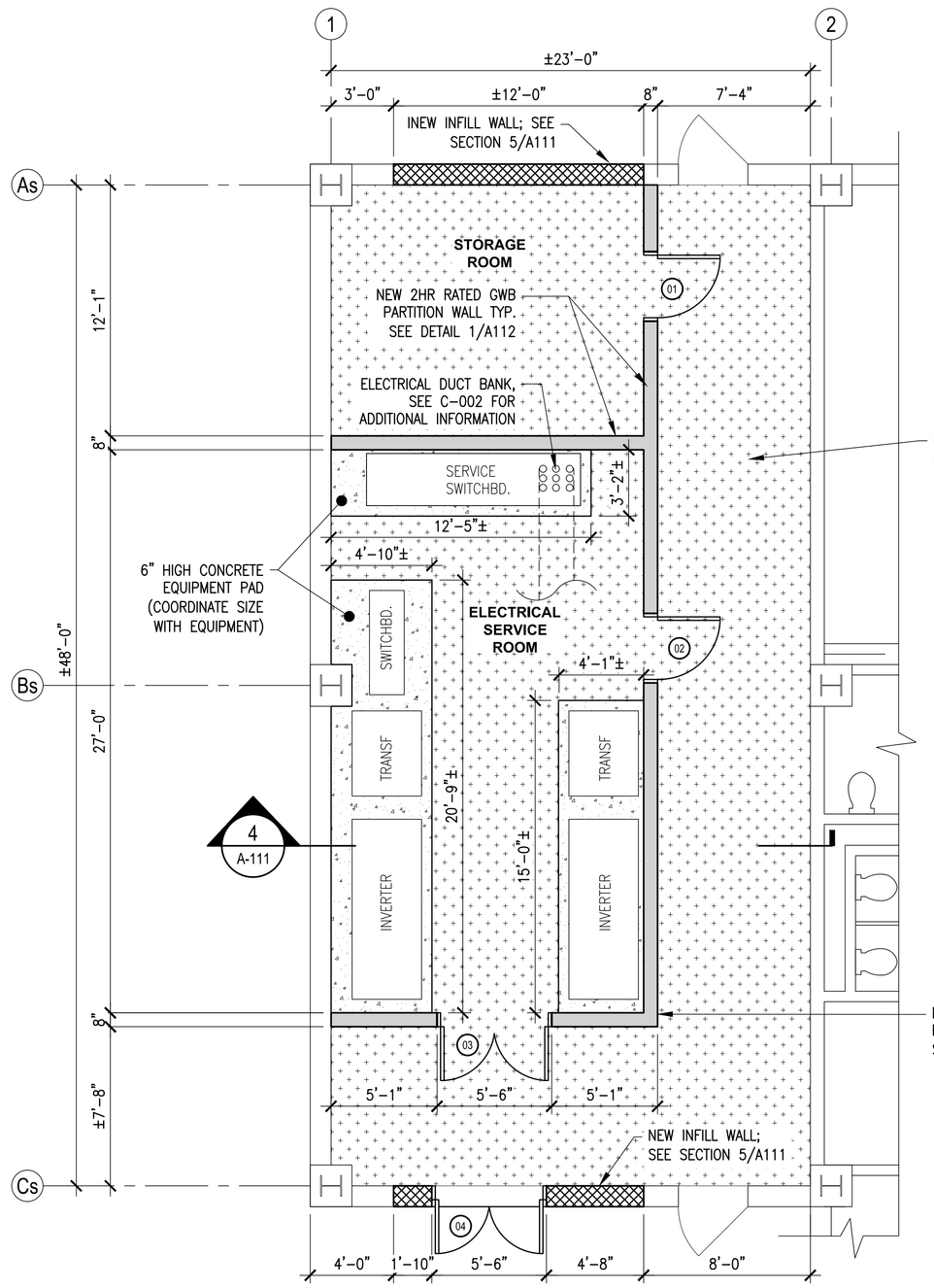
SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/30/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	A-110.00



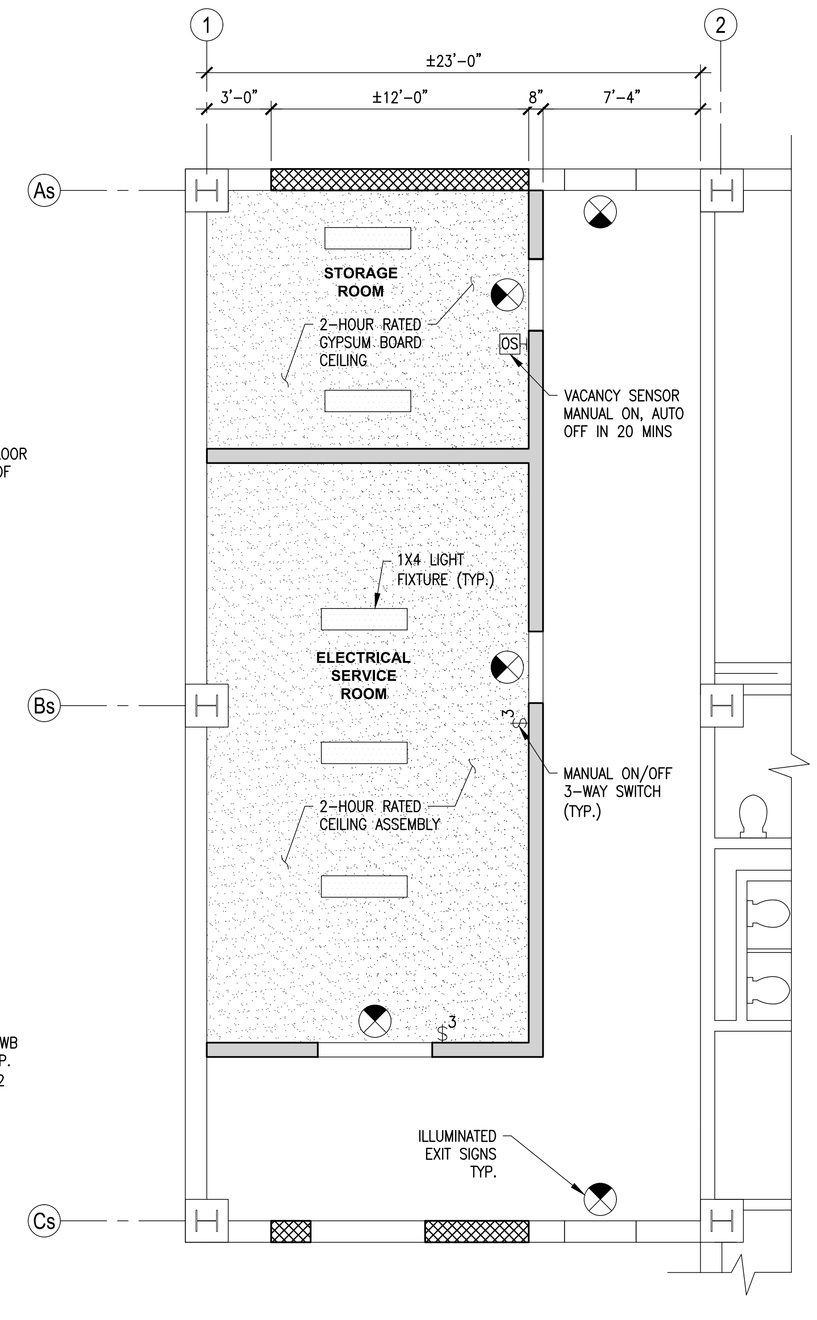
1 A-111 TRUCK WASH AREA- DISTRICT 17
ENLARGED PLAN - REMOVALS

Scale: 0 1.5 3 6 feet



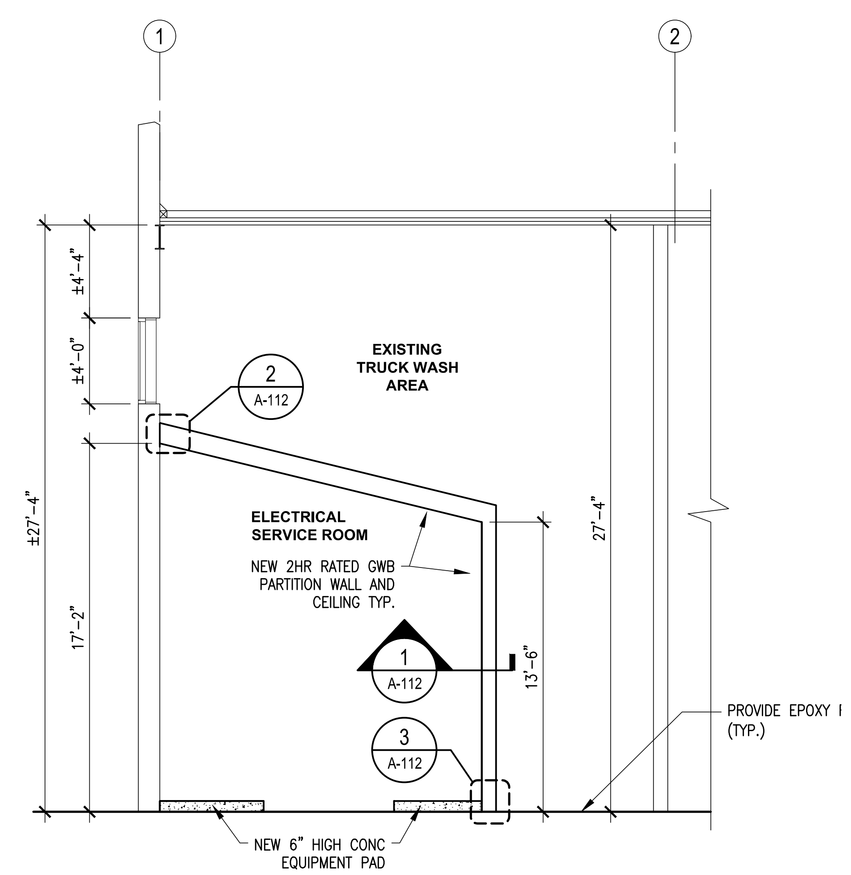
2 A-111 TRUCK WASH AREA- DISTRICT 17
ENLARGED PLAN - CONSTRUCTION

Scale: 0 1.5 3 6 feet



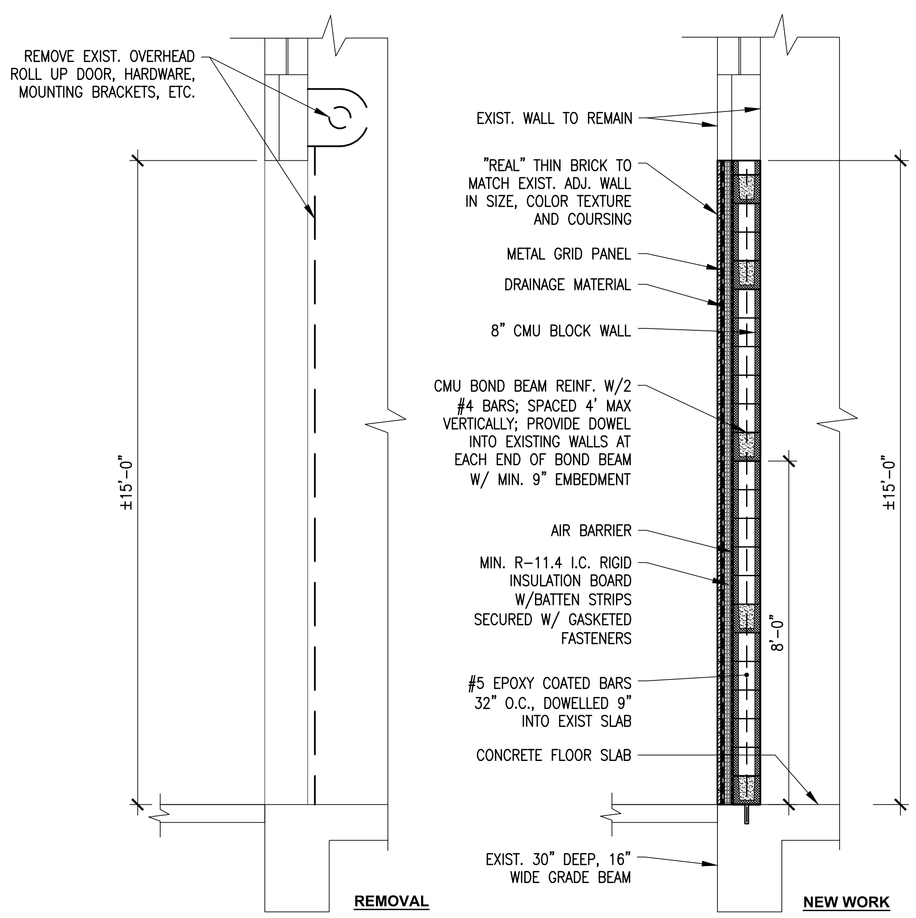
3 A-111 TRUCK WASH AREA - DISTRICT 17
ENLARGED REFLECTED CEILING PLAN - CONSTRUCTION

Scale: 0 1.5 3 6 feet



4 A-111 SECTION THRU ELECTRICAL SERVICE ROOM

Scale: 0 1.5 3 6 feet



5 A-111 SECTION THROUGH INFILL WALLS

Scale: 0 .75 1.5 3 feet

FIXTURE SCHEDULE					
TAG	MANUFACTURER	CATALOG NUMBER	VOLTAGE	WATTS	DESCRIPTION
LT-1	DAY-BRITE LIGHTING	DWAE51L840-4-UNV-(EMLED)	UNIVERSAL	46	ENCLOSED AND GASKETED LED FIXTURE WITH ACRYLIC DIFFUSER
LT-2	ESW	ESW-NY	UNIVERSAL	5	LED NYC COMPLIANT SELF POWERED EXIT SIGN, UL924

SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	AREA OF EPOXY COATED FLOOR.
	AREA OF 6" HIGH CONCRETE EQUIPMENT PAD. SEE DETAIL 4/S105
	CMU AND BRICK MASONRY WALL INFIL SEE SECTION 5/A111
	2 HR RATED GYPSUM BOARD CEILING
	INSTALL CEILING MOUNTED LIGHT FIXTURES, SEE DWG. E-201 FOR ADDITIONAL INFORMATION

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

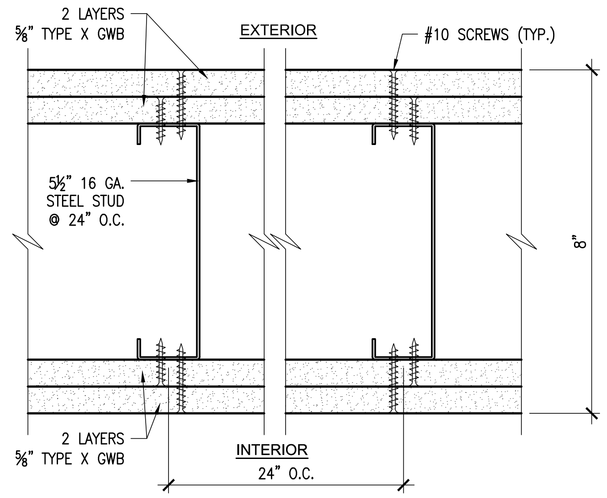
LOT: 1 BLOCK: 8138

DRAWING TITLE:
NEW ELECTRICAL SERVICE ROOM - ENLARGED PLANS AND SECTIONS

SEAL & SIGNATURE
REGISTERED ARCHITECT SRITHIN SABANAYAGAM 035580 STATE OF NEW YORK
09/27/2019

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM

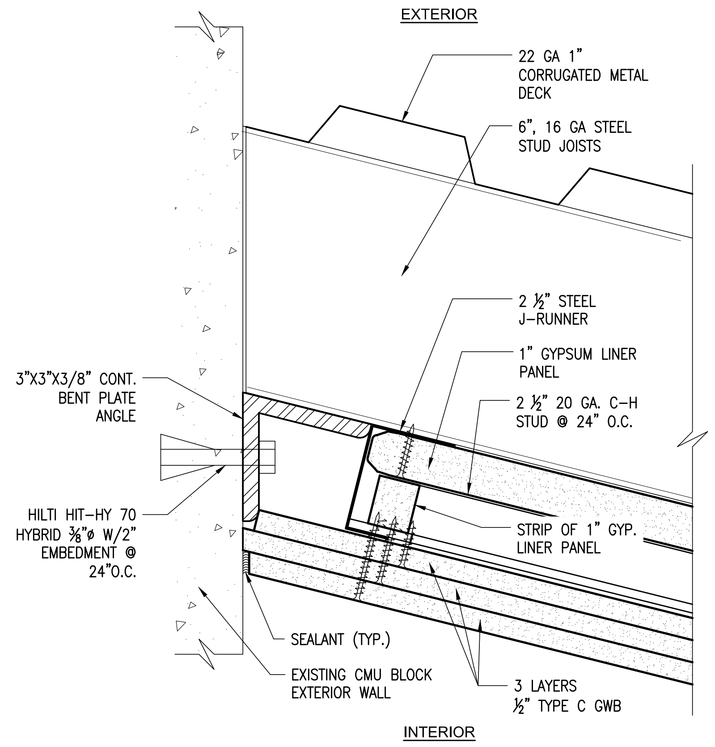
DRAWING NUMBER:
A-111.00



1 A-112 **2-HR RATED WALL DETAIL - PLAN VIEW**

Scale: 0 .75 1.5 3 inches

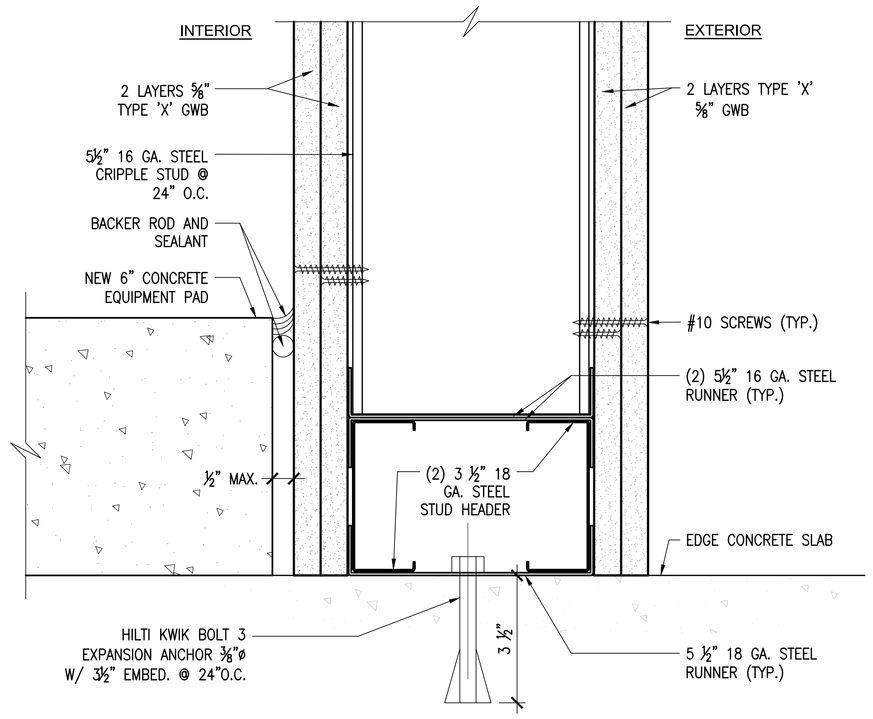
UL DESIGN U423



2 A-112 **2-HR RATED CEILING DETAIL AT CMU WALL INTERSECTION - SECTION VIEW**

Scale: 0 .75 1.5 3 inches

MER 258



3 A-112 **2-HR RATED BASE DETAIL - SECTION VIEW**

Scale: 0 .75 1.5 3 inches

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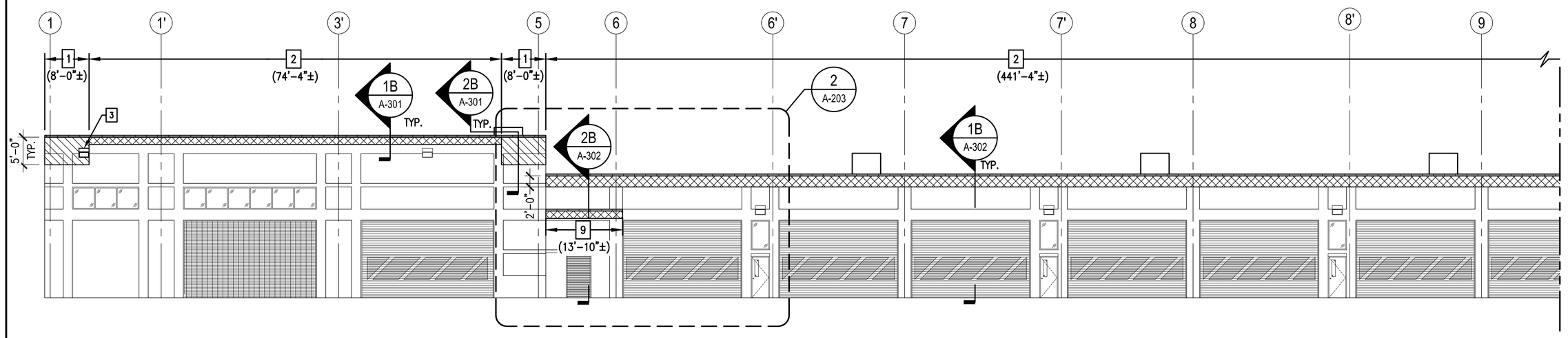
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
NEW ELECTRICAL SERVICE ROOM - DETAILS

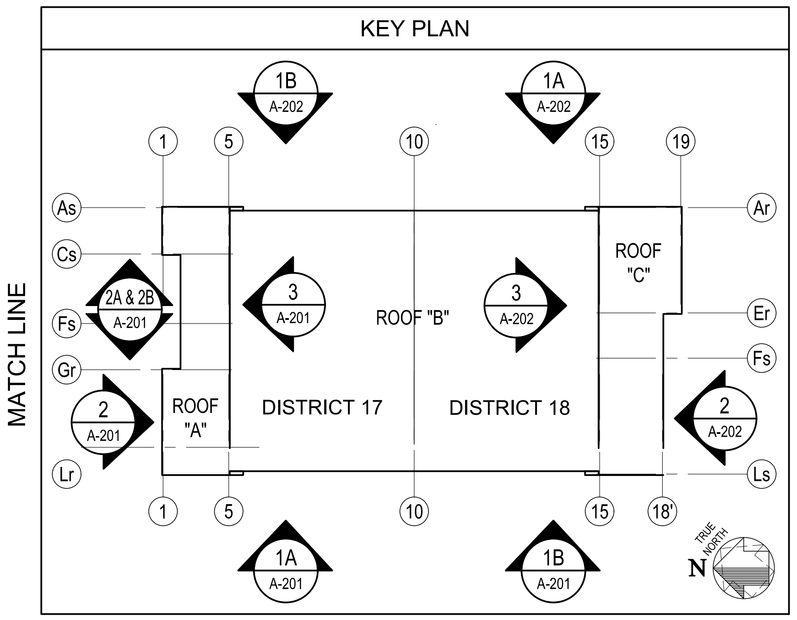
SEAL & SIGNATURE
REGISTERED ARCHITECT SEETHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/30/20

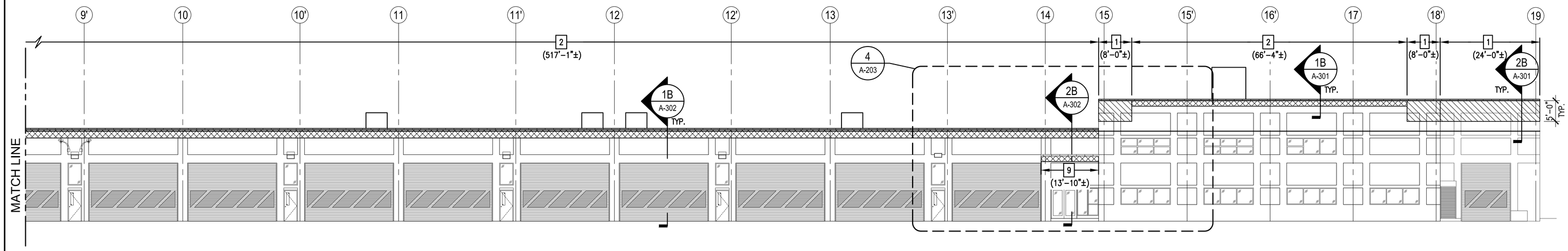
DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
A-112.00



1A A-201 DISTRICT 17 WEST ELEVATION - CONSTRUCTION

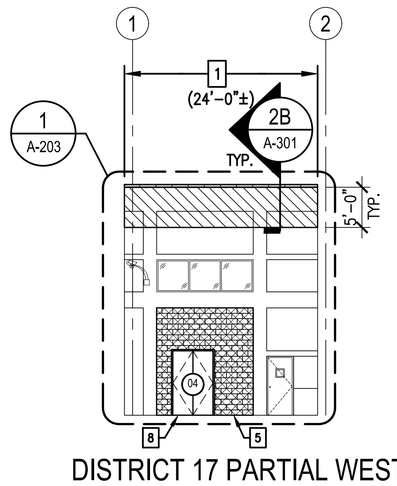
Scale: 0 4 8 16 feet





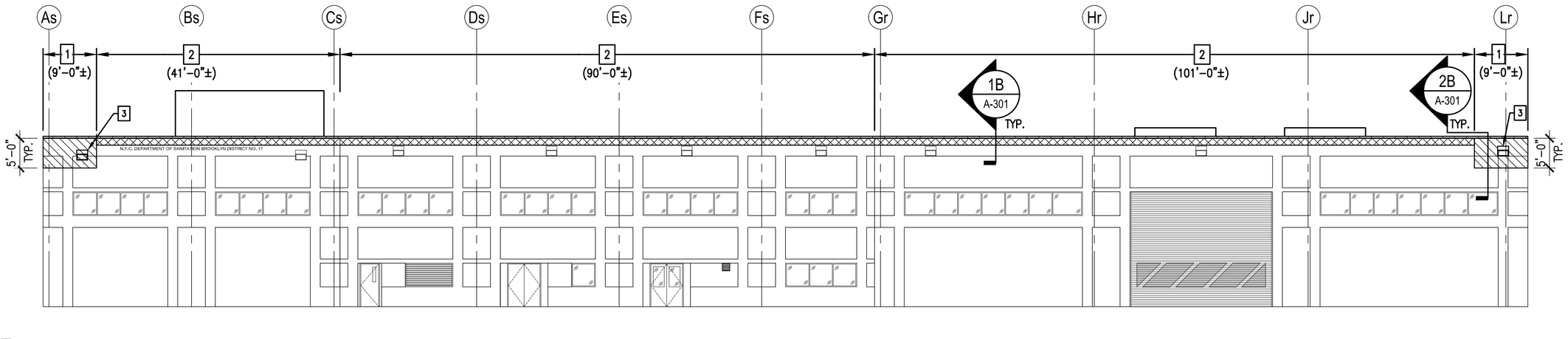
1B A-201 DISTRICT 18 WEST ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet



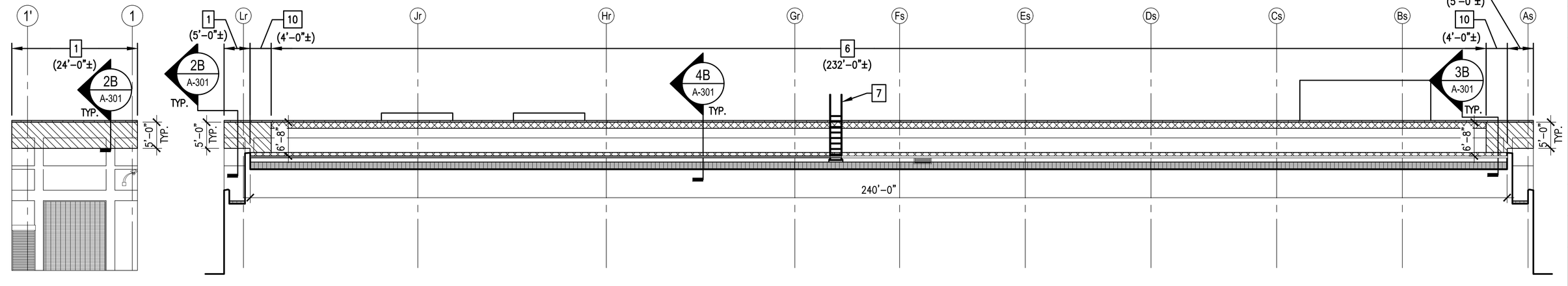
2A A-201 DISTRICT 17 PARTIAL WEST ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet



2 A-201 DISTRICT 17 NORTH ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet



2B A-201 DISTRICT 17 PARTIAL EAST ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet

3 A-201 DISTRICT 17 SOUTH ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet

CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REBUILD MASONRY PARAPETS WITH PRECAST COPING STONE, CMU AND BRICK MASONRY TO MATCH EXISTING SIZE, COLOR, PATTERN AND ADJACENT PARAPET.	2B/A-301
2		RAISE EXISTING PARAPET/CURB WITH PRECAST COPING STONE, CMU AND BRICK MASONRY TO MATCH EXISTING SIZE, COLOR, PATTERN	1B/A-301 AND 1B/A-302
3		REINSTALL EXISTING WALL MOUNTED LIGHT FIXTURES	N/A
4		NOT USED	
5		PROVIDE MASONRY INFILL AT EXISTING OVERHEAD GARAGE DOOR OPENINGS. EXTERIOR BRICK MASONRY TO MATCH EXISTING SIZE, SHAPE AND COLOR	5/A-111
6		PROVIDE FACE BRICK, CMU BACKUP & PRECAST COPING STONE AT UPPER ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING AT LOWER ROOF	4B/A-301
7		REINSTALL EXISTING SHIPS LADDER AT NEW SUPPORTS	1/A-402
8	04	PROVIDE EXTERIOR HOLLOW METAL DOOR AND FRAME. SEE DOOR SCHEDULE	A-501
9		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE ROOF CURB AND PARAPET, PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING	2B/A-302
10		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS AT UPPER ROOF. PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING AT LOWER ROOF	3B/A-301

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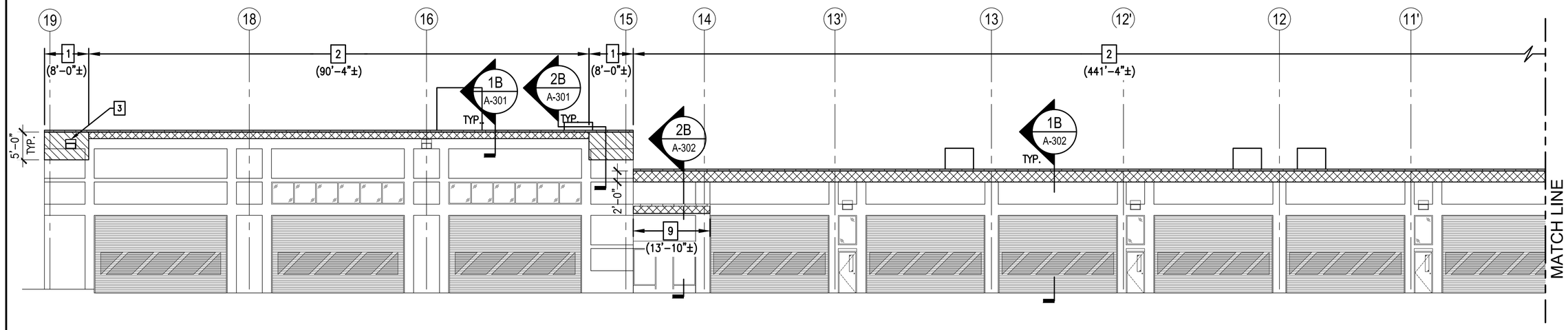
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
WEST AND NORTH ELEVATIONS CONSTRUCTION

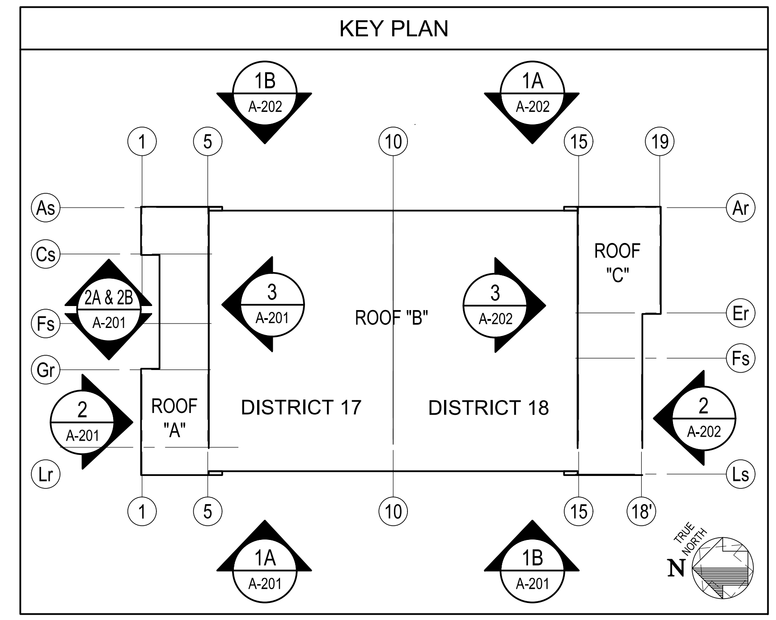
SEAL & SIGNATURE
REGISTERED ARCHITECT SEETHIL SABANAYAGAM 035580 STATE OF NEW YORK
09/27/20

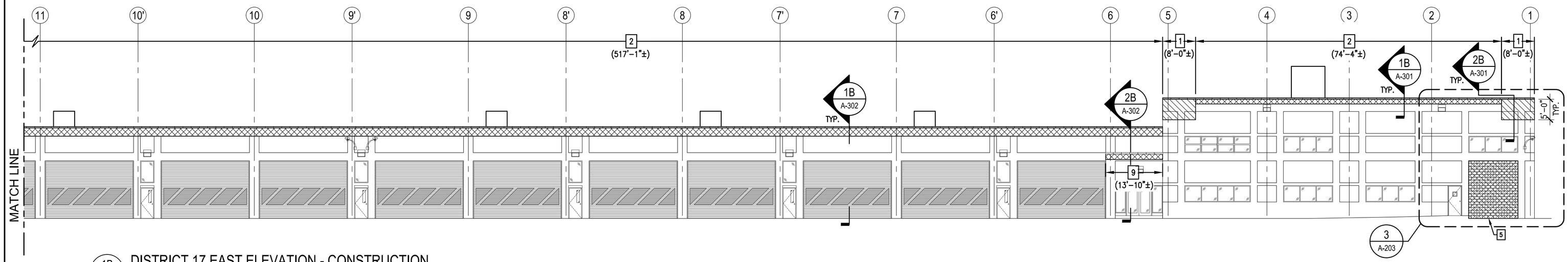
DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER: A-201.00



1A A-202 DISTRICT 18 EAST ELEVATION - CONSTRUCTION

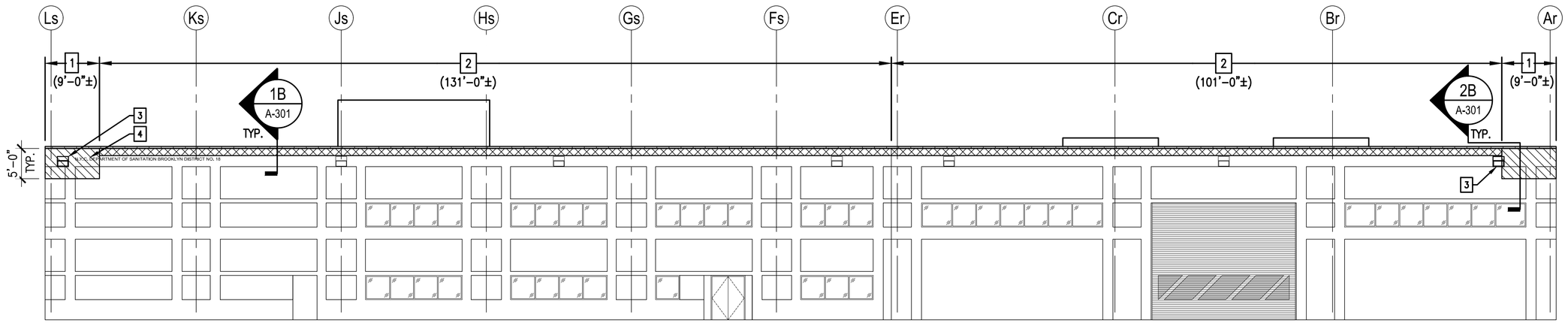
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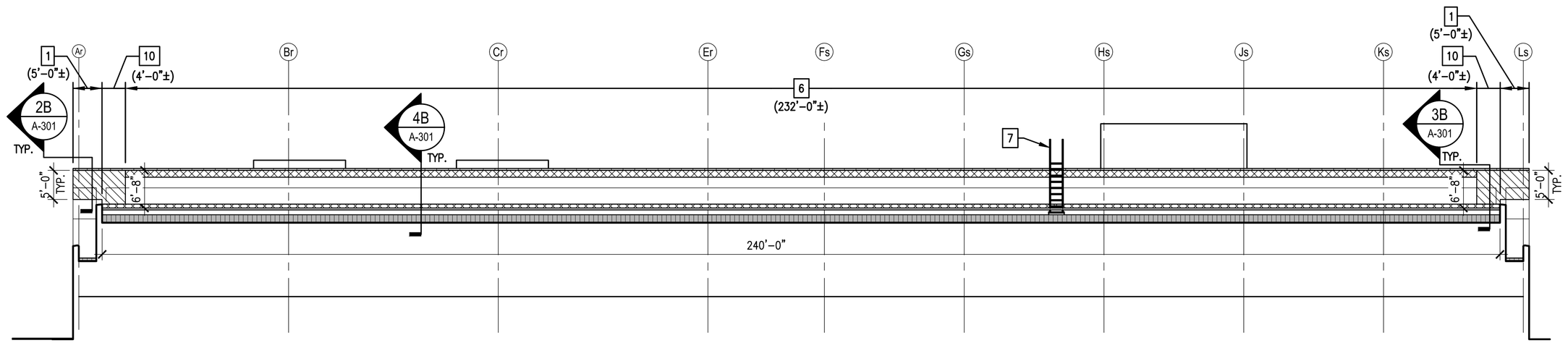
1B A-202 DISTRICT 17 EAST ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet



2A A-202 DISTRICT 18 SOUTH ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet



3 A-202 DISTRICT 18 NORTH ELEVATION - CONSTRUCTION

Scale: 0 4 8 16 feet

CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION	DETAIL
1		REBUILD MASONRY PARAPETS WITH PRECAST COPING STONE, CMU AND BRICK MASONRY TO MATCH EXISTING SIZE, COLOR, PATTERN AND ADJACENT PARAPET.	2B/A-301
2		RAISE EXISTING PARAPET/CURB WITH PRECAST COPING STONE, CMU AND BRICK MASONRY TO MATCH EXISTING SIZE, COLOR, PATTERN	1B/A-301 AND 1B/A-302
3		REINSTALL EXISTING WALL MOUNTED LIGHT FIXTURES	N/A
4	N/A	REINSTALL BUILDING LETTERING AT LOCATION OF REBUILT PARAPET	N/A
5		PROVIDE MASONRY INFILL AT EXISTING OVERHEAD GARAGE DOOR OPENINGS. EXTERIOR BRICK MASONRY TO MATCH EXISTING SIZE, SHAPE AND COLOR	5/A-111
6		PROVIDE FACE BRICK, CMU BACKUP & PRECAST COPING STONE AT UPPER ROOF; PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING AT LOWER ROOF	4B/A-301
7		REINSTALL EXISTING SHIPS LADDER AT NEW SUPPORTS	1/A-402
8		NOT USED	
9		PROVIDE FACE BRICK, CMU BACKUP AND PRECAST COPING STONE TO RAISE ROOF CURB AND PARAPET, PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING	2B/A-302
10		PROVIDE MASONRY PARAPETS WITH PRECAST COPING AT BUILDING CORNERS AT UPPER ROOF. PROVIDE 3 COURSES OF FACE BRICK AND THRU-WALL FLASHING AT LOWER ROOF	3B/A-301

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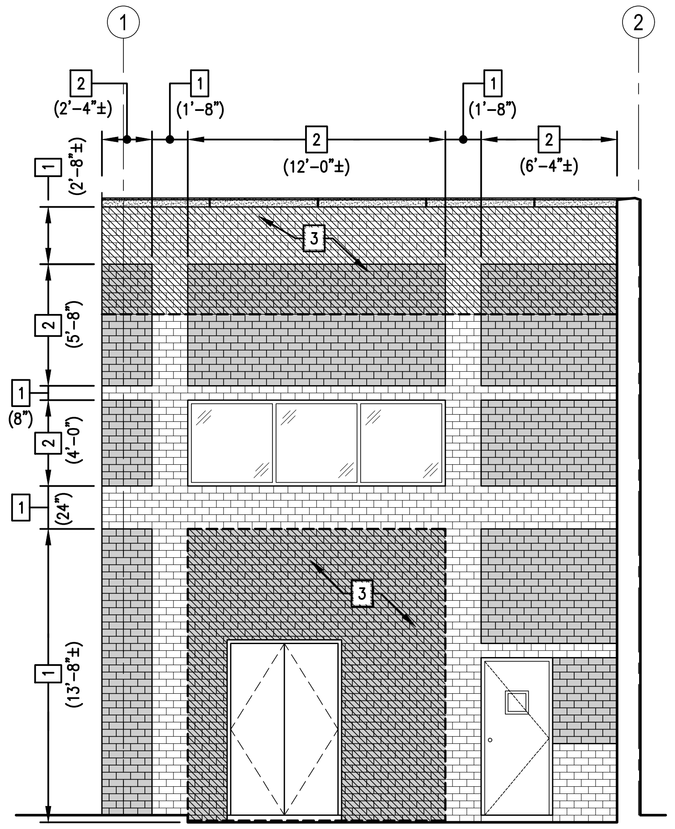
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
EAST AND SOUTH ELEVATIONS CONSTRUCTION

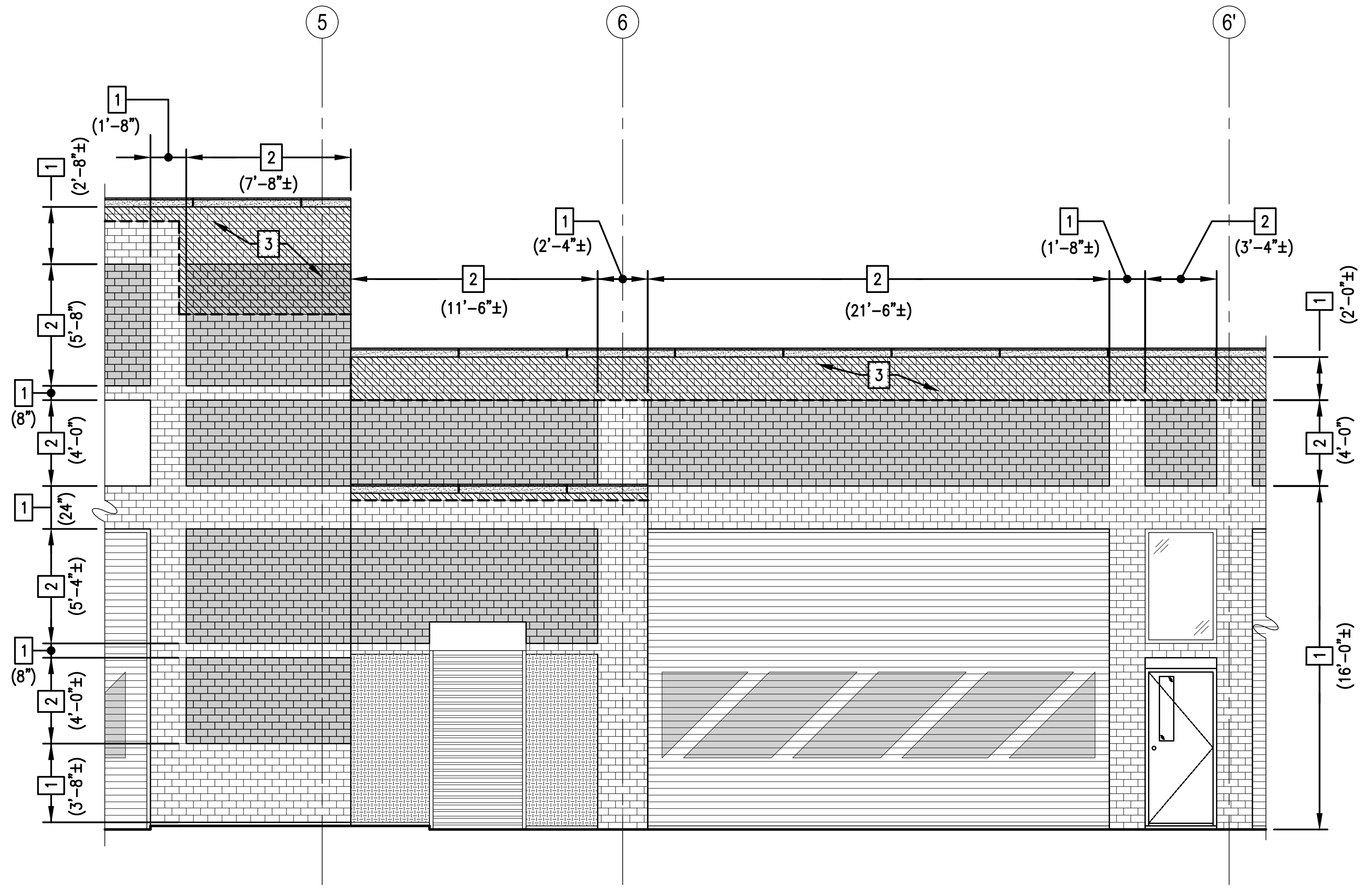
SEAL & SIGNATURE
REGISTERED ARCHITECT SERTHII SABANAYAGAM 035580 STATE OF NEW YORK 09/27/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	A-202.00



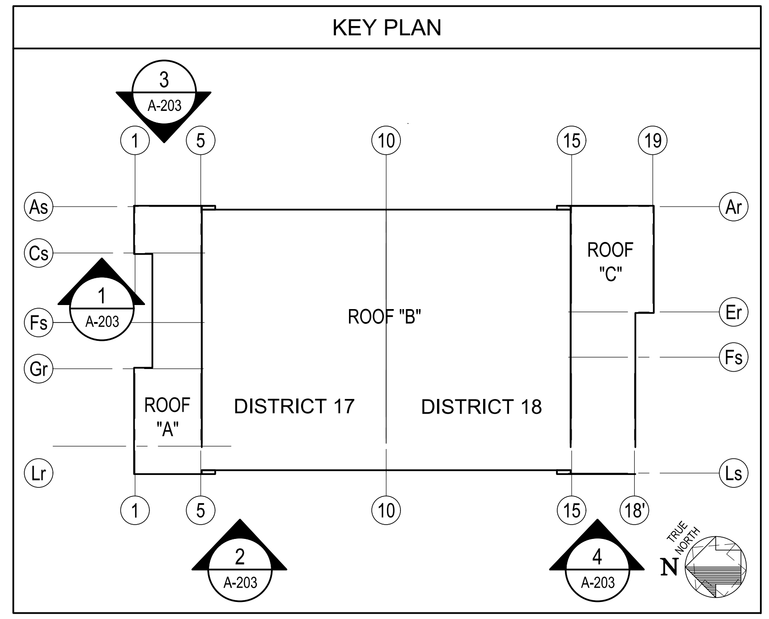
1 A-203 — DISTRICT 17 - PARTIAL WEST ELEVATION AT TRUCK WASH - BRICK COLOR LAYOUT

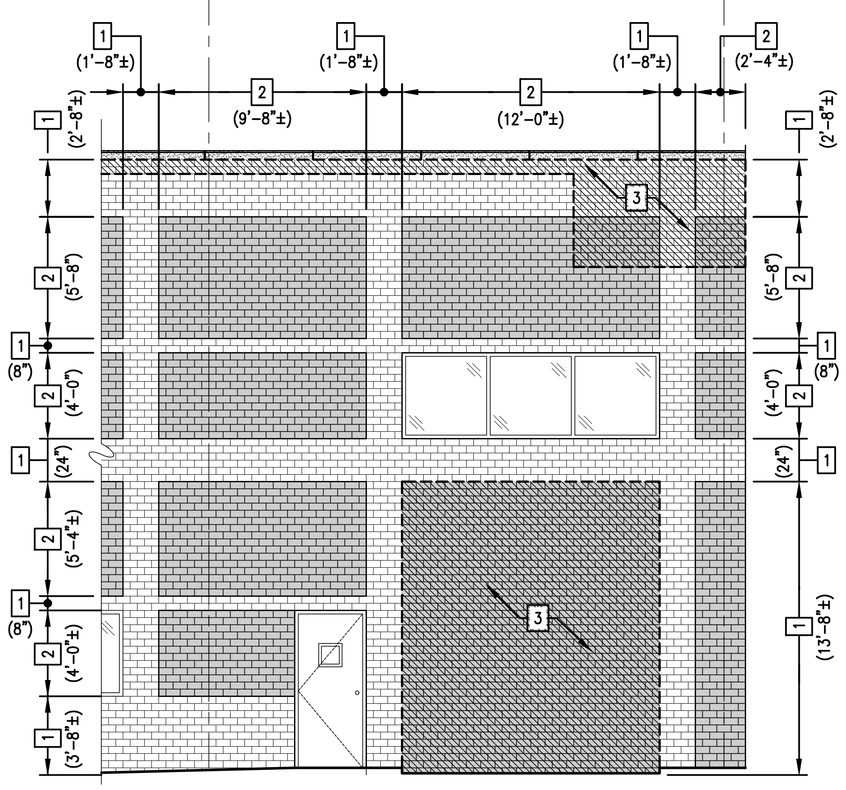
Scale: 0 1.5 3 6 feet



2 A-203 — DISTRICT 17 - PARTIAL WEST ELEVATION - BRICK COLOR LAYOUT

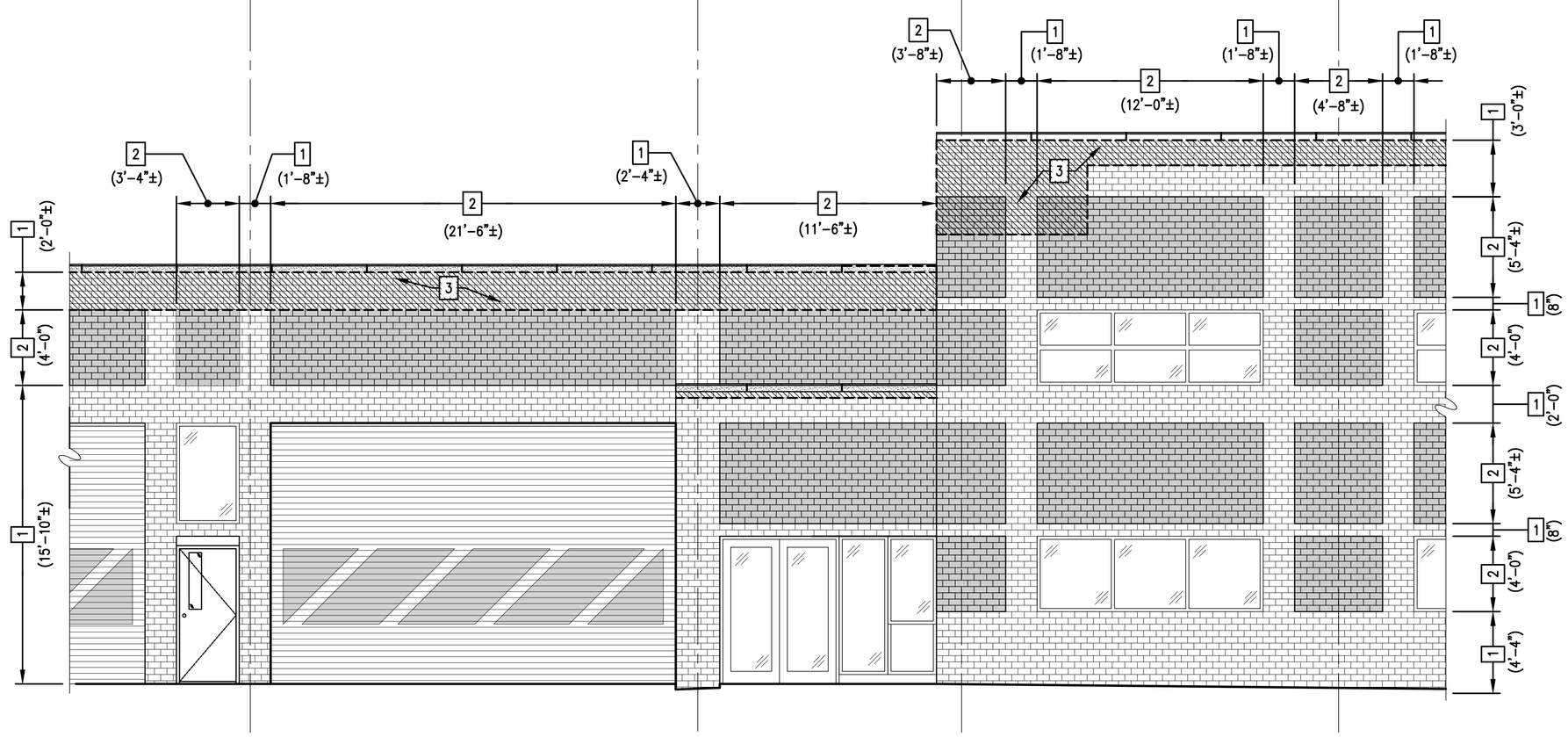
Scale: 0 1.5 3 6 feet





3 A-203 — DISTRICT 17 - PARTIAL EAST ELEVATION AT TRUCK WASH - BRICK COLOR LAYOUT

Scale: 0 1.5 3 6 feet



4 A-203 — DISTRICT 18 - PARTIAL WEST ELEVATION - BRICK COLOR LAYOUT

Scale: 0 1.5 3 6 feet

CONSTRUCTION KEY NOTES

No.	SYMBOL	DESCRIPTION
1		EXISTING TYPE "A" LIGHT COLOR BRICK; BRICK BEING REPLACED IN THIS LOCATION TO MATCH EXISTING COLOR, SIZE AND SHAPE
2		EXISTING TYPE "B" DARK COLOR BRICK; BRICK BEING REPLACED IN THIS LOCATION TO MATCH EXISTING COLOR, SIZE AND SHAPE
3		AREA OF NEW BRICK; COORDINATE WITH ELEVATIONS ON DRAWINGS A–201 & A–202 AND WITH WALL SECTIONS ON DRAWINGS A–301 & A–302

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VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

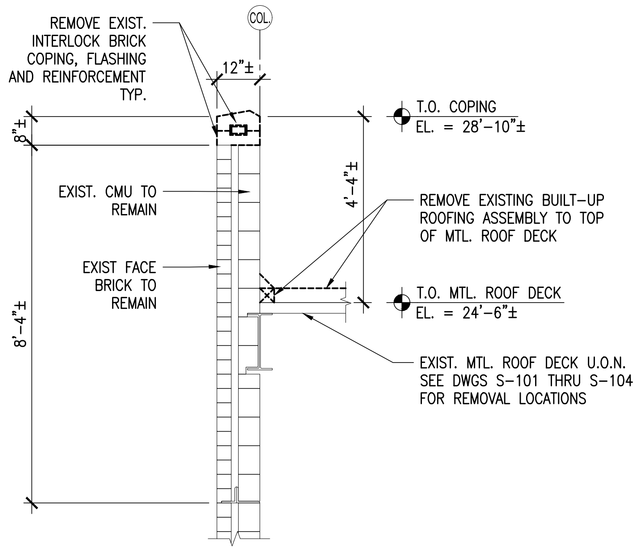
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ENLARGED PARTIAL ELEVATIONS

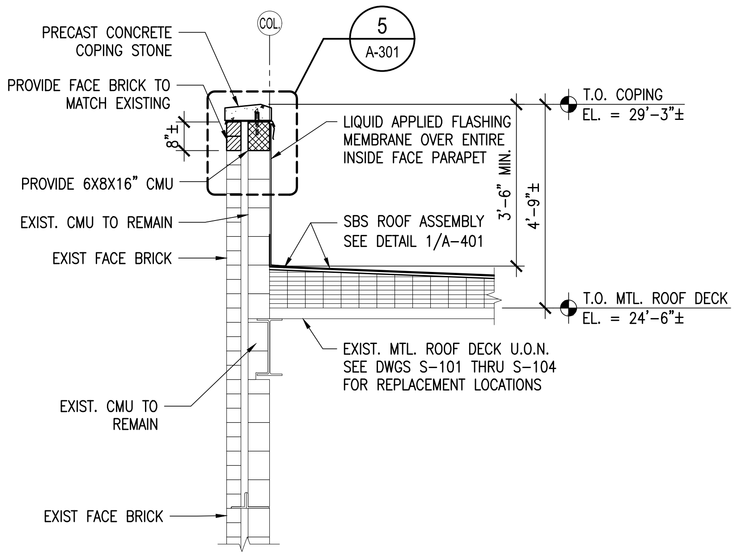
SEAL & SIGNATURE
REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK 09/27/2019

DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM
DRAWING NUMBER:
A-203.00



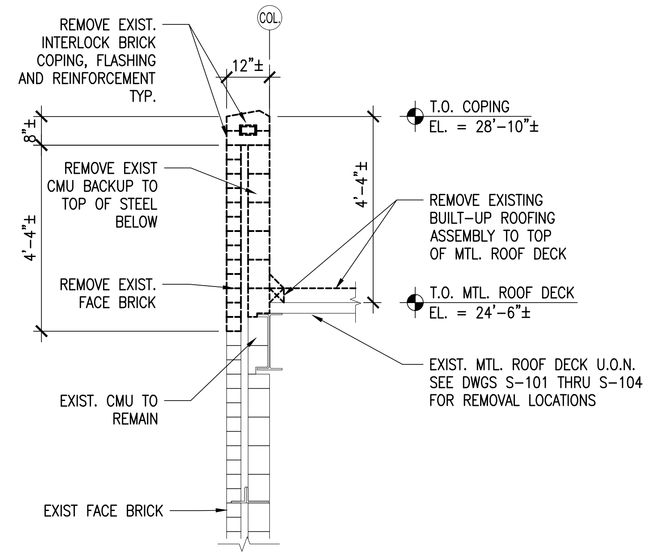
SECTION AT ROOFS A & C PARAPETS - REMOVALS

1A / A-301 Scale: 0 1 2 4 feet



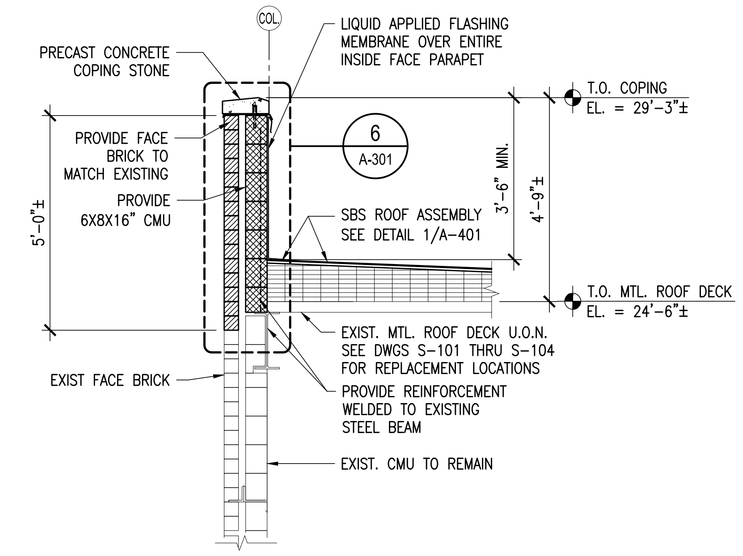
SECTION AT ROOFS A & C PARAPETS - CONSTRUCTION

1B / A-301 Scale: 0 1 2 4 feet



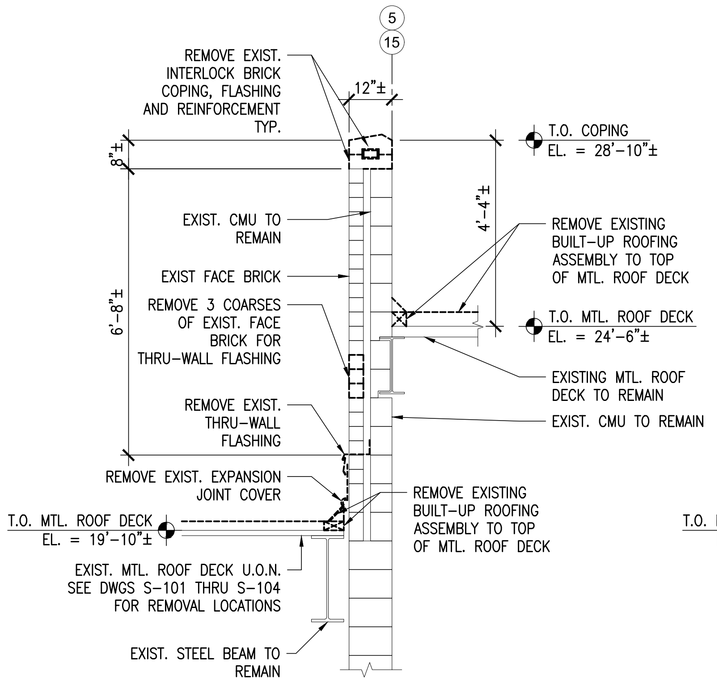
SECTION AT ROOF A & C PARAPET CORNERS - REMOVALS

2A / A-301 Scale: 0 1 2 4 feet



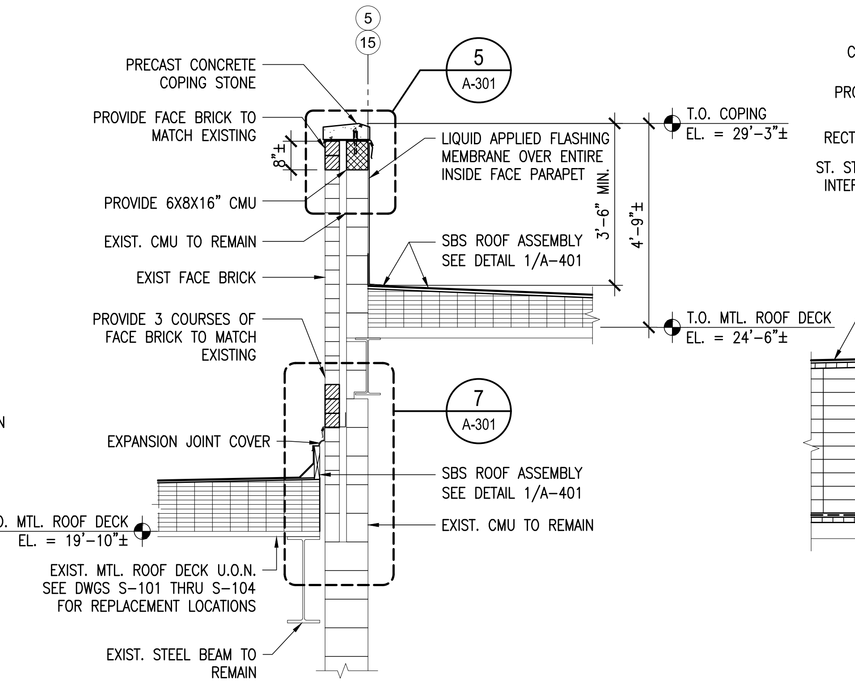
SECTION AT ROOF A & C PARAPET CORNERS - CONSTRUCTION

2B / A-301 Scale: 0 1 2 4 feet



SECTION AT ROOFS A & B1 AND C & B2 PARAPET CORNERS - REMOVALS

3A / A-301 Scale: 0 1 2 4 feet



SECTION AT ROOFS A & B1 AND C & B2 PARAPET CORNERS - CONSTRUCTION

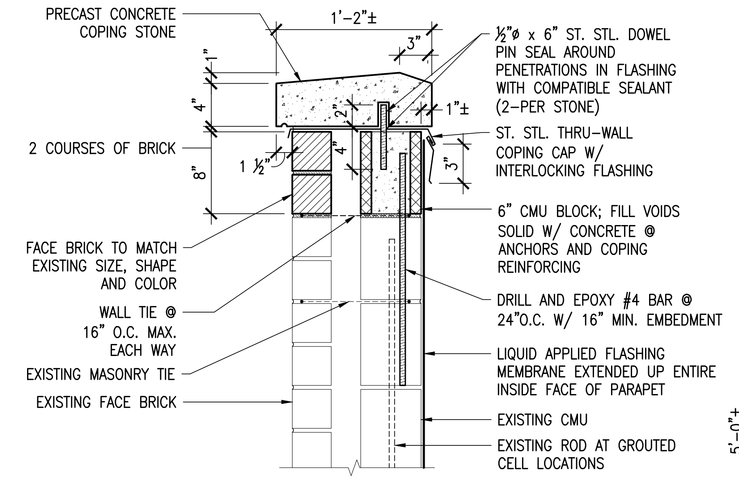
3B / A-301 Scale: 0 1 2 4 feet

SECTION AT ROOFS A & C PARAPETS - REMOVALS

4A / A-301 Scale: 0 1 2 4 feet

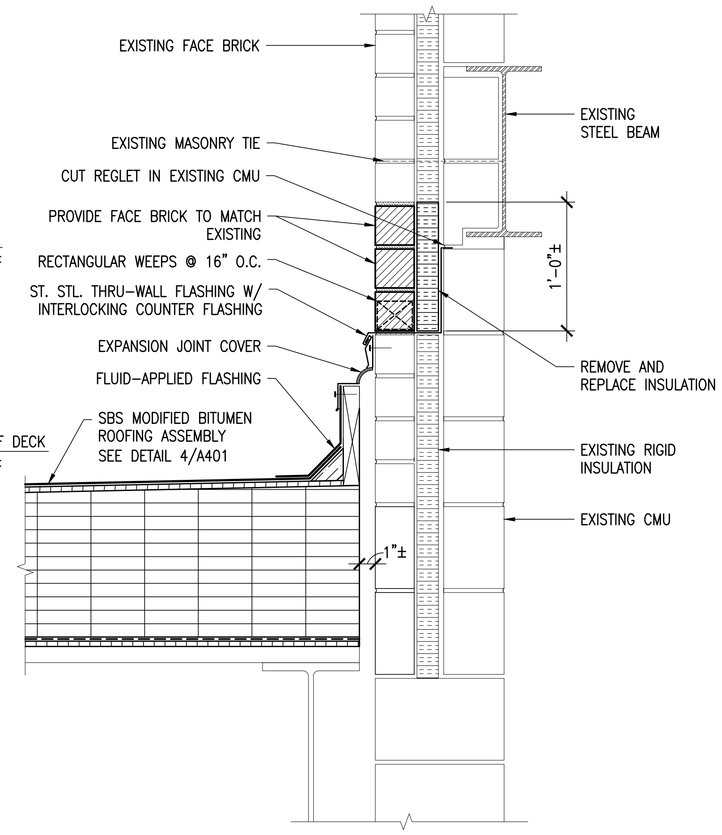
SECTION AT ROOFS A & C PARAPETS - REMOVALS

4B / A-301 Scale: 0 1 2 4 feet



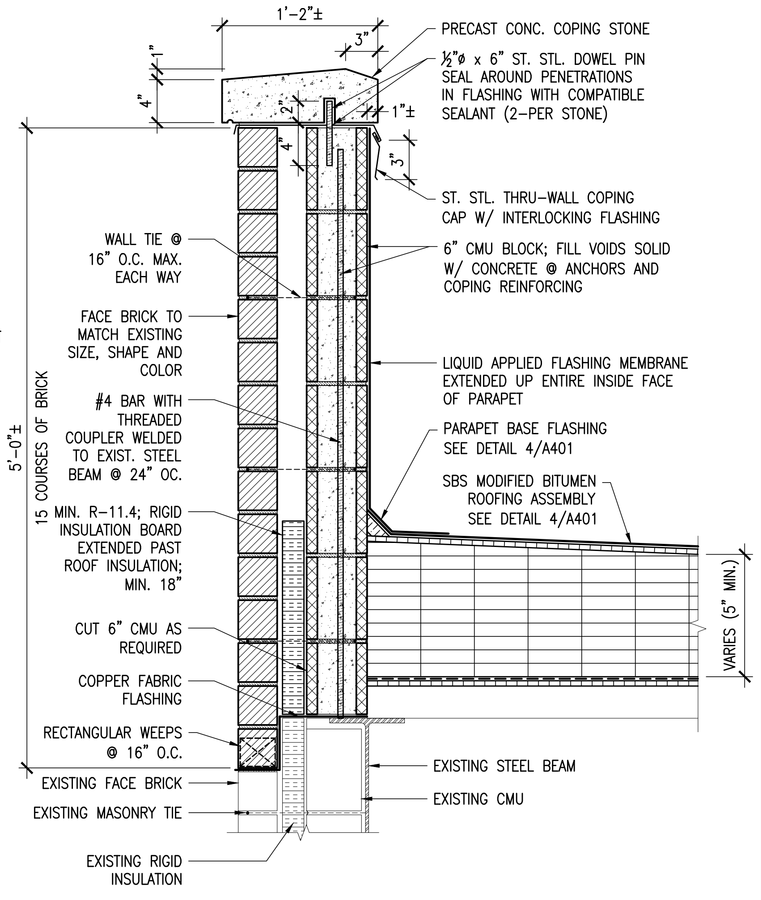
RAISED PARAPET WALL

5 / A-301 Scale: 0 4 8 16 Inches



BUILDING EXPANSION JOINT

7 / A-301 Scale: 0 4 8 16 Inches



PARAPET WALL CORNER REPLACEMENT

6 / A-301 Scale: 0 4 8 16 Inches

SYSKA HENNESSY GROUP
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1515 Broadway
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www.syska.com

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DOB JOB No. 322085266

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CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

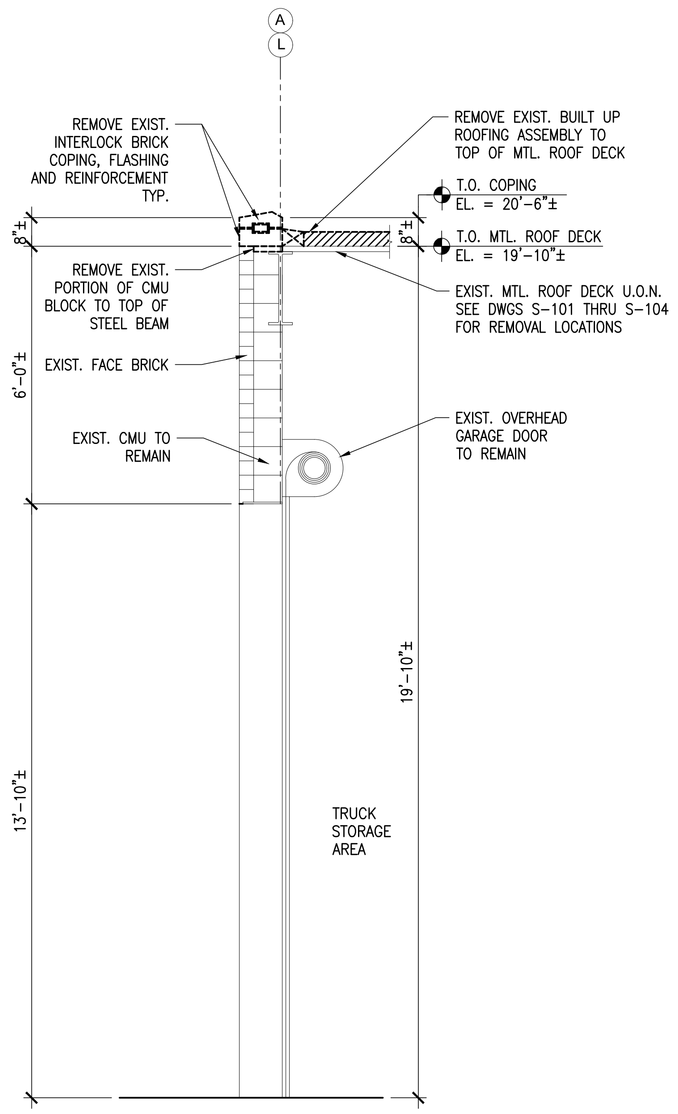
LOT: 1 BLOCK: 8138

DRAWING TITLE:

WALL SECTIONS AND DETAILS 1 OF 2

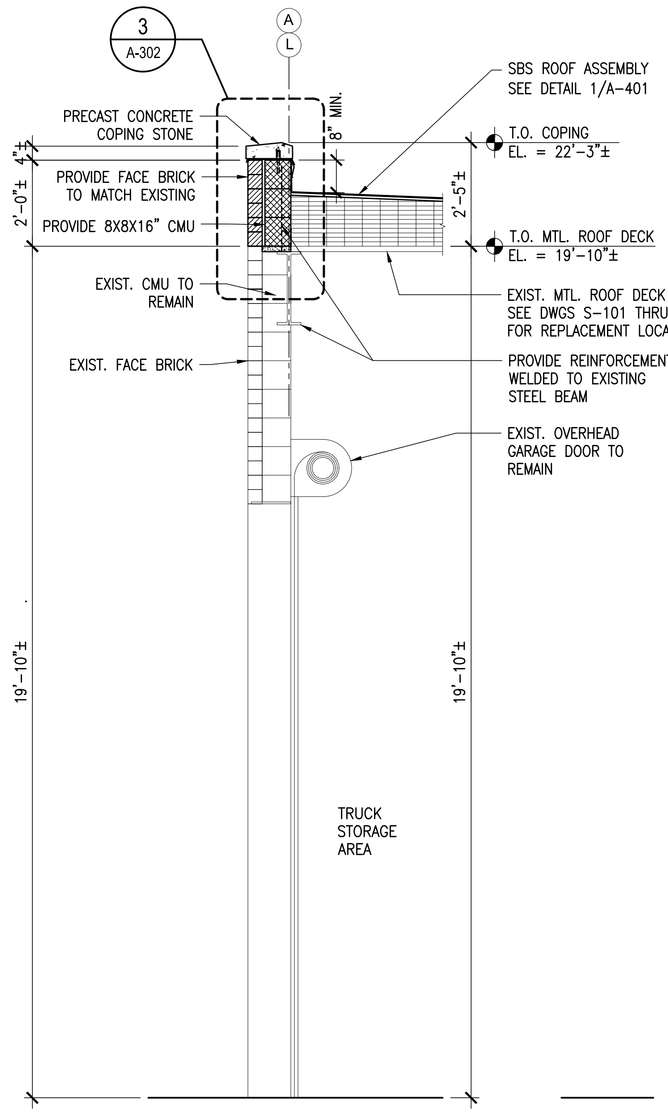
SEAL & SIGNATURE
REGISTERED ARCHITECT SANTHI SABANAYAGAM 035580 STATE OF NEW YORK
09/27/2019

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S. SABANAYAGAM
DRAWING NUMBER:	A-301.00



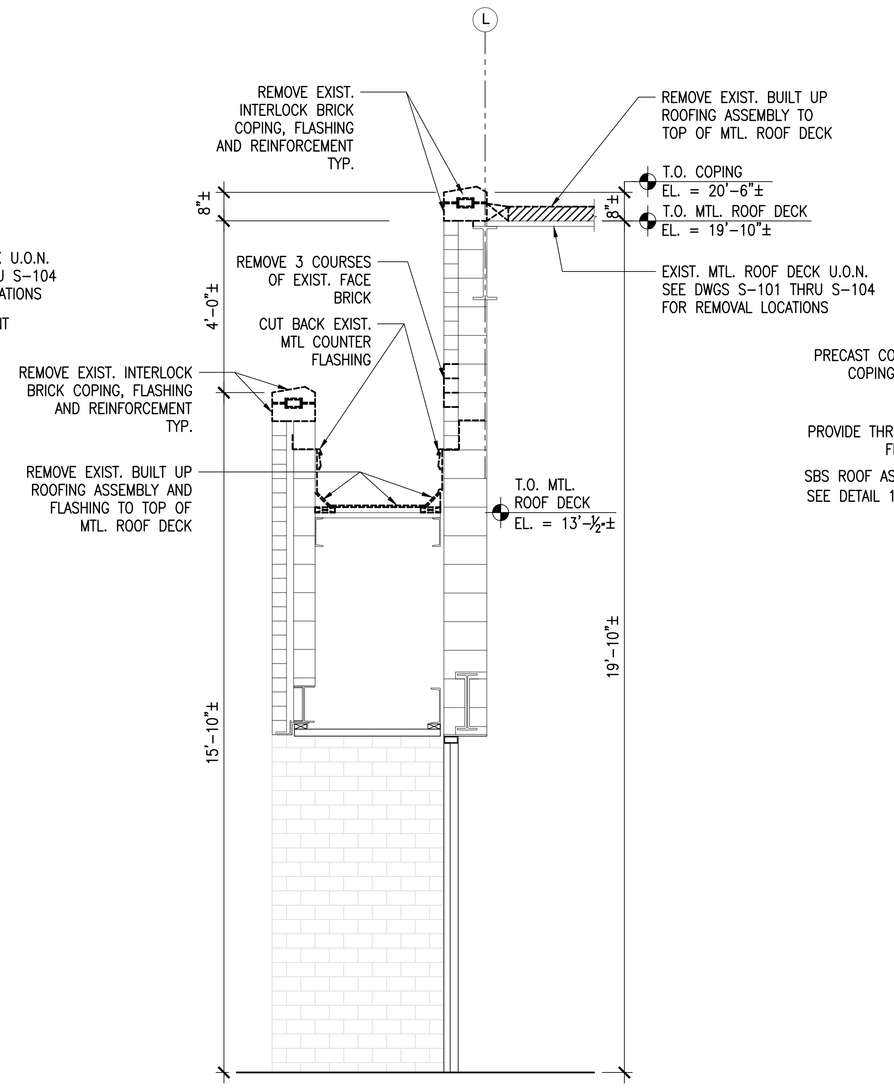
1A A-302 SECTION AT ROOFS
B1 & B2 PARAPETS - REMOVALS

Scale: 0 1 2 4 feet



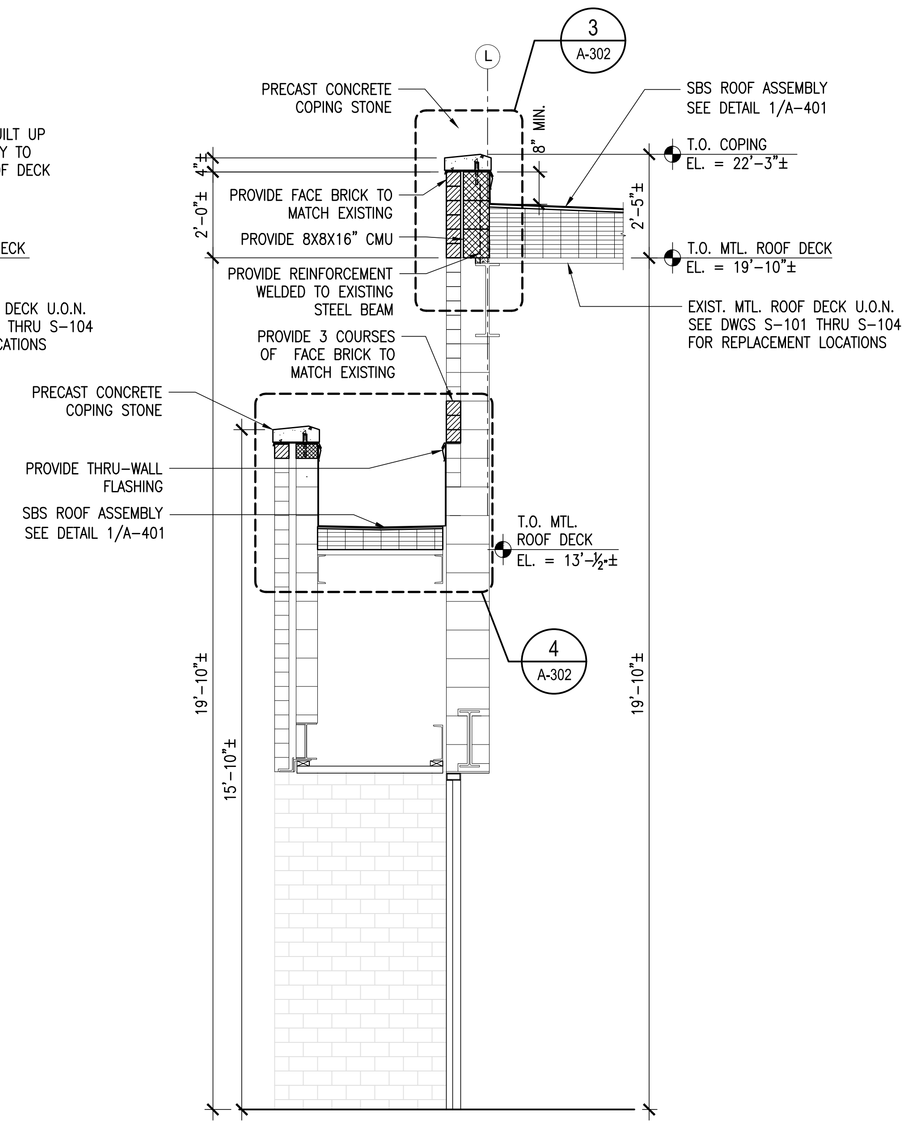
1B A-302 SECTION AT ROOFS
B1 & B2 PARAPETS - CONSTRUCTION

Scale: 0 1 2 4 feet



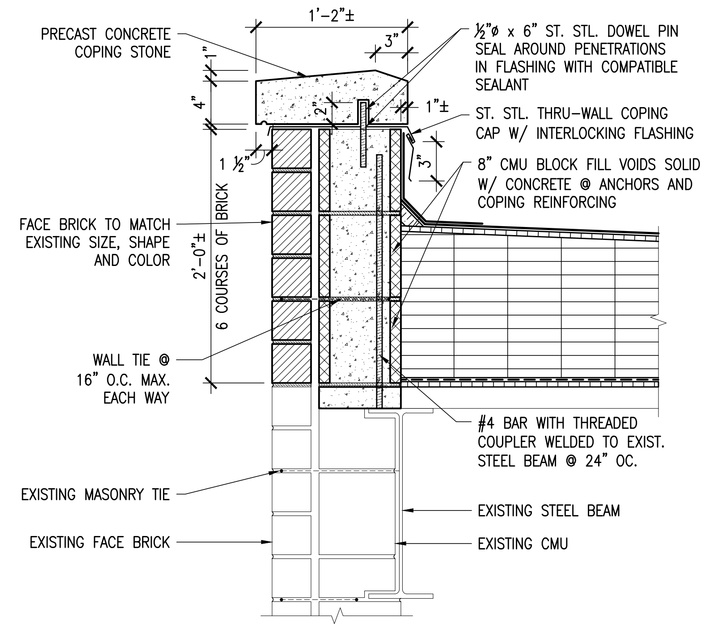
2A A-302 ENTRANCE WALL SECTION- REMOVALS

Scale: 0 1 2 4 feet



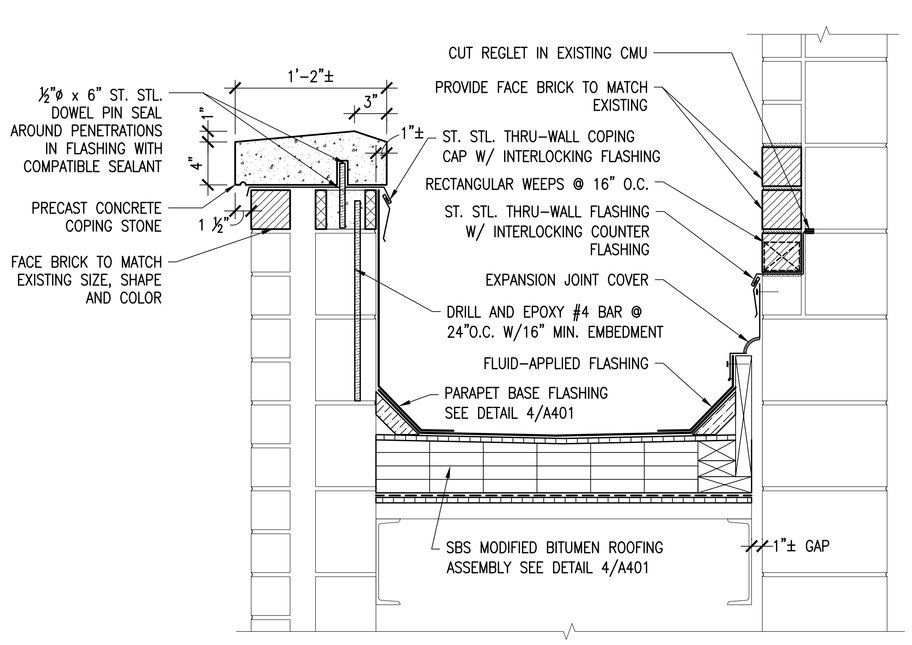
2B A-302 ENTRANCE WALL SECTION - CONSTRUCTION

Scale: 0 1 2 4 feet



3 A-302 RAISED PARAPET WALL

Scale: 0 4 8 16 Inches



4 A-302 ENTRACNE ROOF PARAPET WALL

Scale: 0 4 8 16 Inches

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

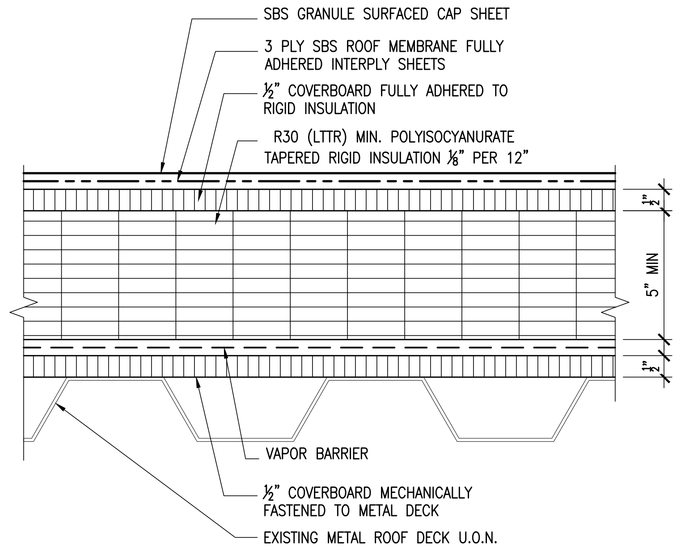
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
WALL SECTIONS AND DETAILS 2 OF 2

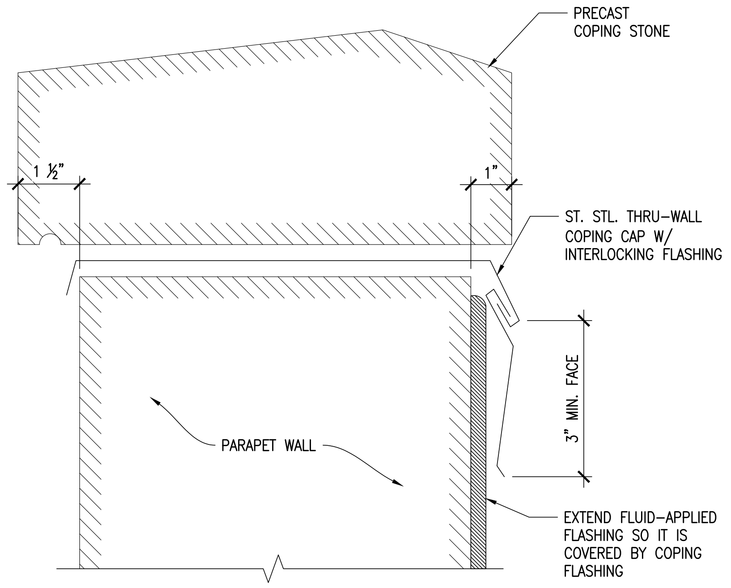
SEAL & SIGNATURE
REGISTERED ARCHITECT SERTHIL SABANAYAGAM 035580 STATE OF NEW YORK 09/27/2019

DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S. SABANAYAGAM
DRAWING NUMBER: A-302.00



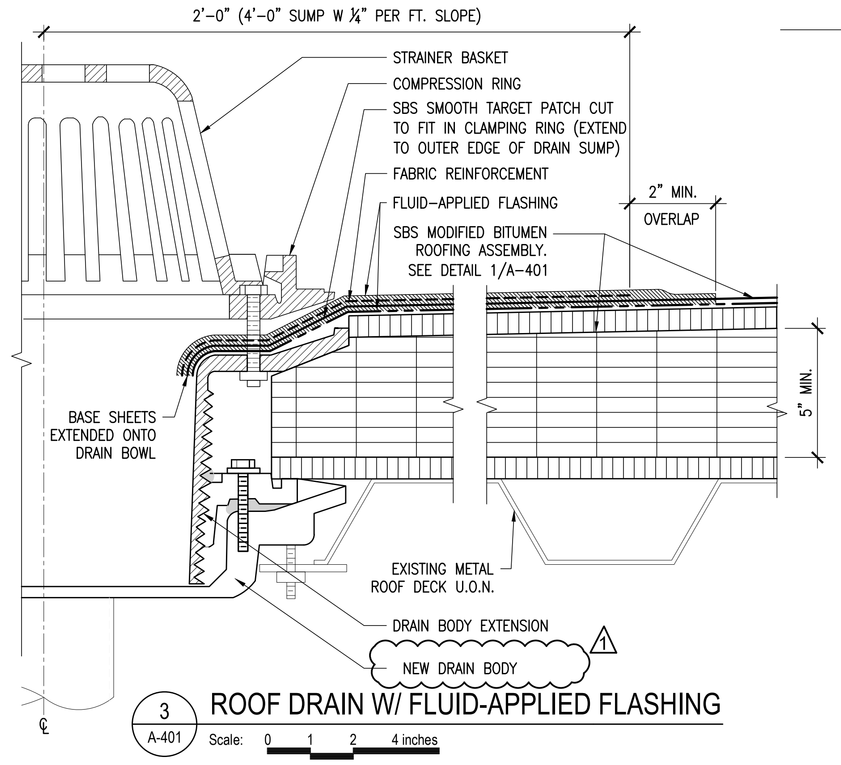
SBS MODIFIED BITUMEN TYPICAL ROOFING ASSEMBLY

1 / A-401 Scale: 0 1 2 4 inches



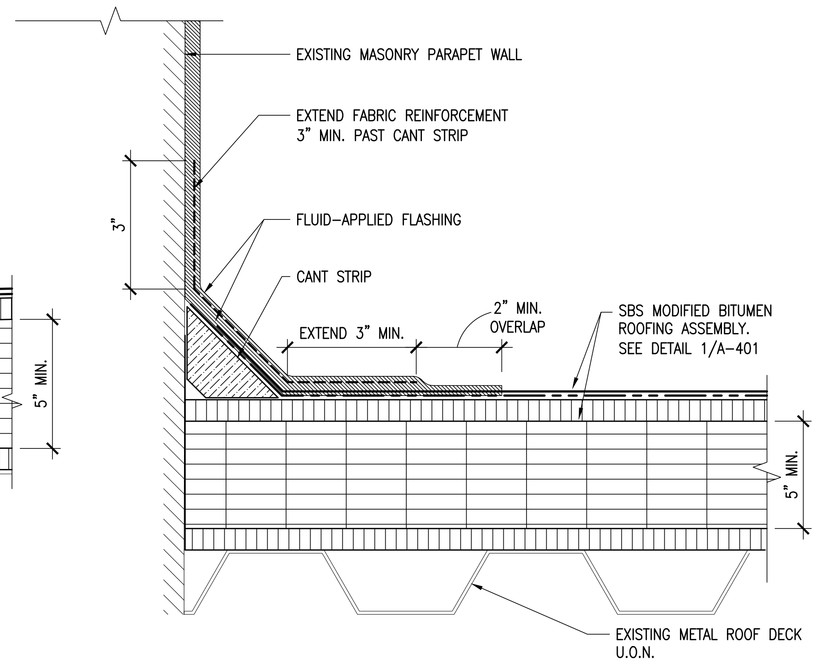
PARAPET WALL WITH THRU-WALL COPING CAP AND FLUID-APPLIED FLASHING

2 / A-401 Not to Scale



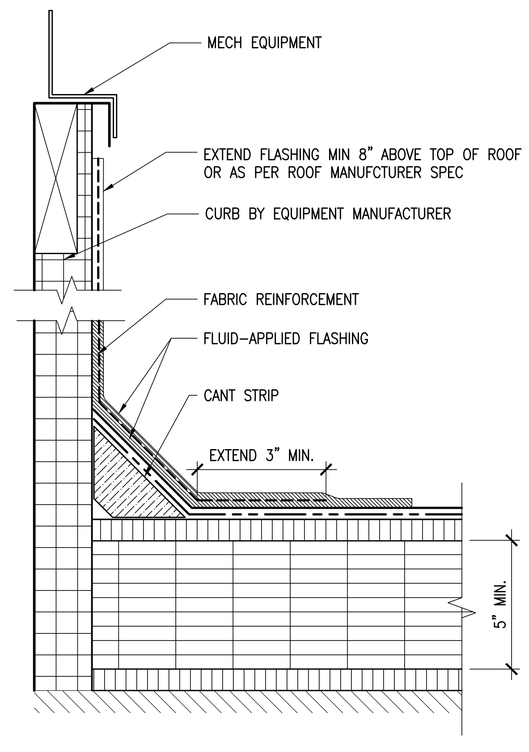
ROOF DRAIN W/ FLUID-APPLIED FLASHING

3 / A-401 Scale: 0 1 2 4 inches



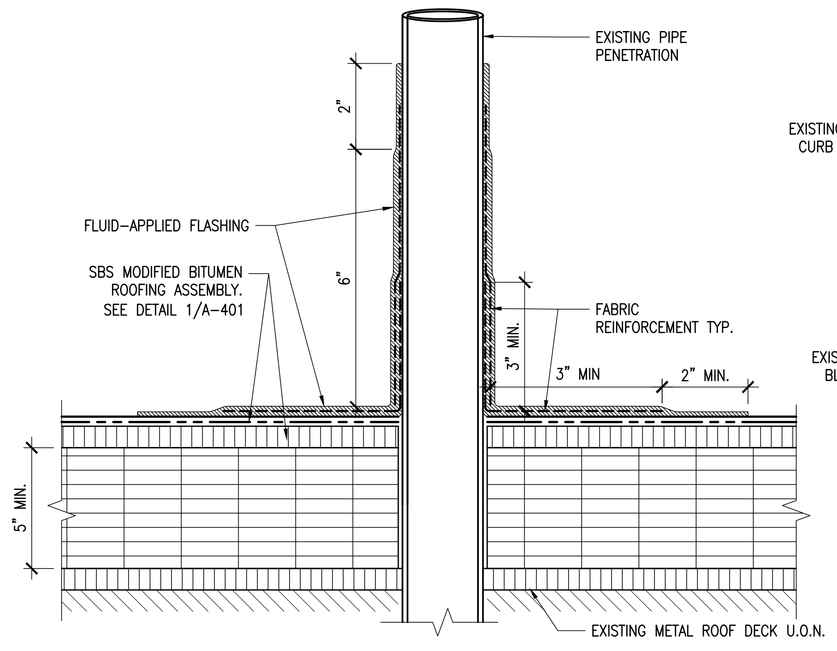
PARAPET WALL FLUID-APPLIED BASE FLASHING

4 / A-401 Not to Scale



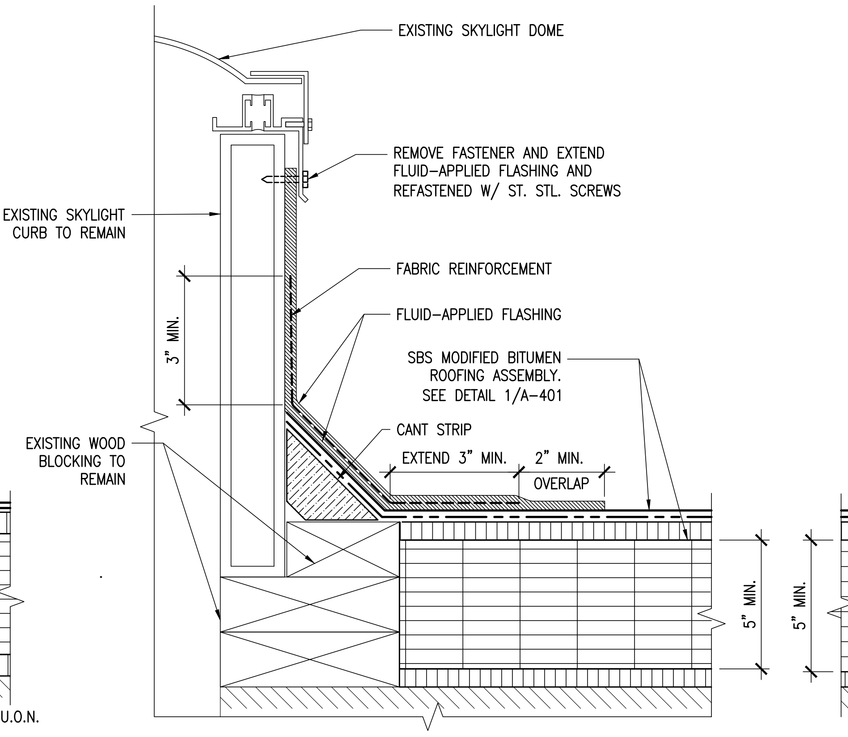
FLUID-APPLIED FLASHING AT EQUIP CURB

5 / A-401 Scale: 0 1 2 4 inches



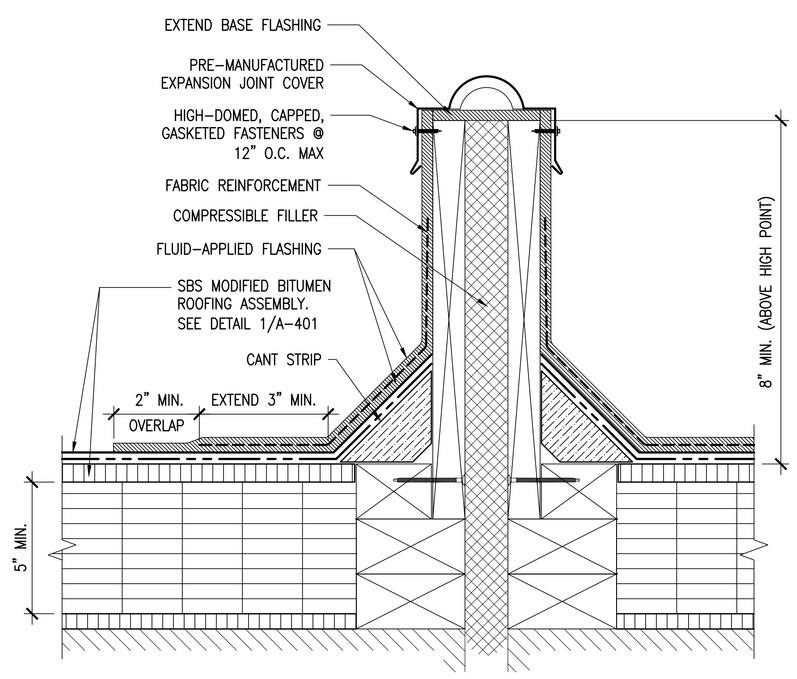
ROOF PIPE PENETRATION W/ FLUID-APPLIED FLASHING

6 / A-401 Scale: 0 1 2 4 inches



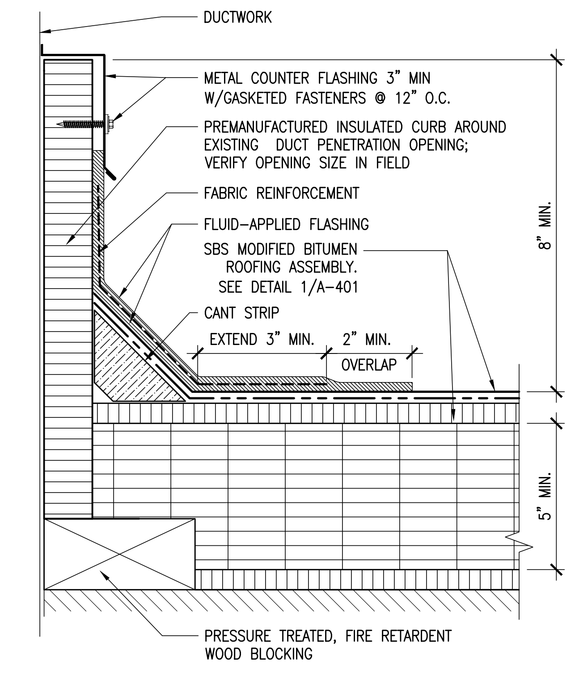
EXISTING SKYLIGHT W/ FLUID-APPLIED FLASHING

7 / A-401 Scale: 0 1 2 4 inches



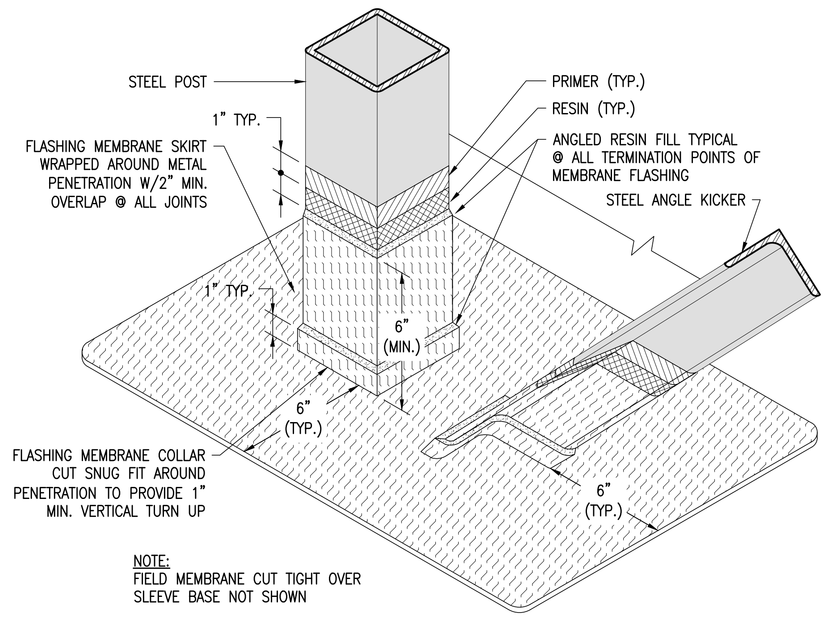
EXPANSION JOINT W/ FLUID-APPLIED FLASHING

8 / A-401 Scale: 0 1 2 4 inches



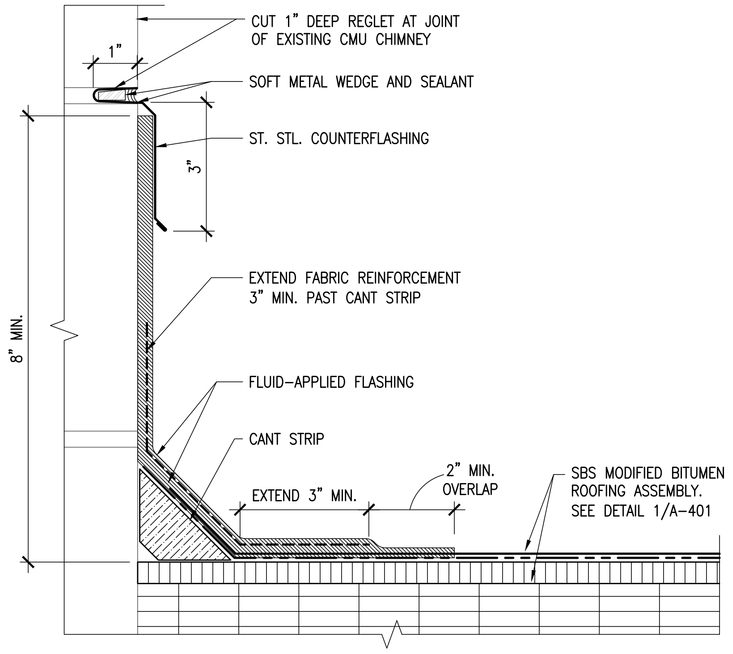
DUCT PENETRATION CURBS W/ FLUID-APPLIED FLASHING

9 / A-401 Scale: 0 1 2 4 inches



IRREGULAR PENETRATION FLUID-APPLIED FLASHING

10 / A-401 Scale: 0 2 4 8 inches



EXISTING MASONRY CHIMEY BASE FLASHING

11 / A-401 Scale: 0 1 2 4 inches

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DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER: S136-383N

PROJECT

DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

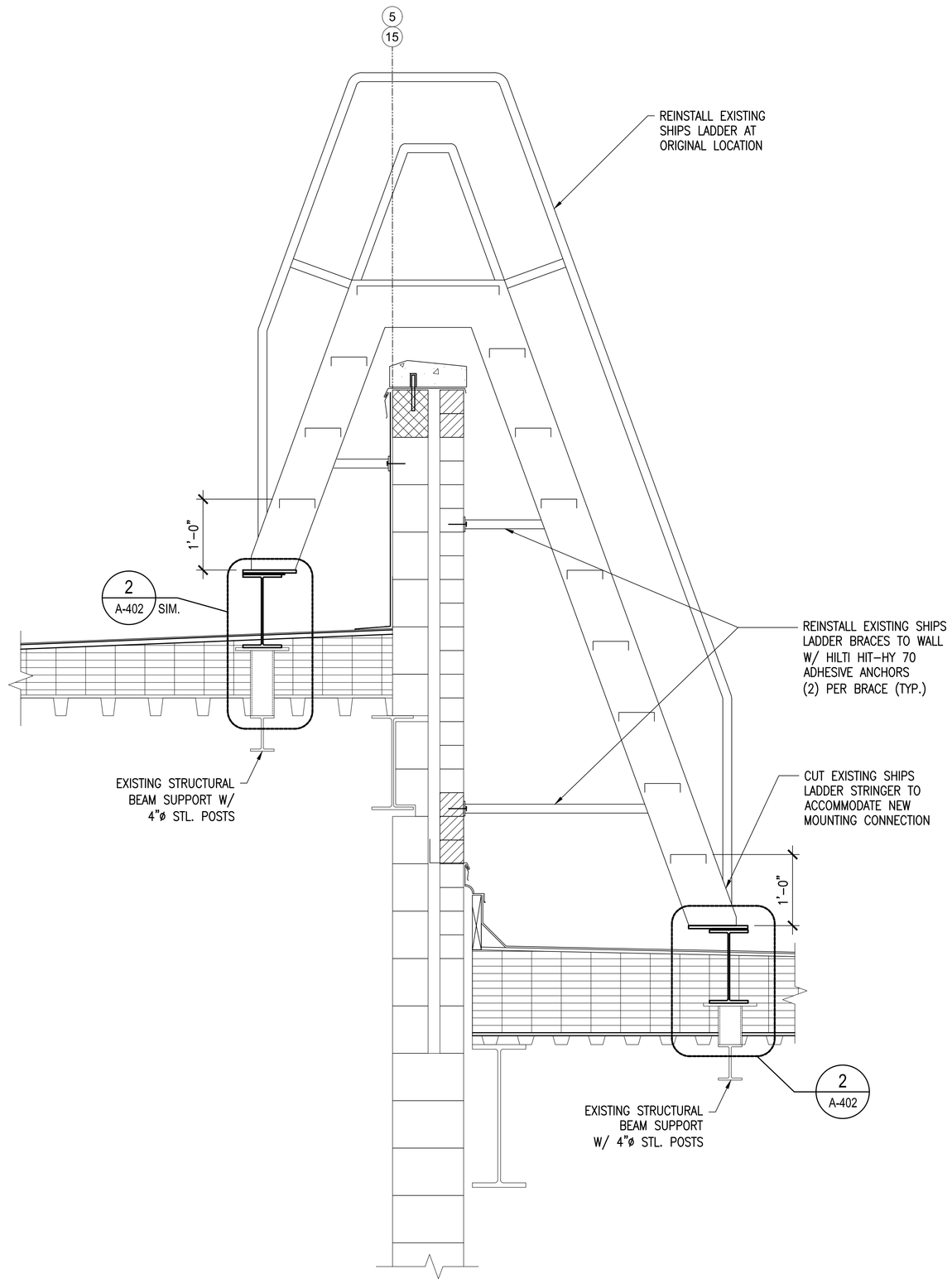
LOT: 1 BLOCK: 8138

DRAWING TITLE:

ROOF DETAILS

SEAL & SIGNATURE

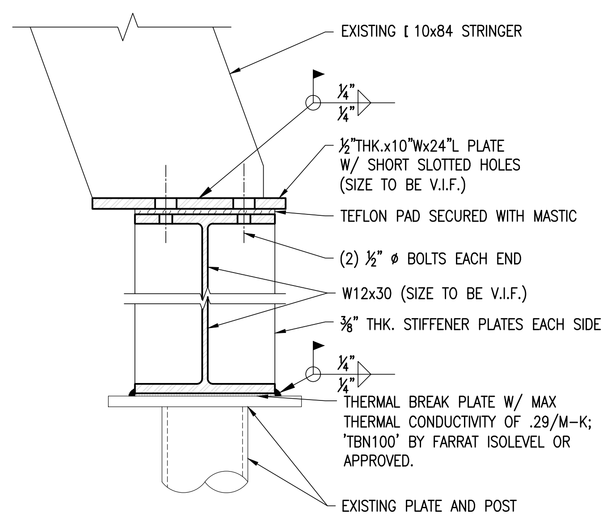
DATE:
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S. SABANAYAGAM
DRAWING NUMBER: A-401.00



1 A-402 SHIPS LADDER REINSTALLATION DETAIL

Scale: 0 6 12 24 inches

NOTE:
ALL WELDS AND FIELD CUTS TO BE CLEANED AND COATED WITH GALVANIZED PAINT



2 A-402 SHIPS LADDER BASE MOUNT

Scale: 0 2 4 8 inches

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LOT: 1 BLOCK: 8138

DRAWING TITLE:

DETAILS

SEAL & SIGNATURE

REGISTERED ARCHITECT SENTHIL SABANAYAGAM 035580 STATE OF NEW YORK 09/27/19

DATE: 09/27/2019
PROJECT NO: DDC30000
DRAWN BY: N. DA ROSA
CHECKED BY: S.SABANAYAGAM

DRAWING NUMBER:
A-402.00

DOOR SCHEDULE

DOOR SYMBOL	LOCATION FROM	LOCATION TO	APPROX. R.O. W	APPROX. R.O. H	INT/EXT	DOOR TYPE	DOOR MAT'L	# OF DOORS	NOMINAL LEAF SIZE TH.	NOMINAL LEAF SIZE WIDTH	NOMINAL LEAF SIZE HGT.	FIRE RATING	U-VALUE (MAX.)	DOOR SWING	FRAME TYPE	FRAME MAT'L	HARD-WARE SET	DETAILS JAMB	DETAILS HEAD	DETAILS SILL	REMARKS
FIRST FLOOR																					
01	STORAGE RM	CORRIDOR	3'-4"	7'-2"	INT	F	HM	1	1 3/4"	3'-0"	7'-0"	1-1/2	N/A	LHR	SF-1	STL.	1	J1	H1	–	
02	ELEC SERVICE RM	CORRIDOR	3'-4"	7'-2"	INT	F	HM	1	1 3/4"	3'-0"	7'-0"	1-1/2	N/A	LHR	SF-1	STL.	2	J1	H1	–	
03	ELEC SERVICE RM	CORRIDOR	5'-6"	8'-2"	INT	F,DD	HM	2	1 3/4"	2'-8"	8'-0"	1-1/2	N/A	LHR,RHR	SF-2	STL.	3	J1	H1	–	
04	CORRIDOR	EXTERIOR	5'-6"	8'-2"	EXT	F,DD	HM	2	1 3/4"	2'-8"	8'-0"	1-1/2	0.61	LHR,RHR	SF-2	STL.	4	J2	H2	–	

TYPICAL DOOR TYPES/ATTRIBUTES

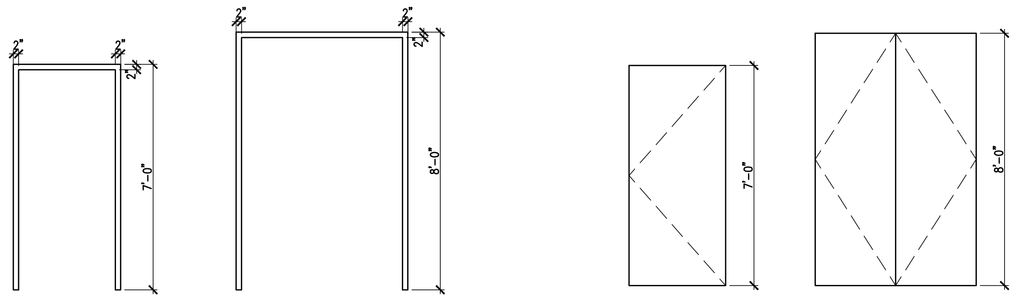
F= FLUSH DOOR
HM= HOLLOW METAL
DD= DOUBLE DOOR

TYPICAL FRAME TYPES:

SF= SINGLE FRAME
DF= DOUBLE FRAME

NOTES:

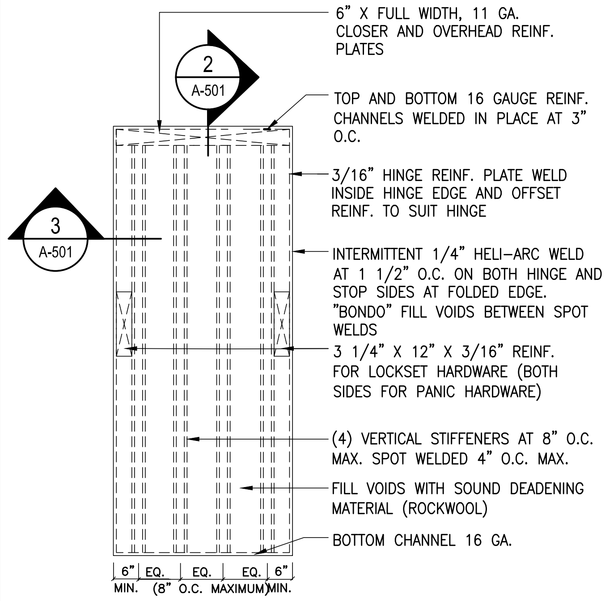
1. ALL EGRESS DOORS TO RECEIVE EXIT DEVICE IN ACCORDANCE WITH N.Y.C. BUILDING CODE.
2. EXIT DEVICE IS INCLUDED IN HARDWARE SETS FOR ALL DOORS.
3. CONTRACTOR MUST VERIFY ALL DIMENSIONS IN THE FIELD
4. FIRE RATING GIVEN IN HOURS



SF-1 SF-2 F F, DD

FRAME TYPE ELEVATIONS DOOR TYPE ELEVATIONS

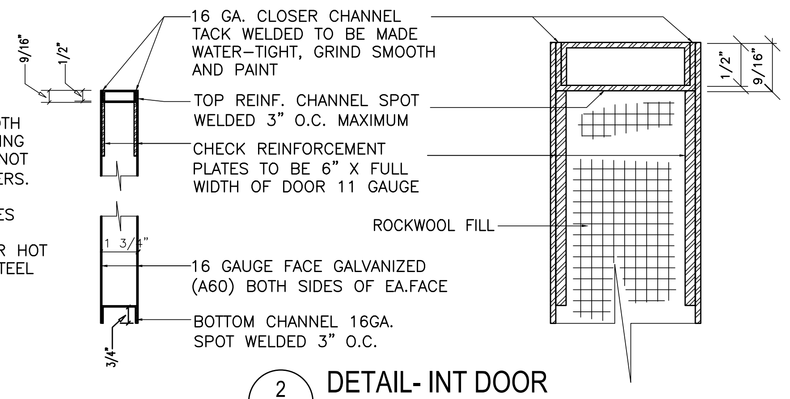
DOOR CONSTRUCTION DETAILS



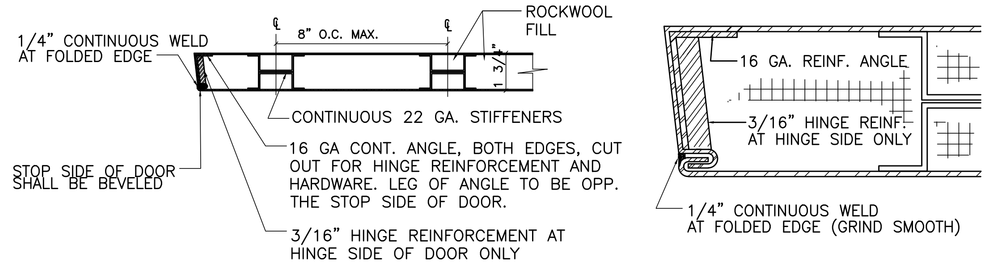
1 A-501 ELEVATION- INT DOOR Scale: 0 12 16 32 Inches

NOTES:

1. IRRESPECTIVE OF WIDTH OF DOORS THE SPACING OF STIFFENERS MAY NOT EXCEED 8" ON CENTERS.
2. ALL INDICATED GAUGES ARE BASED ON U.S. STANDARD GAUGE FOR HOT AND COLD ROLLED STEEL SHEETS.



2 A-501 DETAIL- INT DOOR Scale: 0 2 4 8 Inches



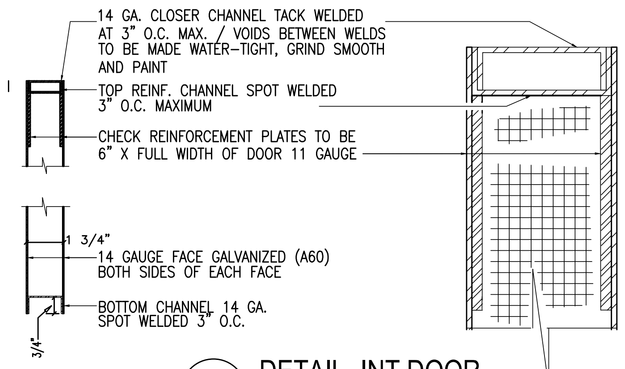
3 A-501 DETAIL- INT DOOR Scale: 0 2 4 8 Inches

4 A-501 ELEVATION- EXT DOOR Scale: 0 12 16 32 Inches

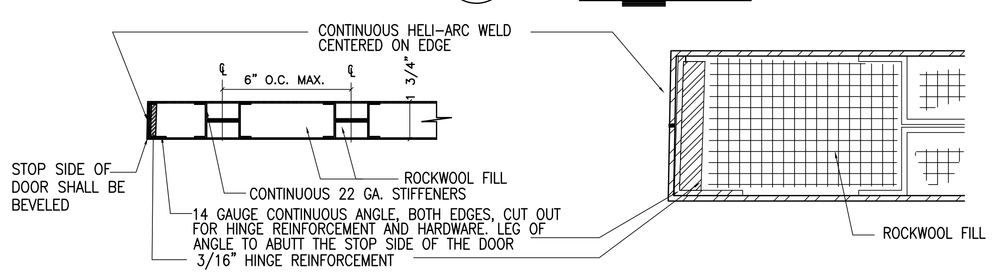
NOTES:
1. TOP OF DOORS SHALL BE WATER TIGHT.

2. EXTERIOR FINISH OF DOOR ASSEMBLY TO BE FREE OF DIMPLES.

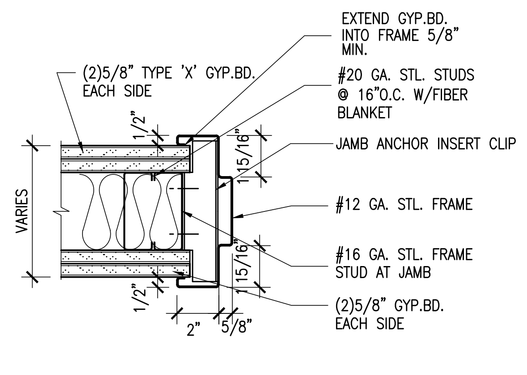
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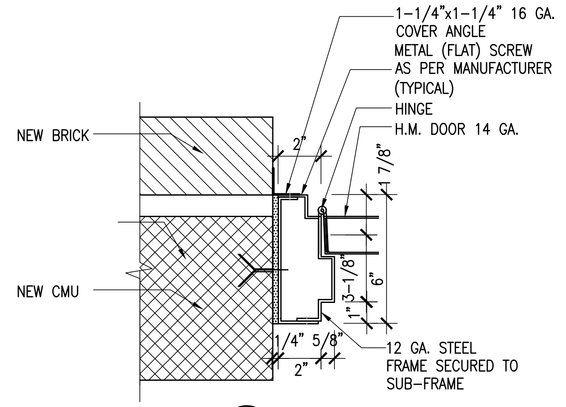
5 A-501 DETAIL- INT DOOR Scale: 0 2 4 8 Inches



6 A-501 DETAIL- INT DOOR Scale: 0 2 4 8 Inches

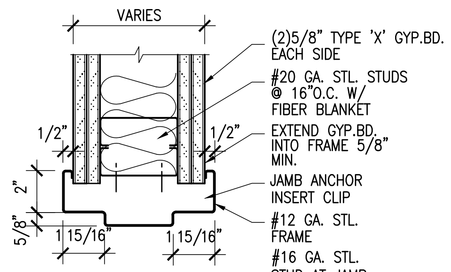


J1

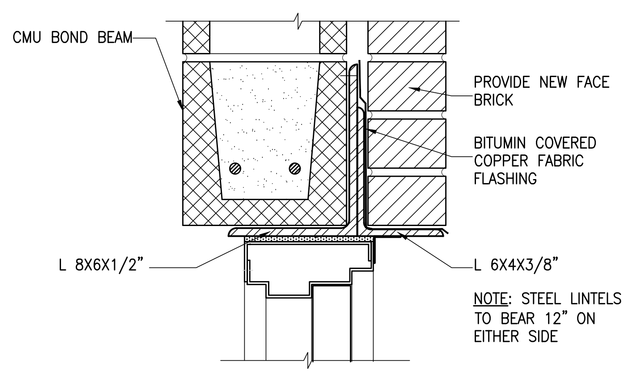


J2

JAMB DETAILS



H1



H2

HEAD DETAILS

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VJ ASSOCIATES
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DOB BSCAN STICKER

DOB APPROVAL STAMP

DOB JOB No. 322085266

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:

DOOR AND WINDOW SCHEDULE AND DETAILS

SEAL & SIGNATURE

REGISTERED ARCHITECT SIDDHIL SABANAYAGAM 035580 STATE OF NEW YORK 09/30/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	N. DA ROSA
CHECKED BY:	S.SABANAYAGAM
DRAWING NUMBER:	A-501.00

THE FOLLOWING REQUIREMENTS, TOGETHER WITH THE PROJECT PLANS AND SPECIFICATIONS, APPLY TO THE STRUCTURES IN THIS CONTRACT.

BASIS OF DESIGN

1.	RISK CATEGORY:	II
2.	ROOF SNOW LOAD:	
2.1.	IMPORTANCE FACTOR, I	1.0
2.2.	EXPOSURE FACTOR, Ce	1.0
2.3.	THERMAL FACTOR, Ct	1.2
2.4.	GROUND SNOW LOAD	25 PSF
2.5.	FLAT ROOF SNOW LOAD	21 PSF*
	*PLUS ALLOWANCE FOR SNOW DRIFT	
3.	DEAD LOADS	
3.1.	ROOF DEAD	10 PSF
3.2.	SUPERIMPOSED DEAD	10 PSF
3.3.	SOLAR PANELS	8 PSF
4.	LIVE LOADS	
4.1.	ROOF LIVE	20 PSF
5.	WIND LOAD	
5.1.	IMPORTANCE FACTOR	1.0
5.2.	WIND EXPOSURE	B
5.3.	NET WIND PRESSURE	20 PSF
6.	SEISMIC LOAD	
6.1.	SOIL SITE CLASS	D (ASSUMED)
6.2.	SEISMIC DESIGN CATEGORY	B
7.	MECHANICAL UNITS	
7.1.	RTU–1	9,852 LBS
7.2.	RTU–2	10,352 LBS
7.3.	MAU UNITS	3,313 LBS

CODES & SPECIFICATIONS

THE DESIGN SHOWN ON THESE DRAWINGS IS BASED ON THE FOLLOWING CODES, SPECIFICATIONS, AND STANDARDS:

1. 2014 NEW YORK CITY BUILDING CODE
2. ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE BY THE ACI (AMERICAN CONCRETE INSTITUTE)
3. AISC MANUAL OF STEEL CONSTRUCTION BY THE AISC (AMERICAN INSTITUTE OF STEEL CONSTRUCTION)
4. ASCE 7 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES BY THE ASCE (AMERICAN SOCIETY OF CIVIL ENGINEERS)
5. AWS D1.1 STEEL STRUCTURAL WELDING CODE BY THE AWS (AMERICAN WELDING SOCIETY)

GENERAL NOTES

1. ALL WORK SHALL BE COORDINATED WITH ARCHITECTURAL, ELECTRICAL, MECHANICAL AND OTHER DISCIPLINE DRAWINGS. CONFLICTS IN DIMENSIONS AND INTERFERENCE SHALL BE DIRECTED TO THE ARCHITECT/ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
2. CHANGES TO THESE CONTRACT DRAWINGS MAY BE MADE ONLY BY AN AUTHORIZED REPRESENTATIVE OF THE ENGINEER OR ARCHITECT. THE ARCHITECT OR ENGINEER SHALL NOT BE HELD RESPONSIBLE OR LIABLE FOR ANY CLAIMS ARISING DIRECTLY OR INDIRECTLY FROM CHANGES MADE WITHOUT WRITTEN AUTHORIZATION BY AN AUTHORIZED REPRESENTATIVE.
3. ALL WORK SHALL BE DONE IN COMPLIANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ORDER TO COMPLY WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS.
5. INSPECTION AND TESTING FOR THE ACCEPTANCE OF MATERIALS, INSTALLATION, FABRICATION, ERECTION OR PLACEMENT OF COMPONENTS AND CONNECTIONS FOR SPECIAL INSPECTION AND FOR QUALITY ASSURANCE SHALL BE IN ACCORDANCE WITH THE NEW YORK CITY BUILDING CODE AND LOCAL ENFORCEMENT AGENCY. ALL CONTRACTORS ARE REQUIRED TO COOPERATE, ACCOMMODATE AND COORDINATE WITH INSPECTING AND TESTING PERSONNEL.
6. TESTING AND INSPECTIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
7. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, ELEVATIONS AND DIMENSIONS. CHANGES REQUIRED DUE TO EXISTING CONDITIONS SHALL BE SUBJECT TO A/E APPROVAL PRIOR TO ANY FABRICATION AND CONSTRUCTION.
8. SHOP DRAWINGS FOR ALL STRUCTURAL ITEMS ARE PART OF THE STRUCTURAL DESIGN. SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW PRIOR TO FABRICATION OR DELIVERY OF MATERIALS TO THE SITE.
9. ALL WORK SHALL BE DONE IN ACCORDANCE WITH OSHA REQUIREMENTS. POTENTIAL CONFLICTS BETWEEN THESE DOCUMENTS AND OSHA REQUIREMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH THE WORK.
10. THE STEELWORK ON THIS PLAN HAS BEEN DESIGNED TO RESIST THE DESIGN LOADS ONLY AS A COMPLETED UNIT. THE CONTRACTOR SHALL FULLY BRACE AND OTHERWISE PROTECT WORK IN PROGRESS. THE CONTRACTOR SHALL ALSO ENSURE THAT ITS OPERATIONS AND PROCEDURES PROVIDE NO LOADINGS GREATER THAN THE DESIGN LOADS ON ANY MEMBER.
11. ALL ARCHITECTURAL AND MEP DETAILS SHOWN ON THE STRUCTURAL PLANS ARE FOR REFERENCE ONLY. ALL EMBEDDED ITEMS AND OPENINGS REQUIRED FOR ARCHITECTURAL, STRUCTURAL, MEP AND OTHER SERVICES SHALL BE INCORPORATED INTO THE STRUCTURE WHETHER OR NOT THEY ARE DETAILED OR INDICATED ON THE STRUCTURAL PLANS. REFER TO THE DISCIPLINE DRAWINGS FOR FURTHER DETAILS.
12. THE CONTRACT DRAWINGS MAY SHOW A TYPICAL INSTALLATION BASED ON A CERTAIN EQUIPMENT MANUFACTURER. IT SHALL NOT BE CONSTRUED AS REPRESENTING THE LAYOUT FOR ANY OTHER. ALL ALTERATIONS NECESSARY TO ADEQUATELY AND SATISFACTORILY ACCOMMODATE ALTERNATE EQUIPMENT SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST.

STRUCTURAL STEEL

1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "STEEL CONSTRUCTION MANUAL" AND "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
2. ALL STRUCTURAL STEEL MEMBERS, PLATES. BOLTS, AND MISCELLANEOUS ITEMS SHALL BE HOT–DIP GALVANIZED, IN ACCORDANCE WITH ASTM A123 AND ASTM A153.
3. UNLESS OTHERWISE NOTED, STRUCTURAL STEEL WIDE FLANGE SHAPES SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL CARBON STEEL ASTM A992.
4. ANGLES AND CHANNELS SHALL CONFORM TO ASTM A36 OR APPROVED EQUAL.
5. STRUCTURAL TUBES SHALL BE ASTM A500, GRADE B.
6. UNLESS NOTED OTHERWISE, STRUCTURAL PLATES SHALL CONFORM TO ASTM A36 OR APPROVED EQUAL.
7. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554, GRADE 55.
8. ALL BOLTS SHALL BE ¾"ø A325 UNLESS NOTED OTHERWISE.
9. WELDING OF STRUCTURAL STEEL SHALL CONFORM TO THE STRUCTURAL WELDING CODE AWS D1.1. ELECTRODES SHALL BE E70XX, LOW HYDROGEN.
10. AREAS OF EXISTING STEEL WHICH ARE TO RECEIVE NEW WELDS SHALL BE SCRAPED, BRUSHED AND GROUND, OR SAND–BLASTED, DOWN TO BRIGHT METAL. THE ARCHITECT/ENGINEER SHALL CHECK THE EXPOSED STEEL AND RECOMMEND EITHER REINFORCEMENT OR MAINTENANCE TO ANY EXISTING MEMBER FOUND TO HAVE A SECTION LOSS GREATER THAN 5%.
11. FIELD–BURNING FOR CUTS AND HOLES IS NOT PERMITTED.
12. A MINIMUM OF TWO (2) BOLTS SHALL BE PROVIDED IN EACH CONNECTION.
13. NO STRUCTURAL MEMBER SHALL BE CUT, NOTCHED OR OTHERWISE ALTERED UNLESS APPROVED IN WRITING BY THE ENGINEER OF RECORD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL COSTS INCURRED BY ENGINEER OF RECORD FOR THE REVIEW.
14. ROOF TOP EQUIPMENT ANCHORAGE: ALL ROOF TOP EQUIPMENT CURBS, ROOF TOP MECHANICAL EQUIPMENT AND IT'S TIE DOWNS AND CONNECTION OF ALL EQUIPMENT TO BUILDING STRUCTURE ARE TO BE DESIGNED AND ENGINEERED BY A REGISTERED ENGINEER RETAINED BY THE MECHANICAL EQUIPMENT SUPPLIER. SIGNED AND SEALED DRAWINGS AND CALCULATIONS ARE TO BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL. THE EQUIPMENT SUPPLIER SHALL PROVIDE THE ATTACHMENT OF THE UNIT TO THE STRUCTURE AND SUBMIT TO THE ENGINEER LOADS, LOCATIONS AND METHOD OF ATTACHMENT. THE STRUCTURE ENGINEER WILL MAKE PROVISIONS IN THE DESIGN OF THE PRIMARY STRUCTURAL FRAME TO ACCOMMODATE THE LOADS AND ATTACHMENTS SUBMITTED BY THE MANUFACTURER.
15. WHERE CONCENTRATED LOAD BEARS ON TOP CHORD OR IS HUNG FROM BOTTOM CHORD OF TRUSSES, PROVIDE L2x2x¼ STRUT TO NEAREST PANEL POINT OF OPPOSITE CHORD. SEE DETAILS.

METAL DECK

1. DECK UNITS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH THE CURRENT "DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS AND ROOF DECKS," PUBLISHED BY THE STEEL DECK INSTITUTE.
2. PROVIDE CELLULAR FLUTED AND FORM UNITS, OPENINGS, SLEEVES, ETC, AS INDICATED ON THE ARCHITECTURAL/STRUCTURAL DRAWINGS AND SPECIFICATIONS.
3. METAL DECK UNITS SHALL BE FASTENED TO THE STEEL FRAME WITH 5/8" DIA. MIN. PUDDLE WELDS, 1 PER FLUTE AND SIDELAPS AT 12" O.C. MIN..
4. FURNISH, INSTALL AND WELD IN POSITION THE CLOSURES AND OTHER MISCELLANEOUS ITEMS AS REQUIRED TO SEAL OPENINGS. CLOSURE SHALL NOT BE LESS THAN 16 GAGE SHEET METAL.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE LAYOUT OF DECK PANELS, INCLUDING DETAILS OF SPECIAL CONDITIONS.
6. METAL DECK AND ACCESSORIES INSTALLED UNDER THIS CONTRACT SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A653. TOUCH–UP, PER SPECIFICATIONS, ALL COATED SURFACES THAT ARE DAMAGED DURING CONSTRUCTION.

CONCRETE

1. ALL CONCRETE SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE," ACI 318.
2. ALL EMBEDDED STEEL SHALL BE HOT–DIP GALVANIZED ASTM A36, UNLESS OTHERWISE NOTED. ALUMINUM INSERTS ARE NOT PERMITTED.
3. SLEEVES, MECHANICAL OPENINGS, CONDUITS, PIPES, RECESSES, DEPRESSIONS, CURBS AND ALL EMBEDDED ITEMS SHALL BE PROVIDED AS SHOWN ON THE ARCHITECTURAL AND MEP DRAWINGS AND AS REQUIRED BY EQUIPMENT MANUFACTURERS. MINIMUM CLEAR CONCRETE SHALL BE 6 INCHES BETWEEN SLEEVES, AND 1½" BETWEEN EMBEDDED ITEMS AND ADJACENT REBARS.
4. REINFORCEMENT WORK OF DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318), ACI DETAILING MANUAL–2004 (SP 66) AND CRSI MANUAL OF STANDARD PRACTICE (MSP 2009)
5. REINFORCEMENT SHALL CONFORM TO ASTM A615 GR. 60.
6. ALL REINFORCEMENT SHALL BE SECURELY HELD IN POSITION WHILE PLACING CONCRETE. REINFORCEMENT, SHALL BE SUPPORTED TO PREVENT DISPLACEMENT BY CONSTRUCTION LOADS OR BY CONCRETE PLACEMENT.

MASONRY

1. FURNISH AND CONSTRUCT CONCRETE MASONRY UNIT WORK ACCORDING TO REQUIREMENTS OF ACI 530.1 FOR MATERIALS, AND ACI 530 FOR DESIGN (MSJC). CONTACT OWNER'S REPRESENTATIVE BEFORE MASONRY WORK TO SCHEDULE PRE–CONSTRUCTION CONFERENCE WITH ENGINEER, GENERAL CONTRACTOR, MASONRY CONTRACTOR AND TESTING LABORATORY.
2. TEST (VERIFY) THE COMPRESSIVE STRENGTH OF THE MASONRY BY THE UNIT STRENGTH METHOD. VERIFY THE COMPRESSIVE STRENGTH OF THE MASONRY BEFORE CONSTRUCTION. ALL CONCRETE MASONRY ASSEMBLAGES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (fm) OF 1,900 PSI. MASONRY UNITS SHALL BE ACCORDING TO REQUIREMENTS OF ASTM C90 HOLLOW CORE, GRADE N, WITH A NET AREA COMPRESSIVE STRENGTH 2,800 PSI MINIMUM. MORTAR SHALL BE TYPE S WITH WASHED SAND AGGREGATE ACCORDING TO REQUIREMENTS OF ASTM C144. MORTAR SHALL BE ACCORDING TO REQUIREMENTS OF ASTM C270 (PROPORTION SPECIFICATION TYPE S). SUBMIT FOR REVIEW PRODUCT DATA CONFIRMING THAT MASONRY PRODUCTS MEET OR EXCEED THESE STANDARDS.
3. FOR FILLING SPACES 4" OR LARGER IN BOTH DIRECTIONS, USE "COARSE GROUT" WITH A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. THE GROUT SHALL BE TESTED IN ACCORDANCE WITH ASTM C1019. FOR FILLING SPACES LESS THAN 4" IN ONE OR BOTH DIRECTIONS USE FINE GROUT PROPORTIONED PER ASTM C476.
4. PLACE GROUT IN 4'–0" LIFTS AT 9" TO 11" SLUMP (HIGH–RANGE WATER REDUCING ADMIXTURE ASTM C494 TYPE F OR TYPE G). GROUT SHALL BE MIXED AT THE PLANT AND DELIVERED TO THE SITE BY A READY–MIX CONCRETE COMPANY. THE GROUT SHALL NOT BE MIXED ON SITE.
5. LAP ALL VERTICAL CMU REINFORCING PER ACI. ALL BARS SHALL BE TIED.
6. ALL MASONRY SHALL HAVE STANDARD HORIZONTAL JOINT REINFORCING AT 16" OC HOT–DIP GALVANIZED.
7. EXTERIOR WALL VERTICAL REINFORCING TO BE #5 @32" OC IN GROUTED CELLS, UNLESS NOTED OTHERWISE. BARS TO BE CENTERED WITHIN CELLS. PROVIDE VERTICAL #5 BARS AT WALL ENDS AND EACH SIDE OF OPENINGS (PER TYP DETAIL).
8. PROVIDE DOWELS @ BOTTOM OF CMU WALL INTO EXISTING GRADE BEAMS, MATCH VERTICAL BAR SPACING, TYP
9. PROVIDE STANDARD HOOKED HORIZONTAL BARS AT ENDS OF BOND BEAMS. ALL VERTICAL BARS SHALL HAVE STANDARD HOOK INTO BOND BEAM.
10. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE ROUGH MASONRY OPENING DIMENSIONS & ELEVATIONS.
11. CONTRACTOR IS RESPONSIBLE FOR CMU WALL BRACING DURING CONSTRUCTION.
12. THROUGH PENETRATIONS FOR CMU WALLS THAT ARE CONFINED TO A SINGLE 8"x16" MASONRY UNIT SHALL NOT REQUIRE LINTELS OR OTHER REINFORCEMENT.

SPECIAL INSPECTIONS

1. SPECIAL INSPECTION WILL BE IN ACCORDANCE WITH NYC BUILDING CODE CHAPTER 17 TOGETHER WITH LOCAL AND STATE AMENDMENTS.
2. SPECIAL INSPECTIONS AND ASSOCIATED TESTING WILL BE PERFORMED BY AN APPROVED ACCREDITED INDEPENDENT AGENCY. THE CONTRACTOR WILL SECURE AND PAY FOR THE SERVICES OF THE AGENCY TO PERFORM ALL SPECIAL INSPECTION AND ASSOCIATED TESTS.
3. THE SPECIAL INSPECTOR WILL OBSERVE THE INDICATED WORK FOR COMPLIANCE WITH THE APPROVED CONTRACT DOCUMENTS AND SUBMIT RECORDS OF INSPECTION.
4. SPECIAL INSPECTIONS INCLUDE:

STRUCTURAL STEEL – WELDING	1704.3.1
STRUCTURAL STEEL – DETAILS	1704.3.2
STRUCTURAL STEEL – HIGH STRENGTH BOLTING	1704.3.3
STRUCTURAL STEEL – COLD–FORMED STEEL	1704.3.4
CONCRETE	1704.4
MASONRY	1704.5
STRUCTURAL STABILITY	1704.20
POST–INSTALLED ANCHORS	1704.32

SYMBOLS & ABBREVIATIONS

℄	CENTER LINE
ø	DIAMETER
PL	PLATE
±	PLUS/MINUS
B/	BOTTOM OF
BOTT.	BOTTOM
BPL.	BASE PLATE
CONC.	CONCRETE
D	DEMOLISHED
DIA.	DIAMETER
DWGS.	DRAWINGS
EA.	EACH
EL.	ELEVATION
EMBED.	EMBEDMENT
EQUIP.	EQUIPMENT
EXIST.	EXISTING
GA.	GAUGE/GAGE
GALV.	GALVANIZED
HSS	HOLLOW STRUCTURAL STEEL
L	ANGLE
LOC.	LOCATION
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
MAU	MAKE–UP AIR UNIT
MFGR.	MANUFACTURER
MIN.	MINIMUM
N.T.S.	NOT TO SCALE
PT.	POINT
REF.	REFERENCE
REQD.	REQUIRED
RTN.	RETURN
RTU	ROOFTOP UNIT
T/	TOP OF
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH

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NYC DDC Department of Design and Construction

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CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
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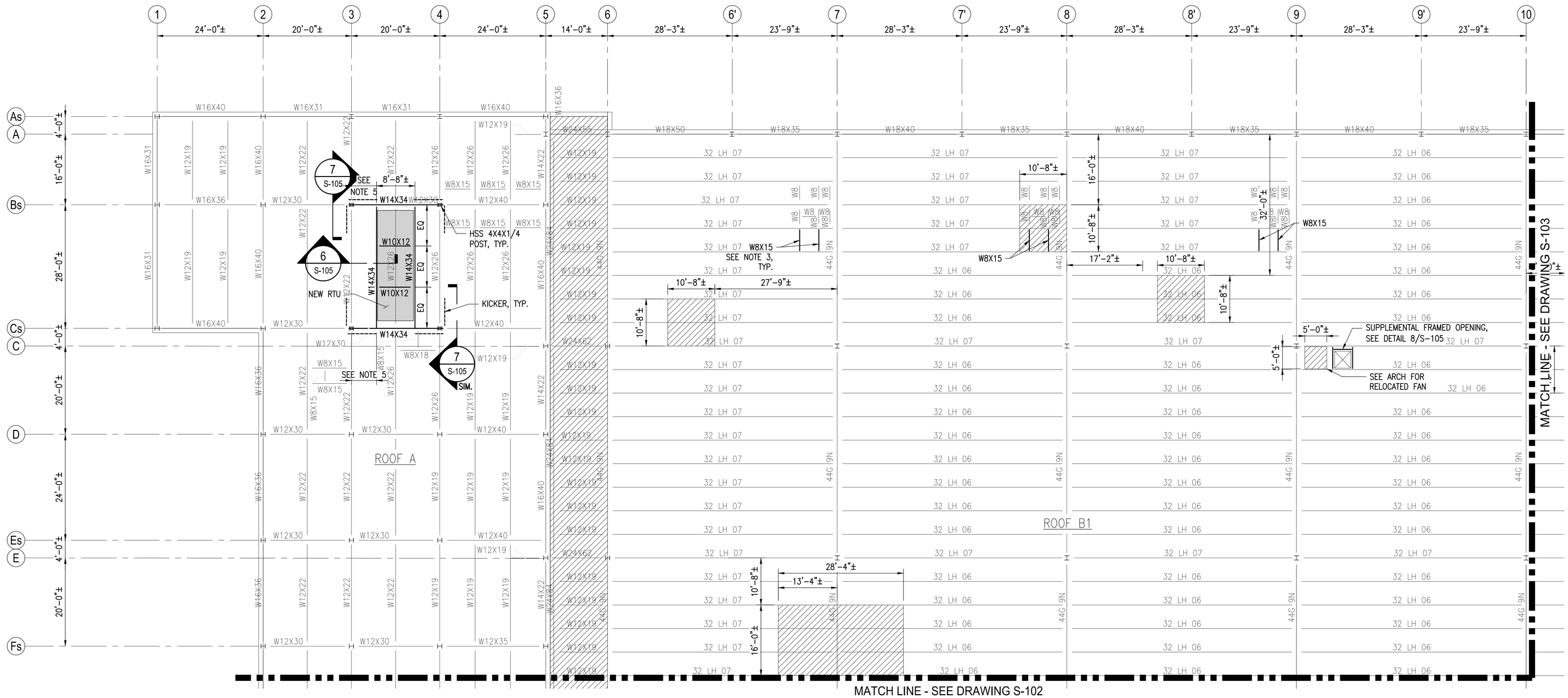
DRAWING TITLE:

STRUCTURAL NOTES

SEAL & SIGNATURE

STATE OF NEW YORK · VINCENT M. ANTES · 092300 · LICENSED PROFESSIONAL ENGINEER

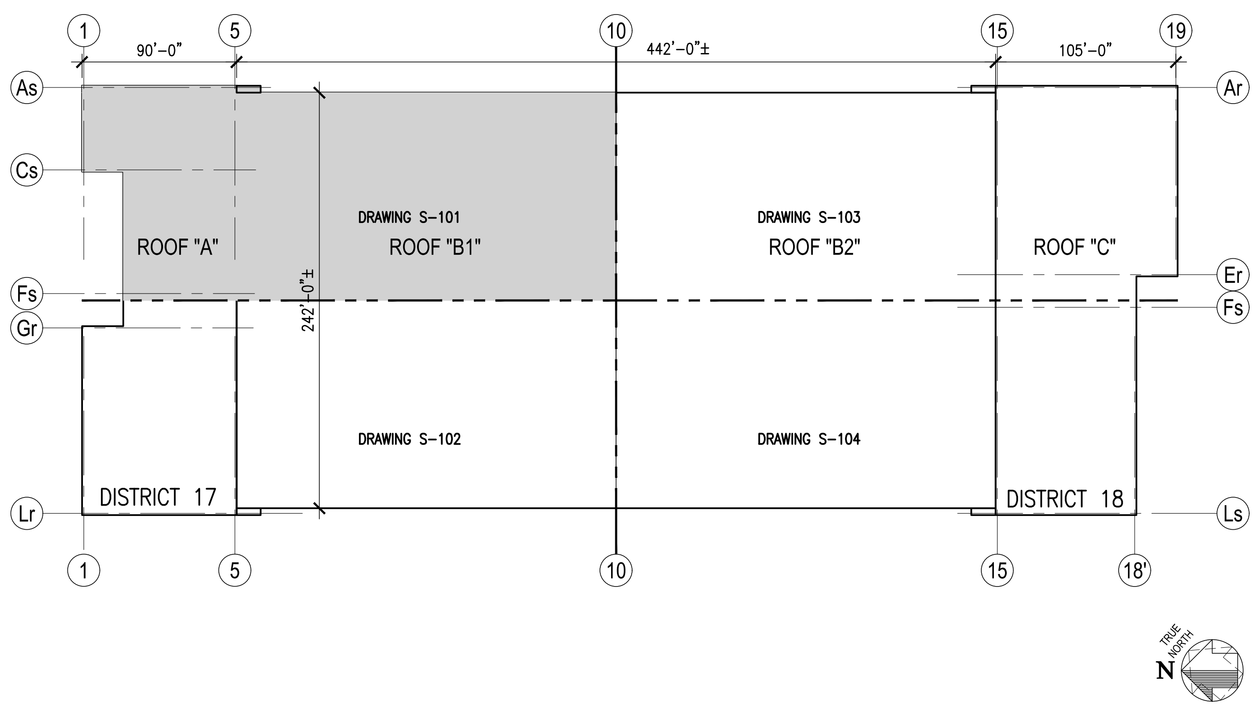
DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	V. ANTES
CHECKED BY:	J. GOULD
DRAWING NUMBER:	S-001.00



1 S-101 PARTIAL ROOF FRAMING PLAN

Scale: 0 4 12 24 feet

BUILDING KEY PLAN



NOTES

1. SEE S-105 FOR TYPICAL DETAILS
2. PER EXISTING DRAWINGS, JOIST SPACING IS 5'-4". CONTRACTOR TO VERIFY SPACING IN FIELD.
3. ALIGN NEW W8 BEAMS WITH EXISTING SUPPLEMENTAL FRAMING. SEE DETAIL 2/S-105 FOR DETAILS. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING ROOF DECK AS REQUIRED TO INSTALL NEW BEAMS.
4. RTU AND MAU LOCATIONS PER ARCH. & MECH. DRAWINGS. COORDINATE SUPPORT FRAMING DUNNAGE LOCATIONS PER MANUFACTURER RECOMMENDATIONS.
5. REFER TO ARCH. DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. FOR NEW BEAM TO EXISTING BEAM CONNECTION, SEE DETAIL 3/S-105.
7. REMOVE AND REPLACE EXISTING METAL DECK. COORDINATE WITH ARCHITECTURAL AND MEP DRAWINGS FOR LOCATIONS OF ALL ROOF PENETRATIONS. REMOVE AND REINSTALL AS REQUIRED.
8. NOT ALL OPENINGS/INFILLS ARE SHOWN ON THE DRAWINGS. SEE ARCHITECTURAL AND MEP DRAWINGS FOR SIZES AND LOCATIONS OF OPENINGS/INFILLS. SEE TYPICAL DETAILS FOR STRUCTURAL DETAILS.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
	REMOVE AND REPLACE EXISTING METAL DECK AT AREAS SHOWN. SEE DETAIL 5/S-105.

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DOB BSCAN STICKER

DOB APPROVAL STAMP

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

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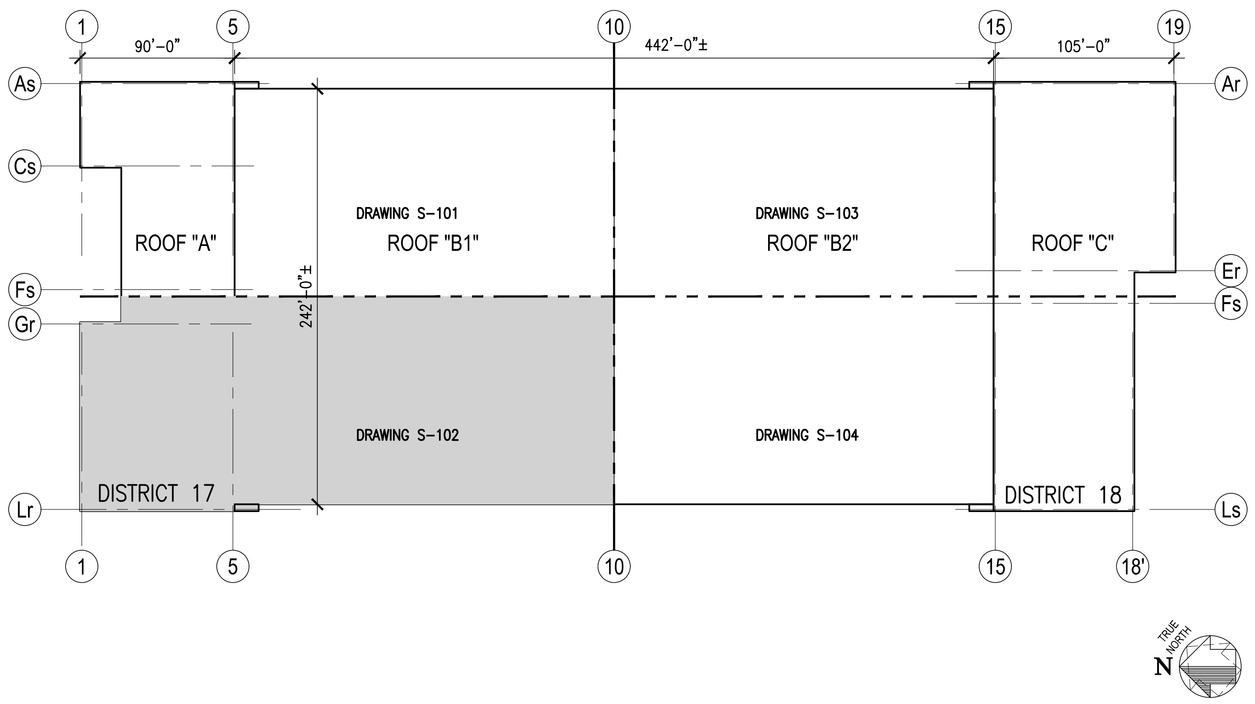
LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF FRAMING PLAN
1 OF 4

SEAL & SIGNATURE
STATE OF NEW YORK · VINCENT M. ANTES · LICENSED PROFESSIONAL ENGINEER · 095395
6/15/20

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	V. ANTES
CHECKED BY:	J. GOULD
DRAWING NUMBER:	S-101.00

BUILDING KEY PLAN

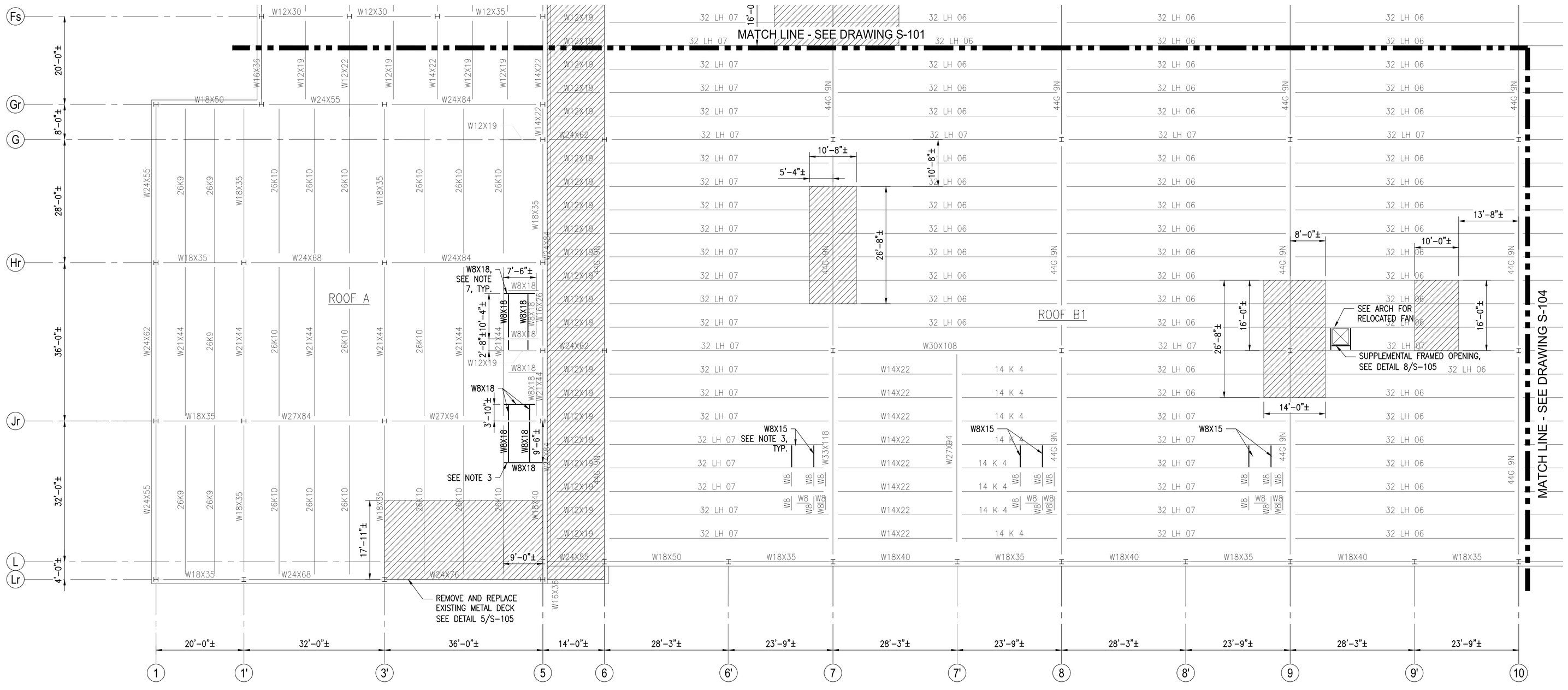


NOTES

1. SEE S-105 FOR TYPICAL DETAILS
2. PER EXISTING DRAWINGS, JOIST SPACING IS 5'-4". CONTRACTOR TO VERIFY SPACING IN FIELD.
3. ALIGN NEW W8 BEAMS WITH EXISTING SUPPLEMENTAL FRAMING. SEE DETAIL 2/S-105 FOR DETAILS. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING ROOF DECK AS REQUIRED TO INSTALL NEW BEAMS.
4. RTU AND MAU LOCATIONS PER ARCH. & MECH. DRAWINGS. COORDINATE SUPPORT FRAMING DUNNAGE LOCATIONS PER MANUFACTURER RECOMMENDATIONS.
5. REFER TO ARCH. DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. FOR NEW BEAM TO EXISTING BEAM CONNECTION, SEE DETAIL 3/S-105.
7. REMOVE AND REPLACE EXISTING METAL DECK. COORDINATE WITH ARCHITECTURAL AND MEP DRAWINGS FOR LOCATIONS OF ALL ROOF PENETRATIONS. REMOVE AND REINSTALL AS REQUIRED.
8. NOT ALL OPENINGS/INFILLS ARE SHOWN ON THE DRAWINGS. SEE ARCHITECTURAL AND MEP DRAWINGS FOR SIZES AND LOCATIONS OF OPENINGS/INFILLS. SEE TYPICAL DETAILS FOR STRUCTURAL DETAILS.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
	REMOVE AND REPLACE EXISTING METAL DECK AT AREAS SHOWN. SEE DETAIL 5/S-105.



1 S-102 PARTIAL ROOF FRAMING PLAN

Scale: 0 4 12 24 feet

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96 Morton Street, NY, New York 10014-3309

VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

DOB BSCAN STICKER

DOB APPROVAL STAMP

REVISIONS:

NUMBER	DESCRIPTION	DATE
	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

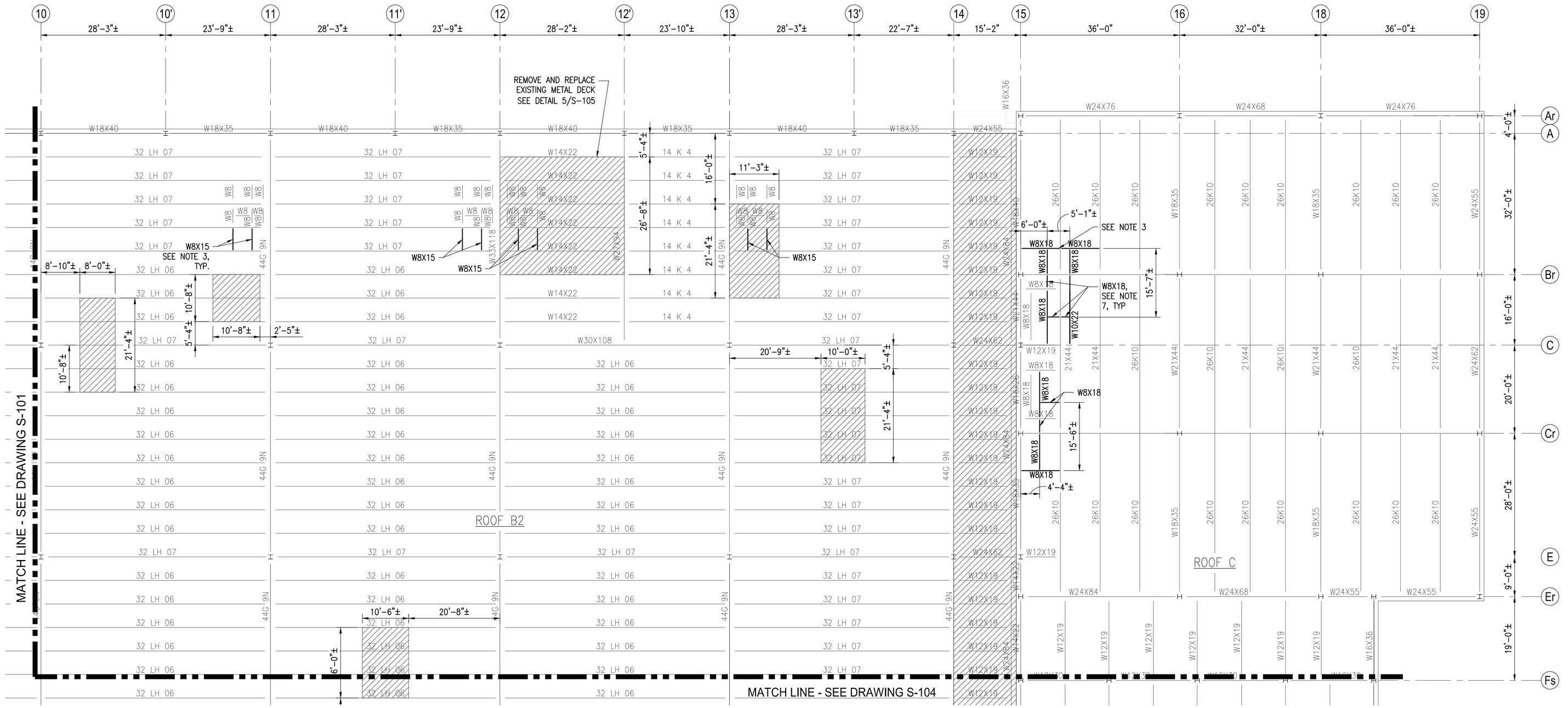
DRAWING TITLE:

ROOF FRAMING PLAN
2 OF 4

SEAL & SIGNATURE

STATE OF NEW YORK · VINCENT M. ANTES · 027309 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	V. ANTES
CHECKED BY:	J. GOULD
DRAWING NUMBER:	S-102.00



1 S-103 PARTIAL ROOF FRAMING PLAN

Scale: 0 4 12 24 feet

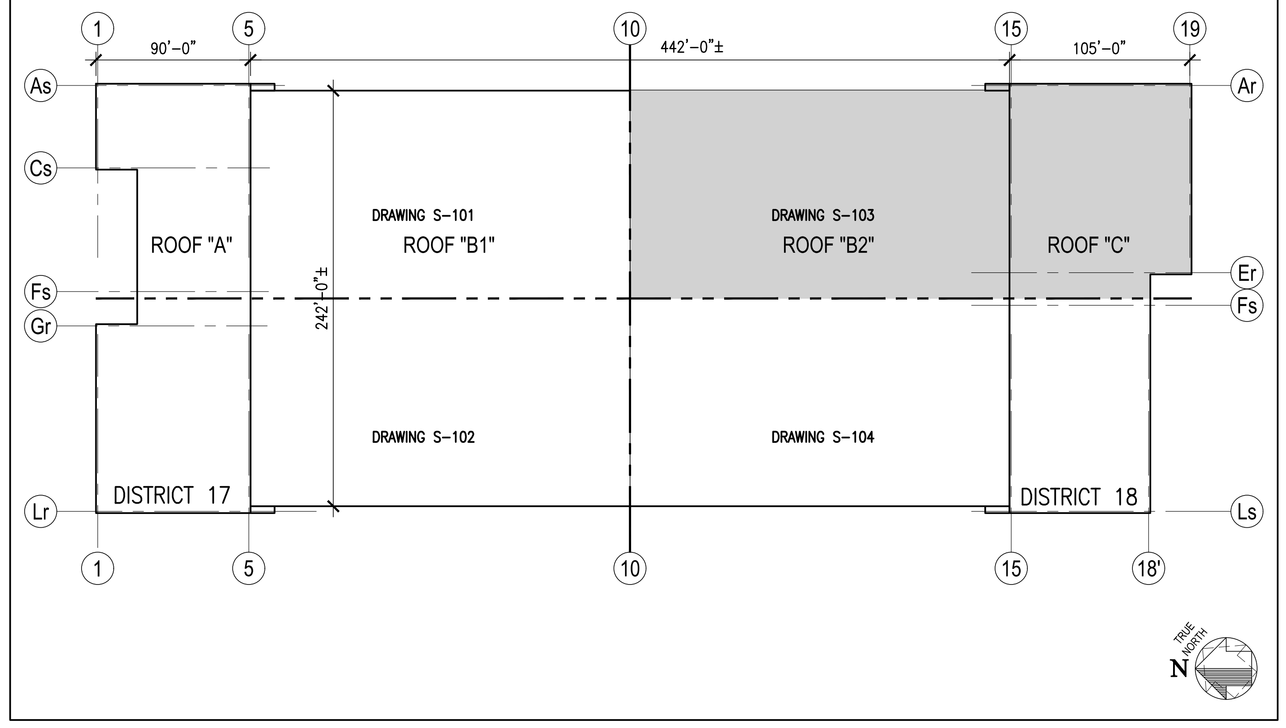
NOTES

1. SEE S–105 FOR TYPICAL DETAILS
2. PER EXISTING DRAWINGS, JOIST SPACING IS 5'–4". CONTRACTOR TO VERIFY SPACING IN FIELD.
3. ALIGN NEW W8 BEAMS WITH EXISTING SUPPLEMENTAL FRAMING. SEE DETAIL 2/S–105 FOR DETAILS. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING ROOF DECK AS REQUIRED TO INSTALL NEW BEAMS.
4. RTU AND MAU LOCATIONS PER ARCH. & MECH. DRAWINGS. COORDINATE SUPPORT FRAMING DUNNAGE LOCATIONS PER MANUFACTURER RECOMMENDATIONS.
5. REFER TO ARCH. DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. FOR NEW BEAM TO EXISTING BEAM CONNECTION, SEE DETAIL 3/S–105.
7. REMOVE AND REPLACE EXISTING METAL DECK. COORDINATE WITH ARCHITECTURAL AND MEP DRAWINGS FOR LOCATIONS OF ALL ROOF PENETRATIONS. REMOVE AND REINSTALL AS REQUIRED.
8. NOT ALL OPENINGS/INFILLS ARE SHOWN ON THE DRAWINGS. SEE ARCHITECTURAL AND MEP DRAWINGS FOR SIZES AND LOCATIONS OF OPENINGS/INFILLS. SEE TYPICAL DETAILS FOR STRUCTURAL DETAILS.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
	REMOVE AND REPLACE EXISTING METAL DECK AT AREAS SHOWN. SEE DETAIL 5/S–105.

BUILDING KEY PLAN



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DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ROOF FRAMING PLAN
3 OF 4

SEAL & SIGNATURE

STATE OF NEW YORK · VINCENT M. ANTES · 092306 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	V. ANTES
CHECKED BY:	J. GOULD
DRAWING NUMBER:	S-103.00

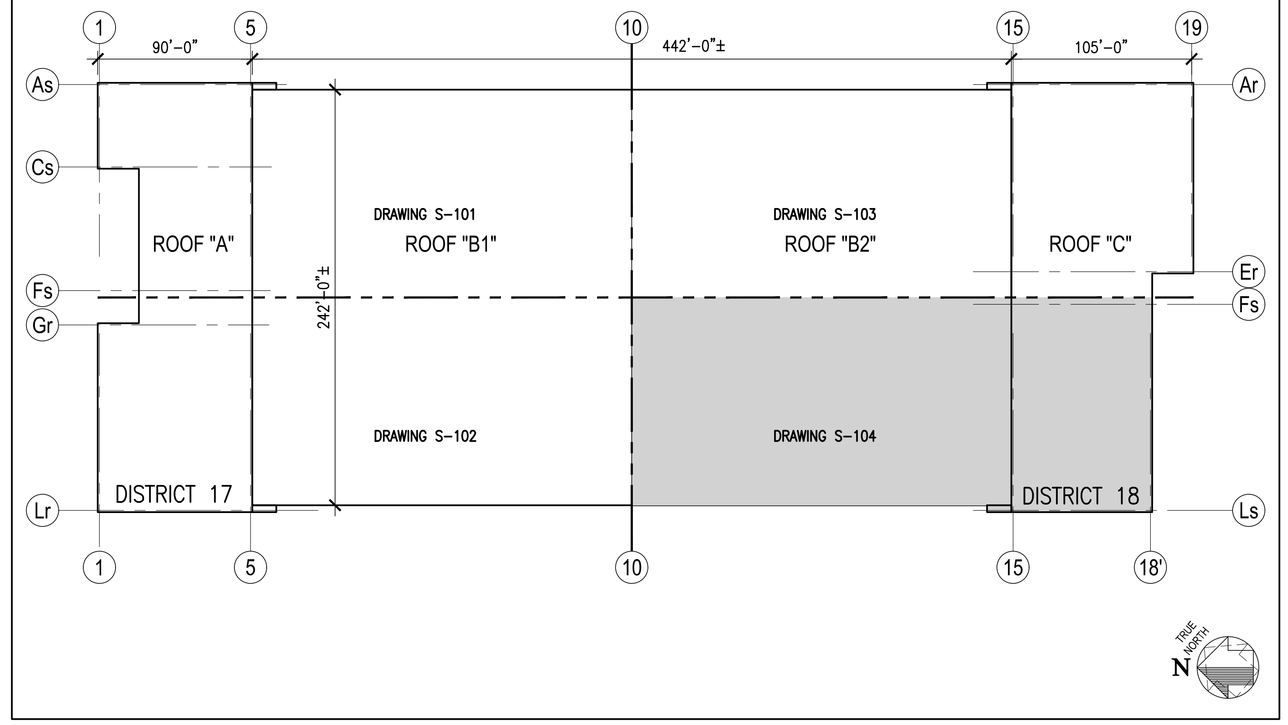
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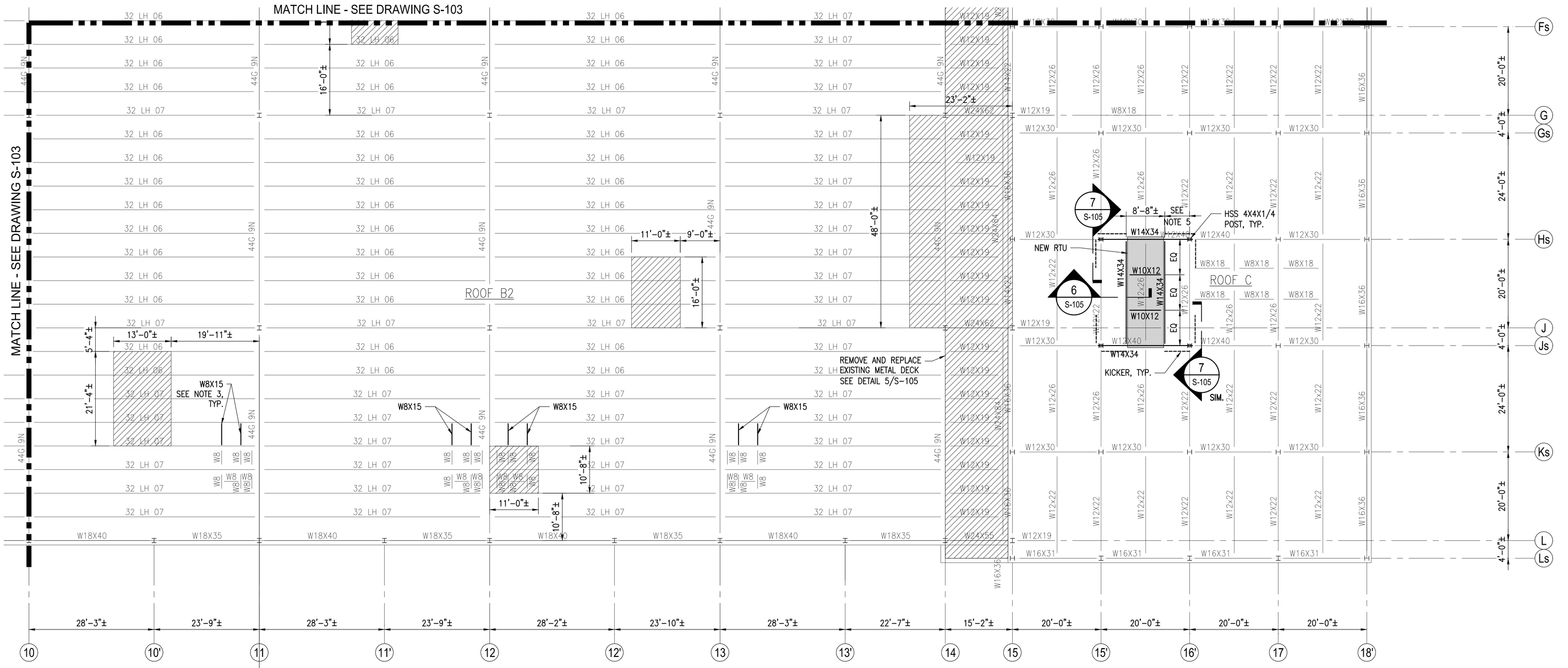
1. SEE S-105 FOR TYPICAL DETAILS
2. PER EXISTING DRAWINGS, JOIST SPACING IS 5'-4". CONTRACTOR TO VERIFY SPACING IN FIELD.
3. ALIGN NEW W8 BEAMS WITH EXISTING SUPPLEMENTAL FRAMING. SEE DETAIL 2/S-105 FOR DETAILS. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING ROOF DECK AS REQUIRED TO INSTALL NEW BEAMS.
4. RTU AND MAU LOCATIONS PER ARCH. & MECH. DRAWINGS. COORDINATE SUPPORT FRAMING DUNNAGE LOCATIONS PER MANUFACTURER RECOMMENDATIONS.
5. REFER TO ARCH. DRAWINGS FOR DIMENSIONS NOT SHOWN.
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7. REMOVE AND REPLACE EXISTING METAL DECK. COORDINATE WITH ARCHITECTURAL AND MEP DRAWINGS FOR LOCATIONS OF ALL ROOF PENETRATIONS. REMOVE AND REINSTALL AS REQUIRED.
8. NOT ALL OPENINGS/INFILLS ARE SHOWN ON THE DRAWINGS. SEE ARCHITECTURAL AND MEP DRAWINGS FOR SIZES AND LOCATIONS OF OPENINGS/INFILLS. SEE TYPICAL DETAILS FOR STRUCTURAL DETAILS.

SYMBOL LEGEND

SYMBOL	DESCRIPTION
	REMOVE AND REPLACE EXISTING METAL DECK AT AREAS SHOWN. SEE DETAIL 5/S-105.

BUILDING KEY PLAN





1 S-104 PARTIAL ROOF FRAMING PLAN

Scale: 0 4 12 24 feet

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DOB APPROVAL STAMP

REVISIONS:

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NYC DDC Department of Design and Construction

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CAPITAL PROJECT NUMBER:
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PROJECT
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10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

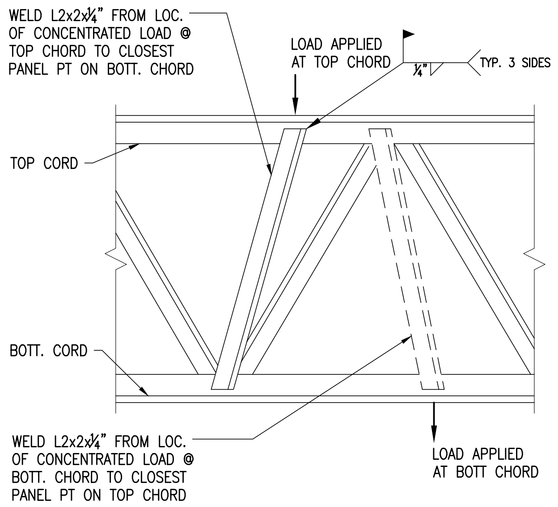
DRAWING TITLE:
ROOF FRAMING PLAN
4 OF 4

SEAL & SIGNATURE

STATE OF NEW YORK · VINCENT M. ANTES · 095396 · LICENSED PROFESSIONAL ENGINEER

5/5/2020

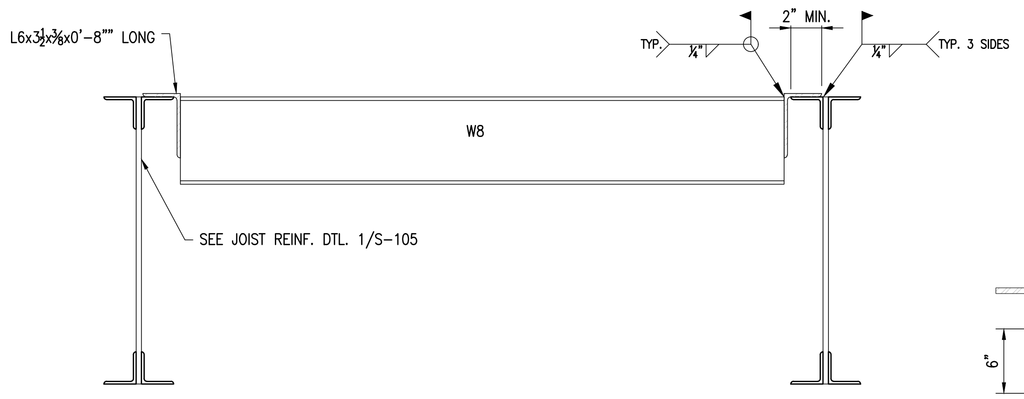
DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	V. ANTES
CHECKED BY:	J. GOULD
DRAWING NUMBER:	S-104.00



1 S-105 JOIST REINFORCING DETAIL

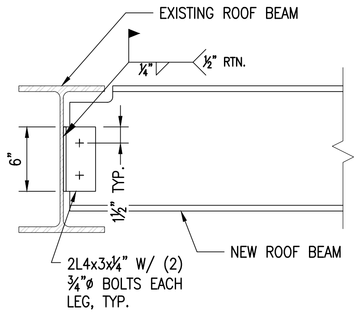
SCALE: N.T.S.

NOTE:
APPLIES WHERE CONCENTRATED LOADS OCCUR AT NON–PANEL POINTS OF JOIST



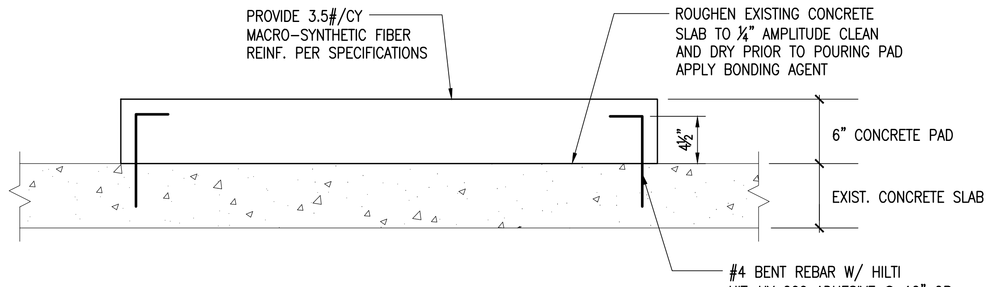
2 S-105 ROOF EQUIPMENT SUPPORT DETAIL

SCALE: N.T.S.



3 S-105 BEAM CONNECTION DETAIL

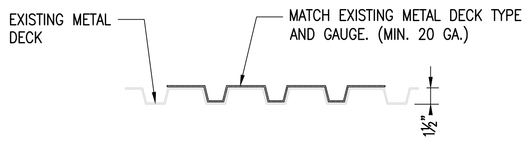
Scale: N.T.S.



4 S-105 SLAB DETAIL AT ELEC SERVICE ROOM

Scale: N.T.S.

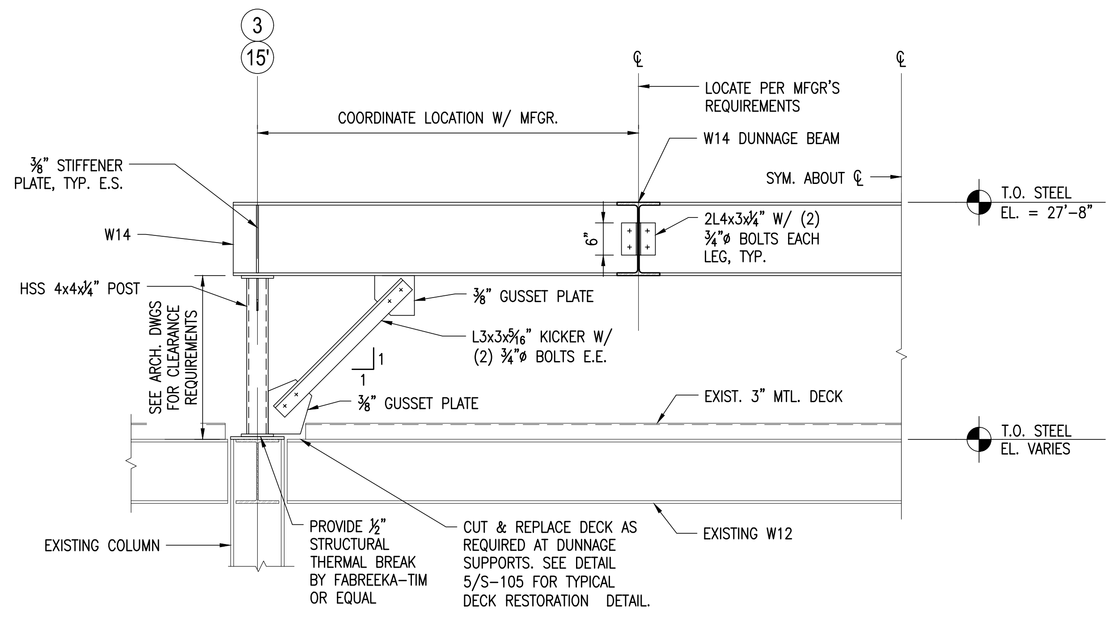
NOTE:
1. FOR LOCATION AND SIZE OF PAD, SEE ARCHITECTURAL DRAWINGS.



NOTES:
1. NEW DECK INFILL SHALL EXTEND A MINIMUM 12" BEYOND EXTENT OF DAMAGE/OPENING ON ALL SIDES.
2. MAXIMUM OPENING WIDTH IN DIRECTION OF DECK SPAN IS 24". FOR OPENINGS GREATER THAN 24", PROVIDE STEEL ANGLES TO SUPPORT DECK.
3. WHERE EXISTING DECK IS BEING REMOVED, REMOVE BACK TO CLOSEST JOIST/BEAM. LAP NEW DECK MINIMUM 12" AND PROVIDE ATTACHMENT AT ENDS OF NEW DECK AND OVER EACH JOIST/BEAM PER DETAIL
4. ATTACH NEW DECK WITH ⅝" PUDDLE WELDS OR #10 TEK SCREWS EACH FLUTE OVER ALL BEAMS/JOISTS AND @ LAPS IF NOT OVER STRUCTURE AND 12" O.C. MIN. @ SIDELAPS.

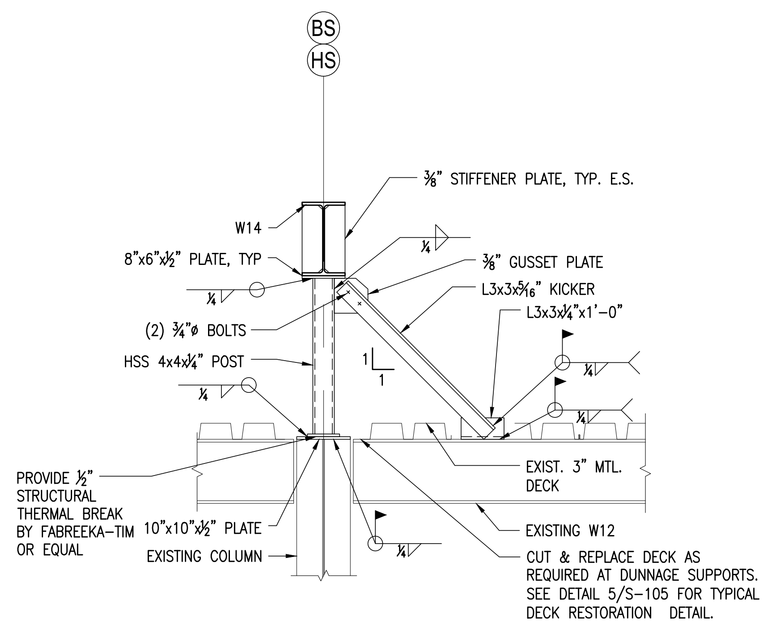
5 S-105 TYPICAL DECK DETAIL

SCALE: N.T.S.



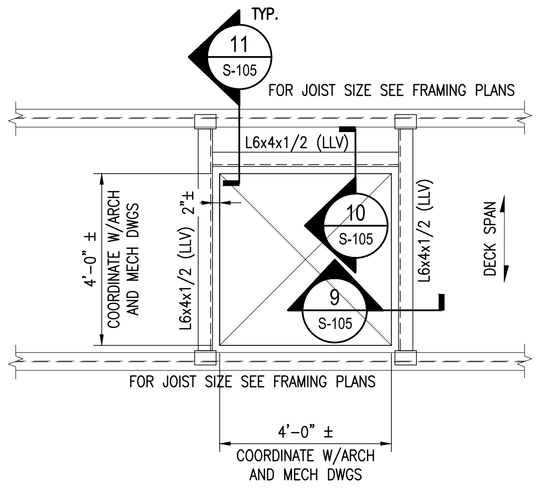
6 S-105 ROOF TOP DUNNAGE EQUIPMENT SUPPORTS - SECTION

SCALE: 3/4" = 1'-0"



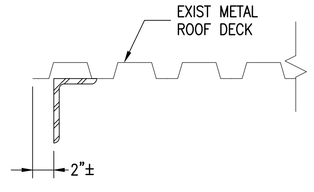
7 S-105 DUNNAGE EQUIPMENT SUPPORTS - SECTION

SCALE: 3/4" = 1'-0"



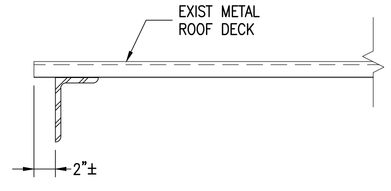
8 S-105 PART PLAN-TYPICAL SUPPLEMENTAL FRAMED OPENING

SCALE: 1/2" = 1'-0"



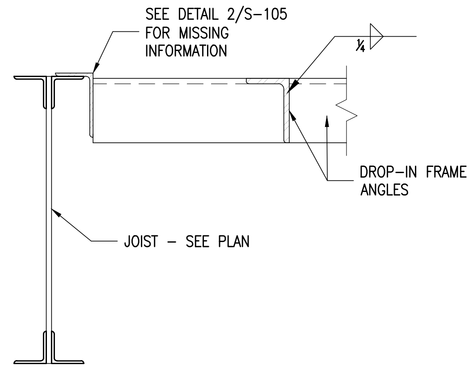
9 S-105 SECTION

SCALE: 1 1/2" = 1'-0"



10 S-105 SECTION

SCALE: 1 1/2" = 1'-0"



11 S-105 SECTION

SCALE: 1 1/2" = 1'-0"

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REVISIONS:

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NYC DDC Department of Design and Construction

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CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
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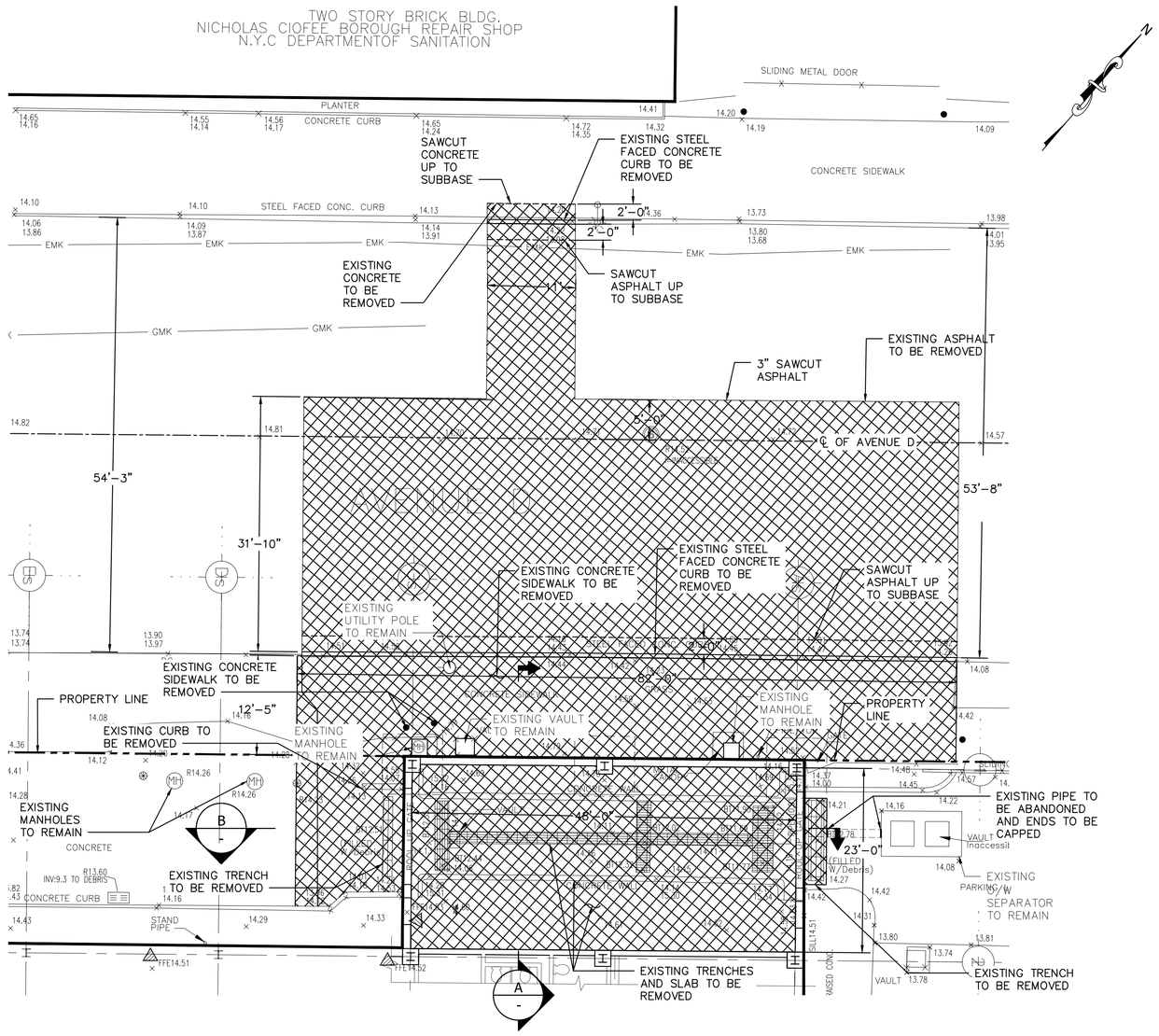
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
STRUCTURAL DETAILS

SEAL & SIGNATURE
STATE OF NEW YORK VINCENT M. ANTES 092306 LICENSED PROFESSIONAL ENGINEER
5/5/2020

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	V. ANTES
CHECKED BY:	J. GOULD
DRAWING NUMBER:	S-105.00



EXISTING CONDITIONS AND REMOVAL PLAN

SCALE: 1" = 10' – 0"

LEGEND:

XRXX.XX	RIM ELEVATION
XXX.XX	SPOT ELEVATION
XBTXX.XX	BOTTOM TRENCH
XFFEXX.XX	FINISHED FLOOR ELEVATION
DC	DROP CURB
CSW	CONCRETE SIDEWALK
	CATCH BASIN
	ENTRANCE DOOR
	UNKNOWN VALVE
	MONITOR WELL
	LIGHT POLE
	WOOD UTILITY POLE
W	WATER VALVE
G	GAS VALVE
MH	UNKNOWN MANHOLE
E	ELECTRIC MANHOLE
S	SEWER MANHOLE
	GPR (GROUND PENETRATING RADAR) – BY OTHERS.
	FLAG POLE
	CHAIN LINK FENCE
	BOLLARD
	TRENCH
GMK	GAS MARK OUT
EMK	ELECTRIC MARK OUT
	EXISTING TO BE REMOVED

SITE/CIVIL GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES, LAWS AND STATUTES AS REQUIRED.
2. THE CONTRACTOR SHALL CAREFULLY EXAMINE THE DRAWINGS, READ THE SPECIFICATIONS AND ALL OTHER PROPOSED CONTRACT DOCUMENTS. THE CONTRACTOR SHALL FULLY INFORM HIMSELF AS TO ALL EXISTING CONDITIONS AND LIMITATIONS UNDER WHICH THE WORK IS TO BE PERFORMED. NO ALLOWANCE WILL BE MADE TO THE CONTRACTOR BECAUSE OF LACK OF SUCH EXAMINATION OR KNOWLEDGE.
3. DO NOT SCALE MEASURE ANY DRAWING. DRAWINGS MAY BE ROUGH SCALED FOR GENERAL REFERENCE PURPOSES ONLY BUT NOT FOR LAYOUT OR FABRICATION. REPORT ANY ERRORS, INACCURACIES, DISCREPANCIES OR CONFLICTS TO THE ENGINEER IN WRITING BEFORE BEGINNING ANY WORK. WRITTEN DIMENSIONS SUPERSEDE SCALED DIMENSIONS.
4. THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE AND DISTURB ONLY THOSE AREAS OF THE SITE AFFECTED BY THE SCOPE OF WORK, UNLESS NOTED OTHERWISE OR DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL PROTECT ALL OTHER AREAS. AREAS BEYOND THE WORK LIMITS DISTURBED FOR ANY REASON BY THE CONTRACTOR AND HIS EMPLOYEES SHALL BE RESTORED, REPAIRED, OR REPLACED IN A MANNER SATISFACTORY TO THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
5. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THE EXACT EXTENT OF WORK CANNOT ALWAYS BE ACCURATELY DETERMINED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED BASED ON FIELD INSPECTION AND OTHER AVAILABLE INFORMATION. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS TO CONSTRUCTION DETAILS AND WORK QUALITIES. THE CONTRACTOR SHALL PERFORM THE WORK IN ACCORDANCE WITH THE FIELD CONDITIONS.
6. THE CONTRACTOR SHALL MAINTAIN AT THE SITE ONE RECORD COPY OF ALL DRAWINGS, SPECIFICATIONS, APPROVED SHOP DRAWINGS AND APPROVED SAMPLES MARKED CURRENTLY TO RECORD ALL CHANGES DURING CONSTRUCTION.
7. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE MEANS OF CONSTRUCTION, METHODS, TECHNIQUES, SEQUENCES OF PROCEDURES, OR THE SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CORRECTNESS OF DIMENSIONS OR QUANTITIES; FOR ENSURING THAT VARIOUS WORK FEATURES ACHIEVE PROPER FIT; AND FOR INFORMATION PERTAINING TO THE FABRICATION PROCEDURE OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES OF CONSTRUCTION. THE VERIFICATION OF THE PHYSICAL INTERRELATIONSHIPS OF ELEMENTS OF THE WORK FROM PLANS AND SPECIFICATIONS AND IN THE FIELD SHALL BE SOLELY THE CONTRACTOR'S RESPONSIBILITY. THE ENGINEER'S REVIEW OF THE CONTRACTOR'S SUBMISSIONS DOES NOT RELIEVE THE CONTRACTOR FROM THESE RESPONSIBILITIES.
9. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD BEFORE COMMENCING WORK AND SHALL REPORT ANY DISCREPANCIES BETWEEN DRAWINGS AND FIELD CONDITIONS TO THE ENGINEER. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR WORK TO BE CONFIRMED AND CORRELATED TO THE SITE; AND FOR VERIFYING EXACT LAYOUT COMPATIBILITY WITH ALL EXISTING CONDITIONS BEFORE BEGINNING WORK.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE PROPOSED CONSTRUCTION AREA INCLUDING THE REMOVAL AND INSTALLATION OF EXISTING EQUIPMENT AND MATERIALS TO PERFORM THE PROPOSED WORK. ANY DAMAGE OCCURRING DURING THE EXECUTION OF THE WORK IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED OR REPLACED TO THE OWNER'S SATISFACTION.
11. VERIFY WITH THE ENGINEER THE EXTENT OF REMOVAL OF ALL SITE ELEMENTS.
12. THE OWNER ASSUMES THE RIGHT AT ALL TIMES TO DELIVER, PLACE AND INSTALL EQUIPMENT AS THE WORK PROGRESSES WHICH SHALL BE COORDINATED WITH THE CONTRACTOR.

STAGING NOTES

1. THE CONTRACTOR SHALL POST SIGNS REQUIRED BY THE CITY OF NEW YORK OR OTHER REGULATORY AGENCY FOR ITS WORK.
2. THE CONTRACTOR SHALL STAGE ON THE SITE IN SUCH A MANNER AS TO NOT BLOCK OR ENCROACH UPON EXISTING EXITS/ENTRANCES TO SITE FACILITIES AND VEHICLE ACCESS.
3. ALL EXITS MUST BE KEPT CLEAR OF CONSTRUCTION DEBRIS AT ALL TIMES.
4. THE CONTRACTOR SHALL SCHEDULE HIS OPERATIONS TO MINIMIZE THE INTERRUPTION OF PEDESTRIAN TRAFFIC, PEDESTRIAN SAFETY AND PROPERTY ACCESS MUST BE MAINTAINED AT ALL TIMES TO THE SATISFACTION OF THE ENGINEER. AT LOCATIONS WHERE EXISTING SIDEWALK IS CLOSED, THE CONTRACTOR SHALL PLACE A BARRICADE WITH A "SIDEWALK CLOSED" SIGN.
5. THE CONTRACTOR MAY BE ORDERED TO TEMPORARILY STOP WORK AND/OR RESCHEDULE WORK IN ORDER TO MINIMIZE INTERFERENCE WITH OTHER PLANNED FESTIVITIES OR ACTIVITIES.

SAFEGUARDING EXISTING UTILITIES NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY UNDER PART 753 OF THE NEW YORK STATE INDUSTRIAL CODE TO DETERMINE THE EXACT LOCATION OF THE UNDERGROUND FACILITIES PRIOR TO WORKING IN THE AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
2. IF ACTIVE UTILITY LINES ARE ENCOUNTERED, PROMPTLY TAKE NECESSARY STEPS TO ASSURE THAT SERVICE IS NOT INTERRUPTED.
3. IF SERVICE IS INTERRUPTED AS A RESULT OF WORK, IMMEDIATELY RESTORE SERVICE BY REPAIRING THE DAMAGED UTILITY AT NO ADDITIONAL COST TO THE OWNER.
4. IF EXISTING UTILITIES ARE FOUND TO INTERFERE WITH THE PERMANENT FACILITIES BEING CONSTRUCTED, IMMEDIATELY NOTIFY THE ENGINEER AND SECURE HIS INSTRUCTIONS.
5. VERIFY ALL EXISTING UNDERGROUND UTILITIES PRIOR TO ANY DISTURBANCE. REMOVAL OR RELOCATION OF ALL UTILITIES NOT CLEARLY SHOWN IN CONTRACT DOCUMENTS OR FOUND DURING EXCAVATION SHALL BE CONFIRMED WITH THE ENGINEER PRIOR TO WORK PROCEEDING.
6. UNLESS SHOWN TO BE REMOVED, PROTECT ACTIVE UTILITY LINES SHOWN ON DRAWINGS OR OTHERWISE MADE KNOWN TO THE CONTRACTOR PRIOR TO EXCAVATING. IF DAMAGED, REPAIR OR REPLACE AT NO ADDITIONAL COST TO THE OWNER.
7. THE CONTRACTOR IS ALERTED TO THE RULES AND REGULATIONS OF INDUSTRIAL CODE RULE 53 AND IS DIRECTED TO COMPLY WITH IT. THE CONTRACTOR, FOR THE PURPOSE OF SAFETY, SHALL NOTIFY THE ENGINEER IF ANY UTILITIES ARE EXPOSED AND/OR UNDERMINED DURING THE COURSE OF CONSTRUCTION. THE OWNER SHALL NOT BE LIABLE FOR ANY COSTS INCURRED BY THE CONTRACTOR AS A RESULT OF THE COMPLIANCE, NON-COMPLIANCE OR IMPROPER COMPLIANCE BY THE FRANCHISED OPERATOR OF UNDERGROUND FACILITIES, WITH SUBPART 53-3 OF RULE 53 OF THE INDUSTRIAL CODE.
8. PRIOR TO ANY EXCAVATION, SUBSURFACE EXPLORATION, OR INSTALLATION BELOW EXISTING GRADE, THE SITE ENGINEER IN CHARGE SHALL BE NOTIFIED OF THE DATE AND LOCATION OF THE PROPOSED WORK. THIS NOTIFICATION CALL SHALL BE MADE A MINIMUM OF TWO (2) DAYS, NOT INCLUDING THE CALL DAY, PRIOR TO WORK.

SITE SAFETY NOTES

GENERAL SAFETY AND SECURITY MEASURES

1. ALL CONSTRUCTION MATERIALS SHALL BE STORED IN A SAFE AND SECURE MANNER.
2. THE CONTRACTOR SHALL INSTITUTE AND MAINTAIN SAFETY MEASURES TO SAFEGUARD THE GENERAL PUBLIC AND PROPERTY AFFECTED BY THE CONSTRUCTION OPERATION.
3. THE CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE FREE AND CLEAR OF ALL UNAUTHORIZED PERSONS.
4. WORK MUST CONFORM TO THE REQUIREMENTS OF THE NEW YORK CITY DEPARTMENT OF BUILDINGS, NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION, NEW YORK CITY DEPARTMENT OF TRANSPORTATION, FIRE DEPARTMENT REGULATIONS, UTILITY COMPANY REQUIREMENTS AND ALL APPLICABLE LAWS AND REQUIREMENTS.
5. ALL TEMPORARY EQUIPMENT AND WIRING SHALL BE IN ACCORDANCE WITH APPLICABLE ELECTRICAL CODES.
6. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS INCLUDING BUT NOT LIMITED TO INSTALLING TEMPORARY SUPPORTS, SHORING AND BRACING TO ENSURE THAT CONSTRUCTION PROCEEDS IN A SAFE MANNER.
7. ALL CONSTRUCTION EQUIPMENT THAT MAY AFFECT THE PUBLIC WHILE IN OPERATION SHALL BE INSPECTED BY THE PROJECT ENGINEER OR BY A COMPETENT DESIGNATED ENGINEER. UNSAFE EQUIPMENT SHALL BE REPAIRED IMMEDIATELY OR REMOVED FROM SERVICE.
8. HOSE LINES, PIPES, CHAINS, ROPES, ETC. SHALL BE LOCATED IN A MANNER NOT TO CREATE A TRIPPING HAZARD.
9. DURING ALL LIFTING AND HOISTING OPERATIONS, FLAG PERSONS SHALL BE PROVIDED TO CONTROL ALL PEDESTRIAN AND/OR VEHICULAR TRAFFIC AT ALL TIMES.
10. ALL TRENCHES ARE TO BE COVERED WITH STEEL PLATES DURING NON-WORKING HOURS AND PROTECTED ON ALL SIDES WITH TEMPORARY FENCING OR BARRICADES.

DUST AND DEBRIS CONTROL

1. SUFFICIENT CONTAINERS MADE OF METAL OR OTHER ACCEPTABLE MATERIAL SHALL BE PROVIDED BY THE CONTRACTOR FOR STORING GARBAGE AND DEBRIS.
2. DEBRIS, DIRT, DUST AND CONTAMINANTS ARE TO BE KEPT TO A MINIMUM AND ARE TO BE CONFINED TO THE IMMEDIATE CONSTRUCTION AREA. PROVISIONS SHALL BE MADE TO PREVENT THE PASSAGE OF DUST AND CONTAMINANTS INTO SITE FACILITIES BY THE CONTRACTOR.
3. DEBRIS, DIRT, DUST AND CONTAMINANTS ARE TO BE CLEANED UP AND REMOVED PERIODICALLY TO AVOID ANY EXCESSIVE ACCUMULATION. THIS SHALL BE ACCOMPLISHED IN A LEGAL MANNER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF CHEMICAL FUMES, GASES, AND OTHER CONTAMINANTS PRODUCED BY WELDING, GASOLINE OR DIESEL ENGINES, PAVING, ETC. TO ENSURE THEY DO NOT ENTER SITE FACILITIES OR BUILDINGS ADJACENT TO THE SITE.

SITE STRUCTURAL CONCRETE NOTES

1. ALL CONCRETE SHALL CONFORM TO THE LATEST EDITION OF ACI-318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
2. CONCRETE SHALL HAVE A MINIMUM 28 DAY STRENGTH F'C=4000 PSI
3. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60. REINFORCING STEEL SHALL BE DETAILED ACCORDING TO ACI MANUAL OF STANDARD PRACTICE (ACI 315) LATEST EDITION.
4. ALL GROUT SHALL BE NON-SHRINK WITH A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI.

FIRE PROTECTION

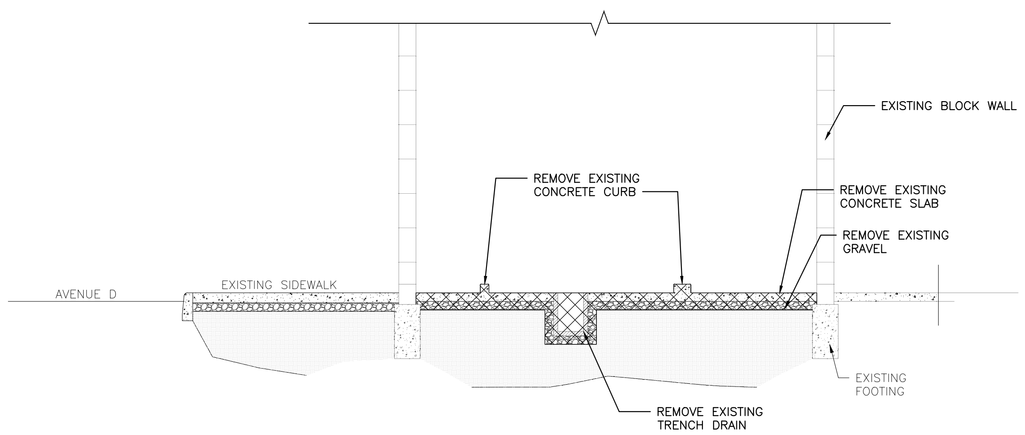
1. A FIRE EXTINGUISHER MUST BE PRESENT WITHIN CLOSE PROXIMITY (NOT MORE THAN 25') OF ALL FUEL-OPERATED EQUIPMENT DURING USE.
2. COMBUSTIBLE WASTE MATERIAL MUST NOT BE ALLOWED TO ACCUMULATE AND SHALL BE REMOVED FROM THE SITE AT REASONABLE INTERVALS.

MISCELLANEOUS NOTES

1. THE ELEVATIONS PROVIDED FOR THE TOP OF NEWLY GRADED AREAS ARE TO BE CONSIDERED APPROXIMATE AND ARE TO BE USED AS A GENERAL GUIDE ONLY.
2. EXISTING STEEL GRATES, PLATES, UTILITY VALVES AND MANHOLE COVERS IN THE PAVEMENT ARE TO BE LOCATED BY THE CONTRACTOR. THESE STEEL GRATES, PLATES, UTILITY VALVES AND MANHOLE COVERS ARE TO BE ADJUSTED TO MATCH THE NEW PAVEMENT GRADES.
3. THE LOCATION AND SIZES OF ALL STEEL GRATES AND PLATES SHOWN ON THE DRAWINGS WERE DETERMINED FROM OLD RECORDS OR FIELD INSPECTIONS. THE ACTUAL SIZES, LOCATIONS AND TYPES SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD.

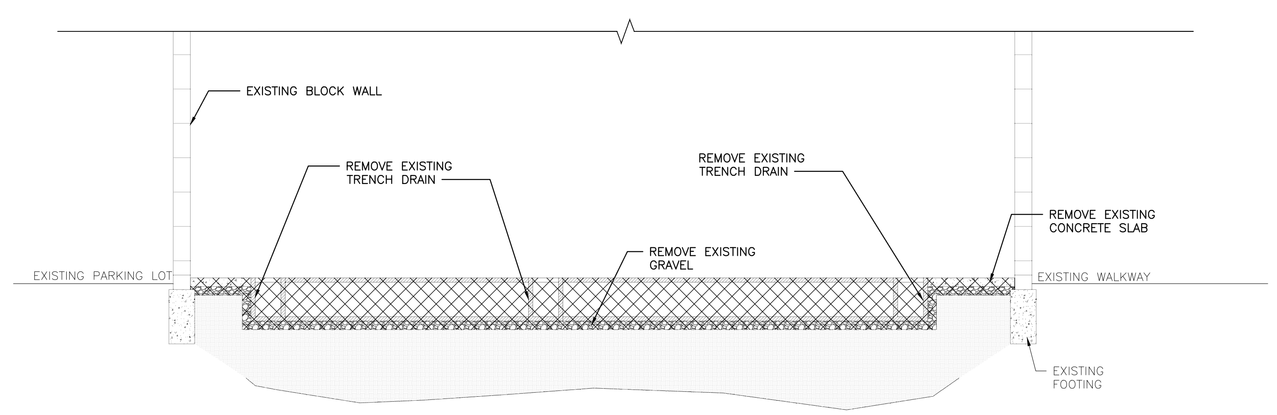
RESTORATION

1. IN THOSE INSTANCES WHERE THE PROPOSED WORK PARALLELS EXISTING CURB LINES THE PIPE SHALL BE PLACED 2 FEET BEHIND THE BACK OF CURB SO AS NOT TO UNDERMINE OR DAMAGE ANY EXISTING CURBS TO REMAIN. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPLACED AT NO COST TO THE OWNER.
2. ALL TRENCHING ACROSS PAVED SURFACES REQUIRES SAWCUTS ON BOTH SIDES OF THE TRENCH. THE REMOVAL OF THE PAVEMENT SHALL BE DONE NEATLY AND CAREFULLY IN ORDER TO PRESERVE A GOOD VERTICAL FACE IN THE ASPHALT PAVEMENT TO REMAIN.
3. THE VERTICAL FACE OF EXISTING ASPHALT PAVEMENT TO REMAIN SHALL BE TACK COATED PRIOR TO NEW PAVEMENT PLACEMENT.
4. WHERE THE PROPOSED WORK INTERSECTS WITH EXISTING CONCRETE SIDEWALK AND/OR CURB, THE LIMITS OF THE SIDEWALK/CURB REMOVAL SHALL BE TO THE NEAREST EXISTING JOINT IN THE SIDEWALK/CURB OR AS ORDERED BY THE RESIDENT ENGINEER.



EXISTING CONDITIONS – SECTION A

SCALE: 1" = 5' – 0"



EXISTING CONDITIONS – SECTION B

SCALE: 1" = 5' – 0"

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

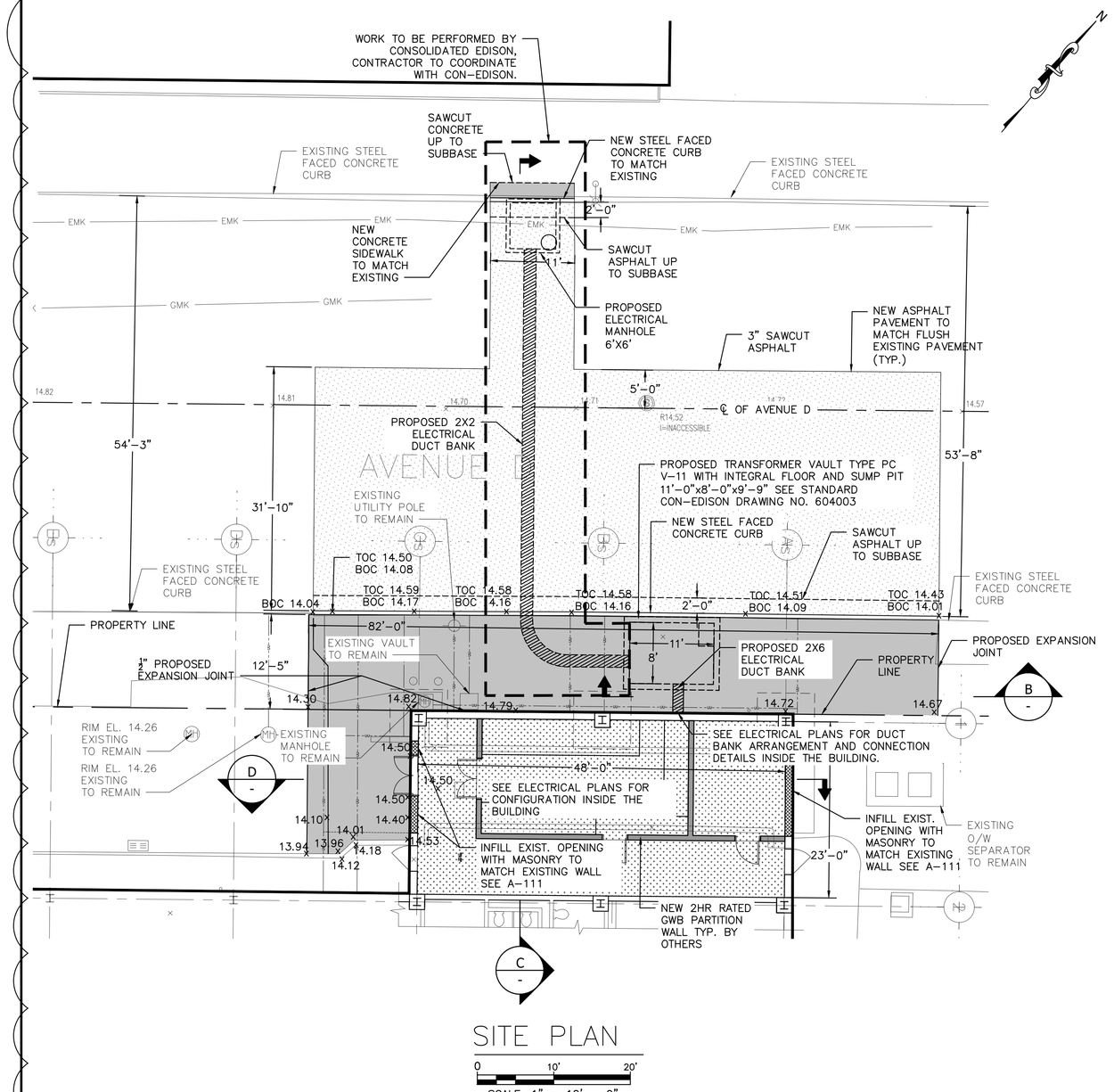
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
EXISTING CONDITION AND REMOVAL PLAN

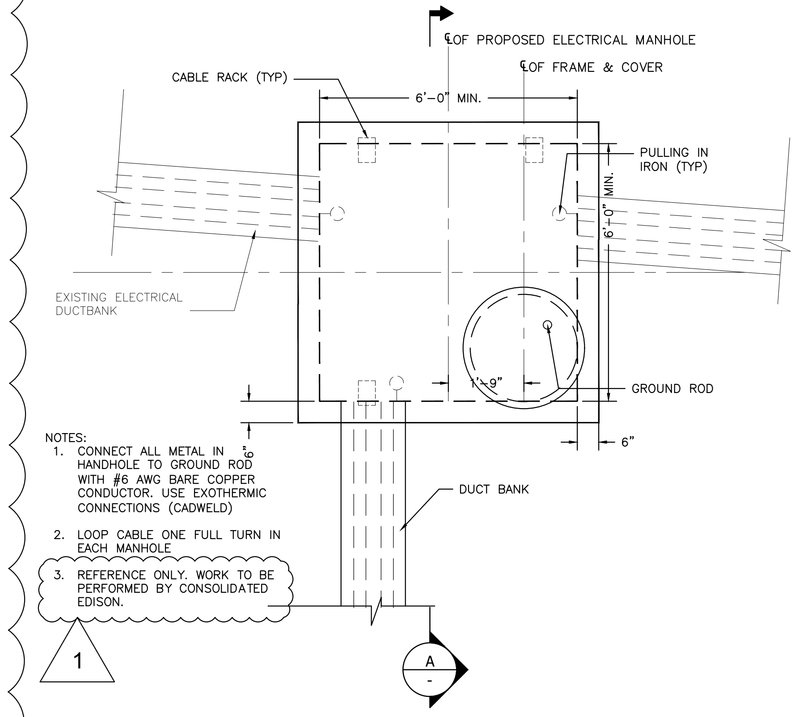
SEAL & SIGNATURE
STATE OF NEW YORK · DANIEL PAUL LOSCALZO · LICENSED PROFESSIONAL ENGINEER · 097841

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	YI
CHECKED BY:	DL
DRAWING NUMBER:	C-001.00



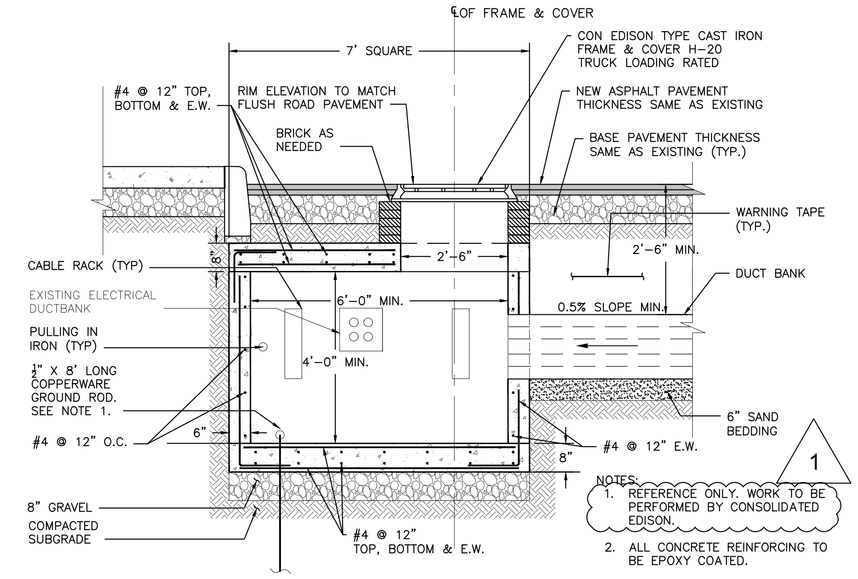
SITE PLAN

SCALE: 1" = 10' - 0"



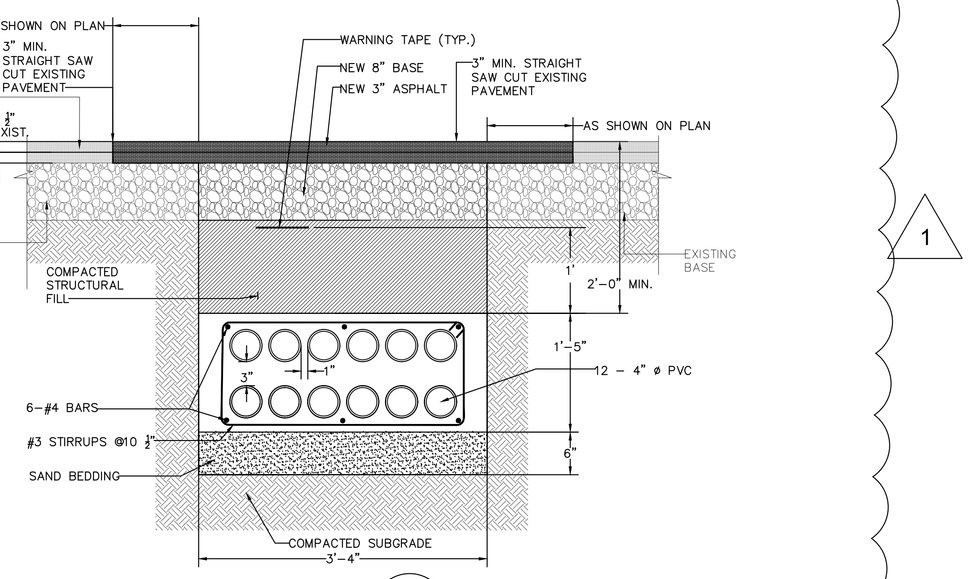
PROPOSED ELECTRICAL MANHOLE PLAN

SCALE: 1" = 2' - 0"



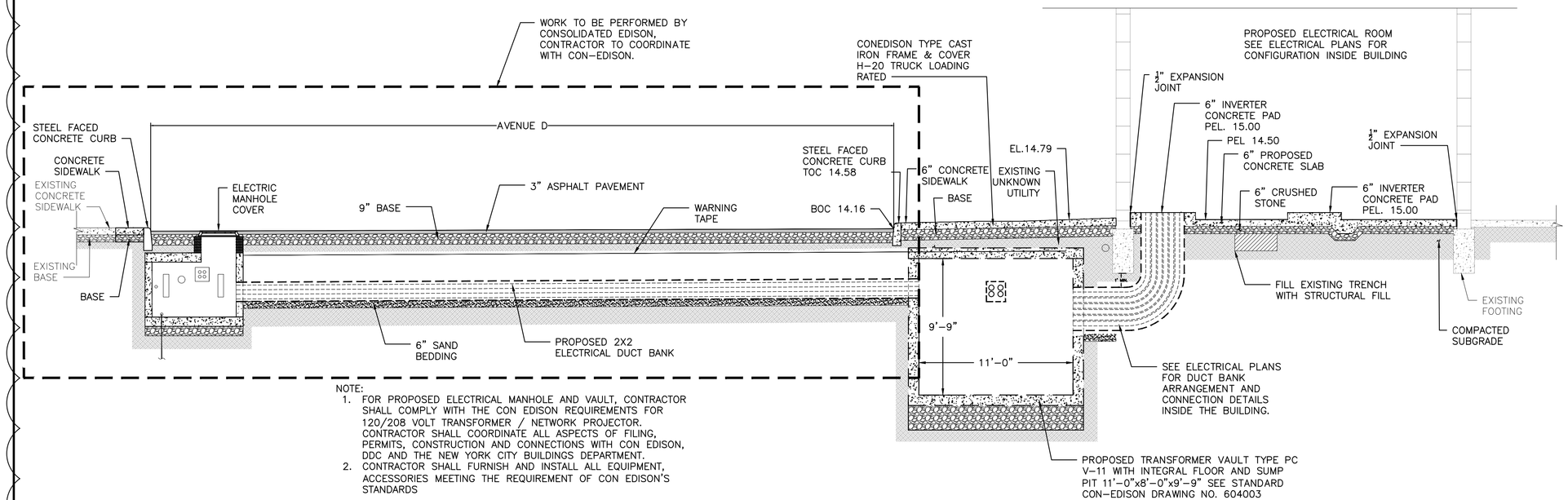
PROPOSED ELECTRICAL MANHOLE SECTION A

SCALE: 1" = 2' - 0"



SECTION B

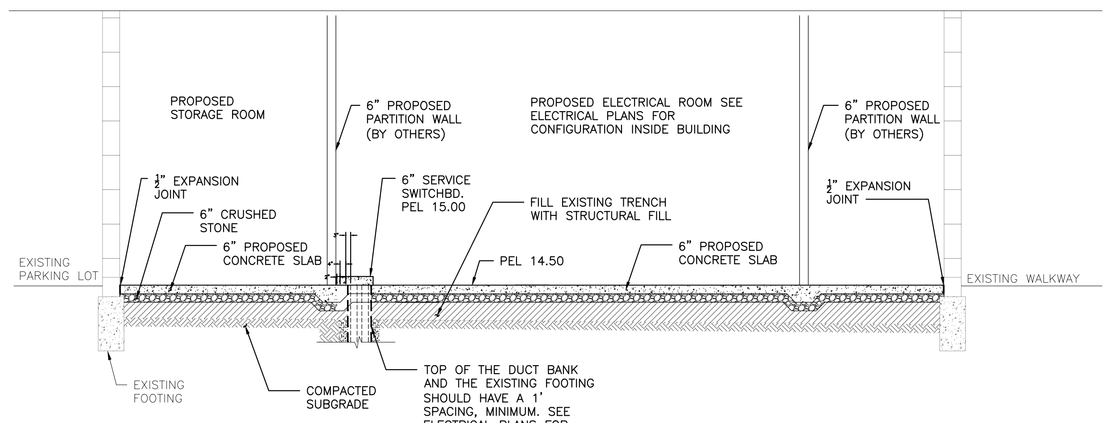
SCALE: 1" = 1' - 0"



NOTE:
1. FOR PROPOSED ELECTRICAL MANHOLE AND VAULT, CONTRACTOR SHALL COMPLY WITH THE CON EDISON REQUIREMENTS FOR 120/208 VOLT TRANSFORMER / NETWORK PROJECTOR. CONTRACTOR SHALL COORDINATE ALL ASPECTS OF FILING, PERMITS, CONSTRUCTION AND CONNECTIONS WITH CON EDISON, DDC AND THE NEW YORK CITY BUILDINGS DEPARTMENT.
2. CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT, ACCESSORIES MEETING THE REQUIREMENT OF CON EDISON'S STANDARDS

SECTION C

SCALE: 1" = 5' - 0"



SECTION D

SCALE: 1" = 5' - 0"

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REVISIONS:

NUMBER	DESCRIPTION	DATE
-	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

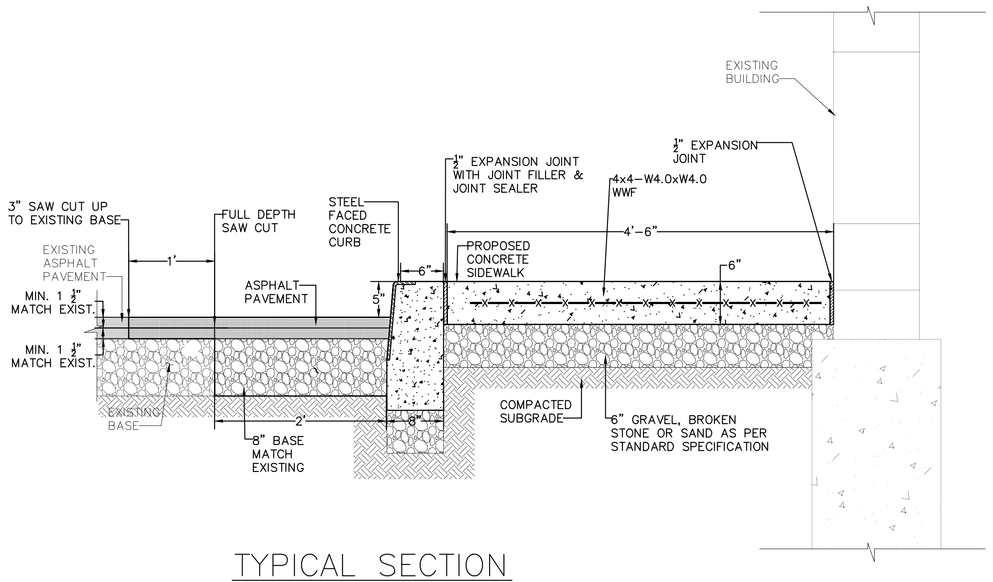
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
PROPOSED SITE PLAN, SECTIONS AND DETAILS

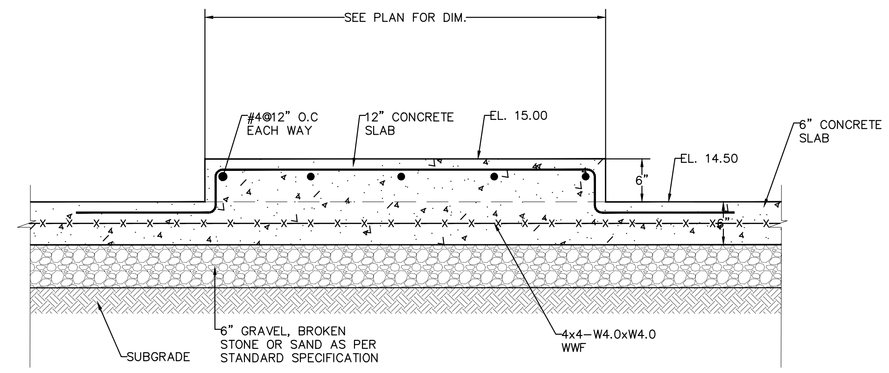
SEAL & SIGNATURE
STATE OF NEW YORK · PAUL LOPICCOLO · 097841 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/30/2019
PROJECT NO:	DDC30000
DRAWN BY:	YI
CHECKED BY:	DL
DRAWING NUMBER:	C-002.00



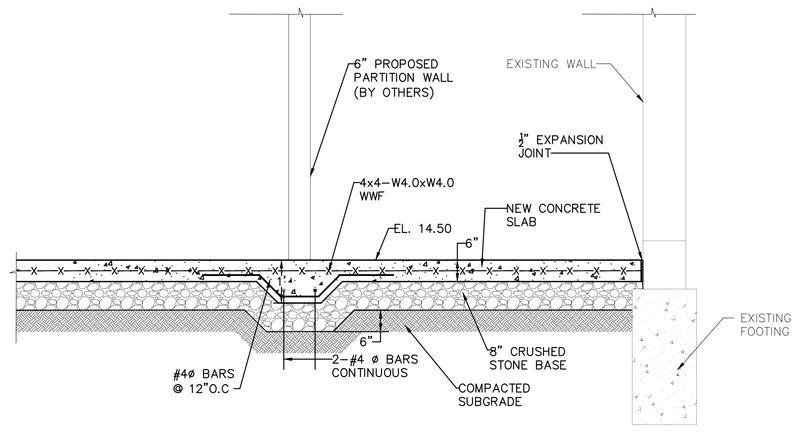
TYPICAL SECTION

SCALE: 1" = 1'–0"



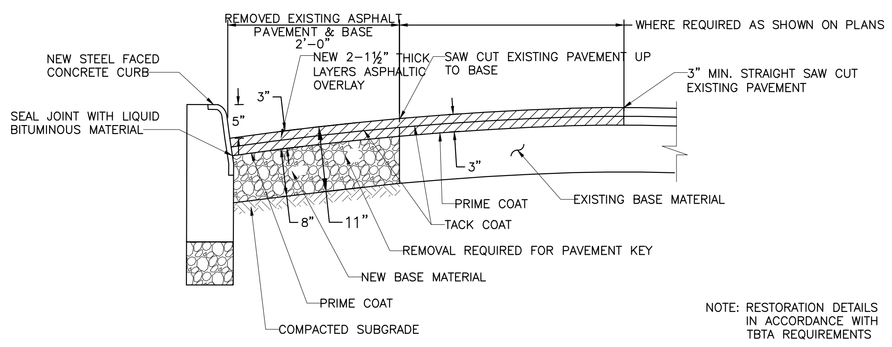
EQUIPMENT PAD TYPICAL SECTION

SCALE: 1" = 1'–0"



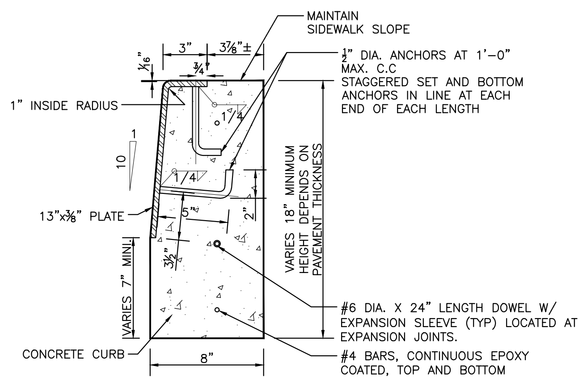
CONCRETE SLAB TYPICAL SECTION

SCALE: 1" = 2'–0"



ASPHALT PAVEMENT TYPICAL SECTION

SCALE: 1" = 1' –0"



STEEL FACED CONCRETE CURB DETAIL

SCALE: 2" = 1'–0"

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

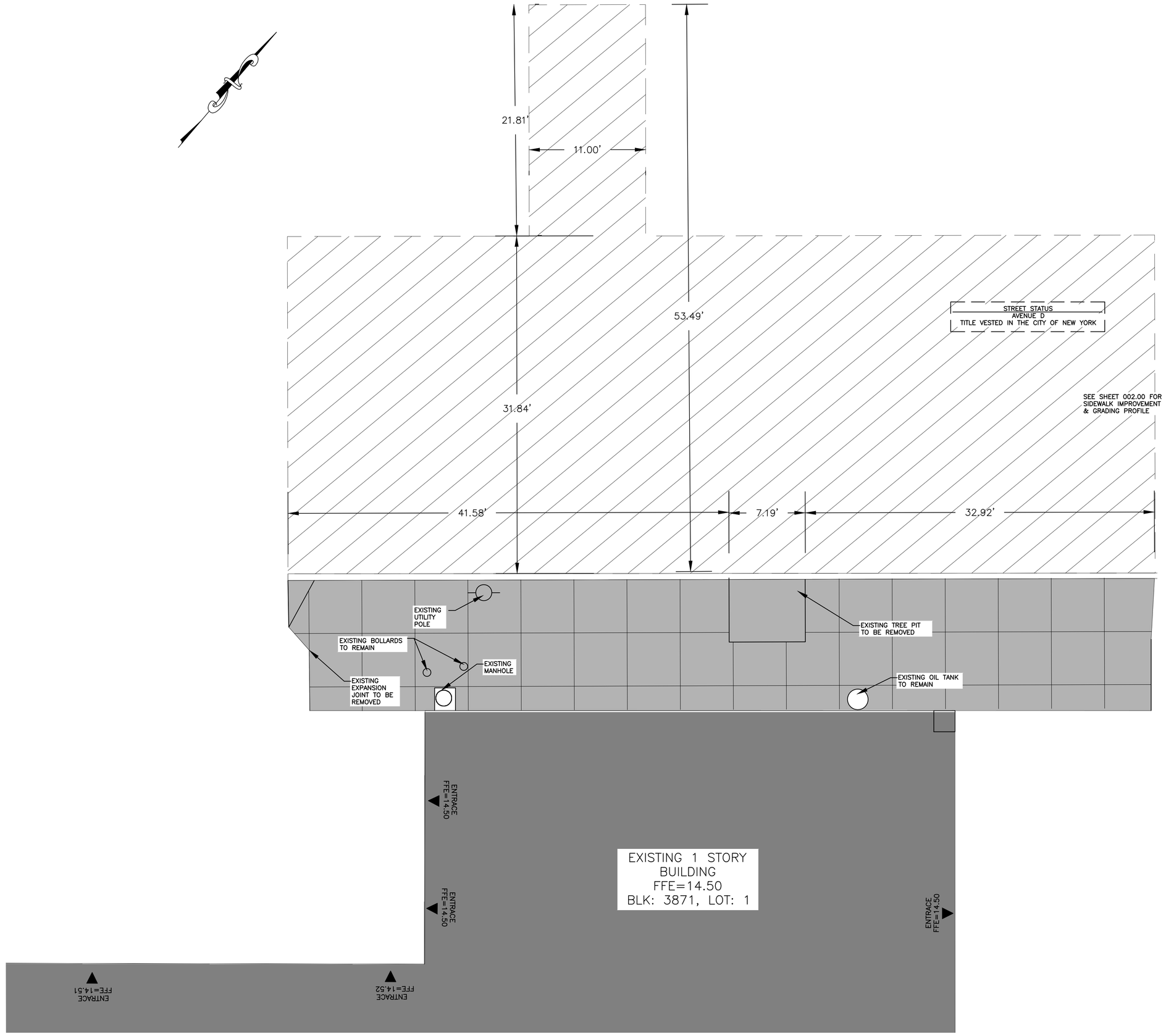
10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
PAVEMENT SECTIONS AND DETAILS

SEAL & SIGNATURE
STATE OF NEW YORK · ROBERT PAUL LORIA JR. · 097841 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC30000
DRAWN BY:	YI
CHECKED BY:	DL
DRAWING NUMBER:	C-003.00



LIST OF ESTIMATED QUANTITIES

NEW STEEL FACED CONCRETE CURB	81.69	LIN.FT.
NEW SIDEWALK	1000.00	SQ.FT.
NEW ROADWAY	350.00	SQ.YDS.
NEW TREES	N/A	EACH
NEW CB's	N/A	EACH
NEW DIP	N/A	LIN.FT.
NEW MANHOLES	1	EACH

INSPECTION/FINAL SIGN-OFF

THE CONTRACTOR IS RESPONSIBLE TO PROCURE OR PROVIDE ALL ITEMS NECESSARY FOR FINAL NYCDOB/NYCDOT SIGN-OFF, INCLUDING BUT NOT LIMITED TO:

- NYCDOT INSPECTION AND SIGN-OFF
- FINAL AS-BUILT SURVEY
- CONCRETE CORE TEST AND FULL-TIME CONTROLLED INSPECTION SIGNED AND SEALED BY A LIST OF DRAWINGS PANIED BY BPP-11 (ENGINEER'S INSPECTION AFFIDAVIT)

DRAWING LIST

1. BPP-001.00 BUILDERS PAVEMENT PLAN TITLE SHEET
2. BPP-002.00 BUILDERS PAVEMENT PLAN – PROFILE & DETAILS
3. BPP-003.00 BUILDERS PAVEMENT PLAN – PHOTOS
4. BPP-004.00 BUILDERS PAVEMENT PLAN – MPT

GENERAL NOTES

1. EXISTING TOPOGRAPHIC, BOUNDARY AND.OR UTILITY INFORMATION AS SHOWN ON THIS DESIGN DOCUMENT IS BASED ON ARCHITECTURAL SURVEY PREPARED BY HIRANI ENGINEERING & LAND SURVEYING, LLC DATED 00-00-0000.
2. TRANSVERSE EXPANSION JOINTS WITH JOINT FILLER SHALL BE PROVIDED AT INTERVALS OF MAXIMUM 20 FEET. SCORE LINED SHALL BE EVERY 5 FEET ON CENTER.
3. EXPANSION JOINT WITH JOINT FILLER TO BE PROVIDED BETWEEN THE SIDEWALK SLABS AND CURB, STREET HARDWARE, WOOD POLES, STREET LIGHT AND TRAFFIC POLE FOUNDATIONS, HYDRANT FOUNDATION, SLABS, BUILDINGS, ETC.
4. CONTRACTOR TO OBTAIN NECESSARY DOT WORK PERMITS AND PERFORM ALL WORK IN ACCORDANCE WITH DOT REQUIREMENTS AND STANDARDS.
5. STRIP AND RESURFACE ROADWAY AS NOTED ON PLAN OR TO THE EXTENTS NECESSARY AS DIRECTED BY NYCDOT OR DOB. NYCDOT RESERVES THE RIGHT, UPON BPP INSPECTION, TO REQUIRE THE OWNER TO MILL AND RESURFACE ENTIRE STREET WIDTH.
6. ALIGN EXPANSION JOINTS FOR CURB EXPANSION JOINTS FOR SIDEWALK.
7. AS PER NYC DEPARTMENT OF PARKS, VACANT TREE PIT WILL BE REMOVED.
8. THE CONTRACTOR IS RESPONSIBLE FOR CREATING ALL REQUIRED SITE LOGISTICS PLANS, AND COORDINATING SAID PLANS AND ALL REQUIRED PERMITS WITH THE NEW YORK CITY OFFICE OF CONSTRUCTION MITIGATION AND COORDINATION (OCMC).
9. ADJUST ALL SURFACE FEATURES TO MATCH PROPOSED GRADES AS NECESSARY. CONTRACTOR SHALL COORDINATE THIS WORK WITH THE APPROPRIATE UTILITY OWNER(S), AS REQUIRED.
10. IN ORDER TO COMPLY WITH ADA REQUIREMENTS, THE CONTRACTOR IS REQUIRED TO BREAK THE TRANSVERSE GRADE OF SIDEWALKS SUCH THAT THERE SHALL BE A MINIMUM OF FIVE (5) FEET WIDTH OF SIDEWALK WITH A TRANSVERSE SLOPE NOT EXCEEDING TWO (2) PERCENT AND THE REMAINING SIDEWALK SLOPE NOT EXCEEDING FIVE (5) PERCENT.
11. "Dig Safely" Requirements in New York State for excavation on Long Island and five Boroughs of New York City, New York 811 must be called at 1-800-272-4480. For excavation elsewhere in New York State, Dig Safely New York must be called at 1-800-835-7962. Notifications for excavation work anywhere in the state can be made by dialing 811.

LEGEND

(A)	ASPHALT		SEPTIC TANK
(C)	CONCRETE		ITEM TO BE REMOVED
(G)	GRAVEL		EXISTING TREE TO BE REOMVED
(L)	LANDSCAPE AREA		PARKING SPACE
(C)	CONCRETE SIDEWALK	X	FENCE
W	WATER SERVICE	TC	TOP OF CURB
F	FIRE SERVICE	BC	BOTTOM OF CURB
T&C	TELEPHONE & CABLE	FF	FINISHED FLOOR ELEVATION
EMK	ELECTRIC	TS	TOP OF STEP
GMK	NATURAL GAS	BS	BOTTOM OF STEP
D	STORM DRAIN	20	EXISTING CONTOUR
	LIGHT	20	PROPOSED CONTOUR
	VALVE	+20.0	SPOT ELEVATION
S	SEWER MANHOLE		CLEARENCE LIMIT LINE
D	DRAIN MANHOLE		PEDESTRIAN RAMP

	DRAINAGE INLETS
	SANITARY LEACHING POOL
	SANITARY EXPANSION LEACHING POOL
	GREASE TRAP
	SIGN
	HANDICAPPED PARKING SPACE
	INLET PROTECTION
	CONSTRUCTION ENTRANCE
	CONCRETE CURB
T	TRANSFORMER

ROADWAY/SIDEWALK REPAIR LEGEND

PROPOSED ASPHALT PAVEMENT RESTORATION IN RIGHT-OF-WAY

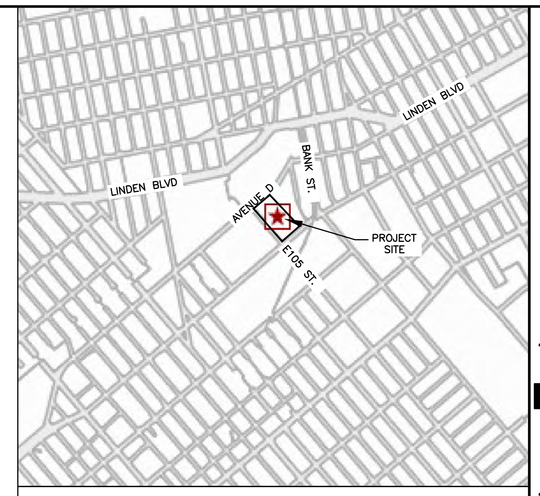
PROPOSED 6" THICK CONCRETE SIDEWALKS PER NYCDOT H-1045 TYPE I

PROPOSED STEEL FACED CONCRETE CURB

PROPERTY LINE

GRAPHIC SCALE

5 0 5 10 20



KEY MAP

SCALE 1"=1000'

GENERAL REQUIREMENTS

1. ALL DESIGN, MATERIALS CONSTRUCTION METHODS AND WORKMANSHIP SHALL COMPLY WITH THE FOLLOWING PUBLICATIONS OF THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION (DOT): STANDARD SPECIFICATIONS, STANDARD DETAILS OF CONSTRUCTION; RULES OF THE INFRASTRUCTURE COMPONENTS.
2. ALL NON-STANDARD MATERIALS AND CONSTRUCTION PROCEDURES SHALL BE SPECIFICALLY APPROVED IN WRITING BY DOT.
3. ANY WORK NOT COMPLYING WITH THE REQUIREMENTS OF THE DOT SHALL BE REMOVED AND REPLACED.
4. THIS PLAN SHALL BE VALID FOR THE ISSUANCE OF CONSTRUCTION PERMITS FOR A PERIOD OF ONE YEAR FROM THE DATE OF APPROVAL OR SELF-CERTIFICATION, AS APPLICABLE.
5. ALL SIDEWALK AND STREET AREAS CONSTRUCTED UNDER THIS PLAN SHALL REMAIN OPEN TO THE PUBLIC AT ALL TIMES.

ISSUANCE OF PERMITS

6. NO SIDEWALK, CURB OR ROADWAY WORK SHALL BE DONE WITHOUT A PERMIT FROM THE BOROUGH HIGHWAY SUPERINTENDENT, APPLICATION SHALL BE MADE THREE DAYS BEFORE STARTING CONSTRUCTION. THE CONTRACTOR SHALL HAVE ALL REQUIRED INSURANCE COVERAGE ON FILE.
7. NO WORK ON DRAINAGE STRUCTURE SHALL BE DONE WITHOUT A PERMIT FROM THE BOROUGH OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.
8. ANY VAULT WORK AT THE SITE SHALL BE DONE AS PER THE APPLICABLE RULES OF THE DOT AND THE DEPT. OF BUILDINGS.

CONSTRUCTION ACTIVITY

9. A CONSTRUCTION PLAN SHOWING MAINTENANCE AND PROTECTION OF TRAFFIC, INCLUDING PLACEMENT OF SIDEWALK BRIDGES, BARRIERS AND SIGNAGE, SHALL BE SUBMITTED TO THE BOROUGH HIGHWAY OFFICE BEFORE CONSTRUCTION BEGINS.
10. NO SIDEWALK SHALL BE CLOSED WITHOUT A PERMIT. PEDESTRIAN AND TRAFFIC SAFETY SHALL BE PROTECTED AT ALL TIMES. ROADWAY CLOSING SHALL BE AS DIRECTED.
11. THE SITE SHALL BE MAINTAINED IN A CLEAN AND SAFE CONDITION.

FINAL SIGNOFF

12. PERMITS SHALL BE PRESENTED FROM ALL PUBLIC AGENCIES AND UTILITIES HAVING OWNERSHIP OF STRUCTURES RELOCATED OR REMOVED DURING CONSTRUCTION.
13. ALL PAVEMENT MAKINGS INCLUDING THERMOPLASTIC LANE DIVIDERS, REMOVED DURING CONSTRUCTION SHALL BE REPLACED IN KIND TO THE BUREAU OF TRAFFIC STDS.
14. ALL EXISTING CATCH BASINS ON SITE SHALL BE CLEANED AND MADE OPERABLE..
15. ALL DAMAGE CAUSED BY CONSTRUCTION ON THIS PROJECT OUTSIDE THE PROJECT LIMITS SHALL BE REPAIRED AS DIRECTED.
16. THE ROADWAY SHALL BE PAVED TO THE REQUIREMENTS OF THE DOT AND AS DIRECTED.

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www.hirani@group.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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NYC DDC Department of Design and Construction

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10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

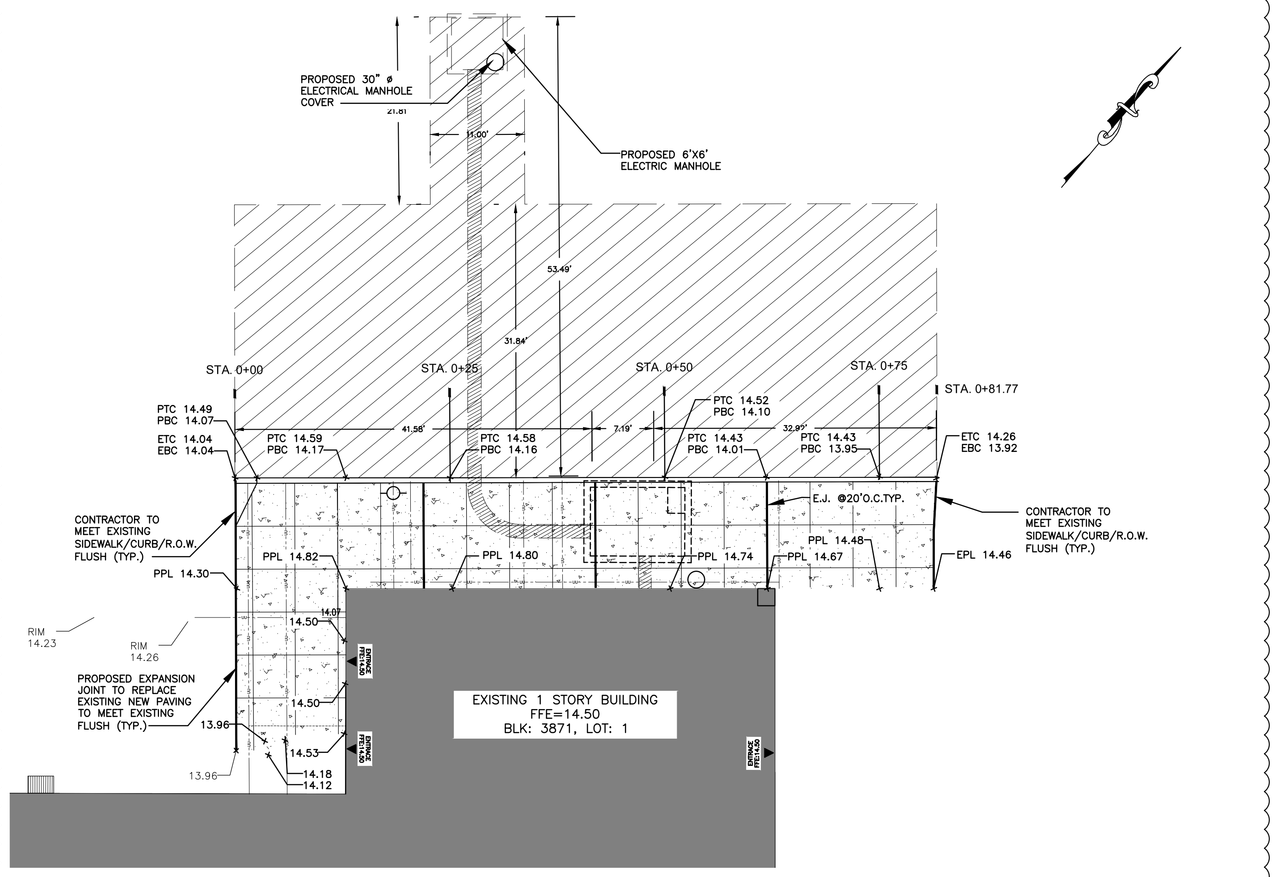
DRAWING TITLE:

BUILDERS PAVEMENT PLAN TITLE SHEET

SEAL & SIGNATURE

STATE OF NEW YORK · PAUL LOSCALZO · LICENSED PROFESSIONAL ENGINEER · 097647

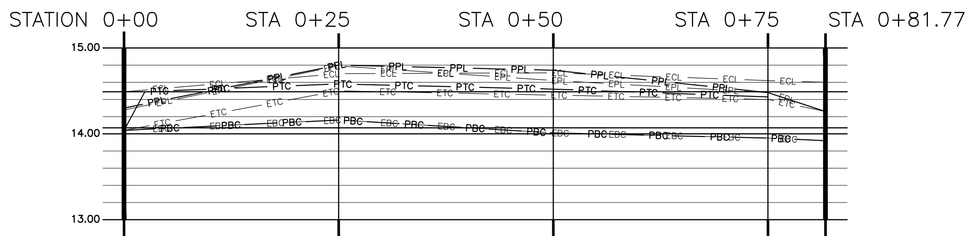
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PROJECT NO:	DDC30000
DRAWN BY:	YI
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DRAWING NUMBER:	BPP-001.00

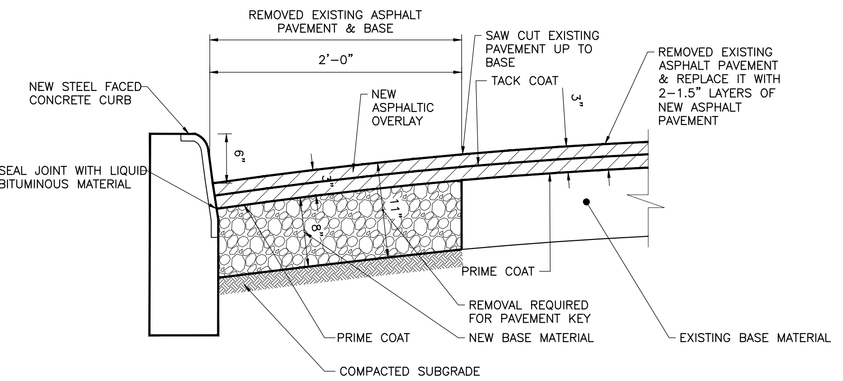


AVENUE D PLAN VIEW

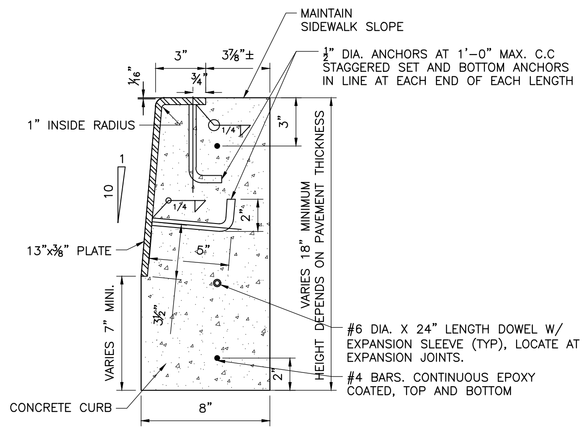
1

	0+00		0+25		0+50		0+75		0+81.77	
PROPOSED GUTTER SLOPE (%)		0.5%		-0.6%		-0.2%		-0.1%		0.4%
PROPOSED ROADWAY SLOPE (%)		-0.4%		0.0%		-0.4%		-0.1%		0.3%
PROPOSED CURB REVEAL (IN)		0.0		5.0		6.1		5.8		4.1
PROPOSED SIDEWALK SLOPE (%)		2.0%		1.7%		1.7%		0.4%		1.5%
	EPL 14.28		EPL 14.79		EPL 14.62		EPL 14.48		EPL 14.46	
	PPL 14.30		PPL 14.80		PPL 14.74		PPL 14.48		PPL 14.46	
	ETC 14.04		ETC 14.50		ETC 14.45		ETC 14.40		ETC 14.26	
	EBC 14.04		EBC 14.16		EBC 14.01		EBC 13.95		EBC 13.92	
	PTC 14.04		PTC 14.58		PTC 14.52		PTC 14.43		PTC 14.26	
	PBC 14.04		PBC 14.16		PBC 14.01		PBC 13.95		PBC 13.92	
	ECL 14.79		ECL 14.70		ECL 14.71		ECL 14.62		ECL 14.60	

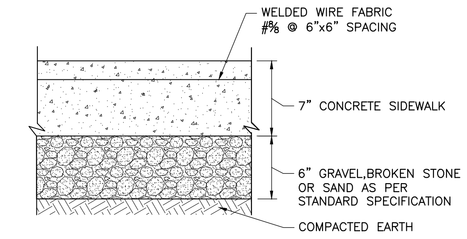




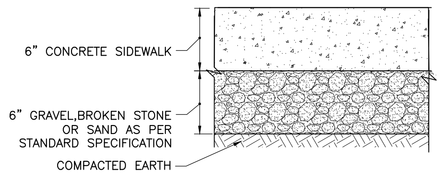
PAVEMENT KEY - TYPE C
NOT TO SCALE



STEEL FACED CONCRETE CURB DETAIL
NOT TO SCALE



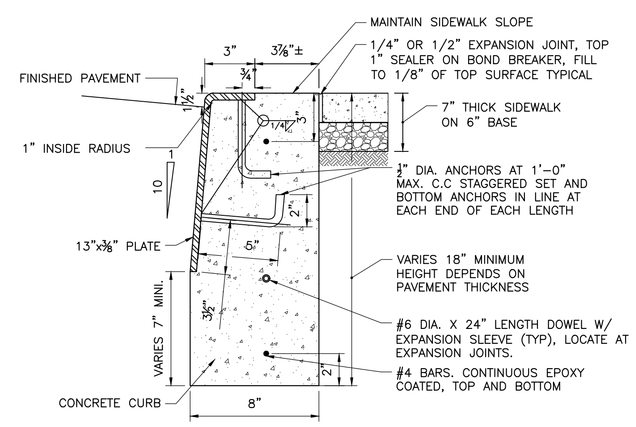
TYPE III - SIDEWALK IN DRIVEWAY WITH WELDED WIRE FABRIC
NOT TO SCALE
H-1045



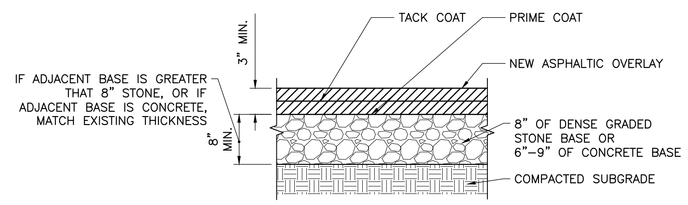
TYPE I - SIDEWALK, OUTSIDE DRIVEWAY AND CORNER QUADRANTS
NOT TO SCALE
H-1045

SIDEWALK NOTES:

1. ALL MATERIALS AND CONSTRUCTION METHODS USED ARE TO CONFORM TO SECTION #4.13 OF THE NYC DEPARTMENT STANDARD HIGHWAY SPECIFICATION.
2. WELDED WIRE FABRIC, WHERE SPECIFIED, SHALL BE ASTM DESIGNATION A-185, GAUGE #8X8 AT 6"X8" SPACING, AND CONFORM TO SECTION #2.25 OF THE NYCDOT STANDARD HIGHWAY SPECIFICATION.



STEEL FACED DROP CURB DETAIL
NOT TO SCALE
H-1015

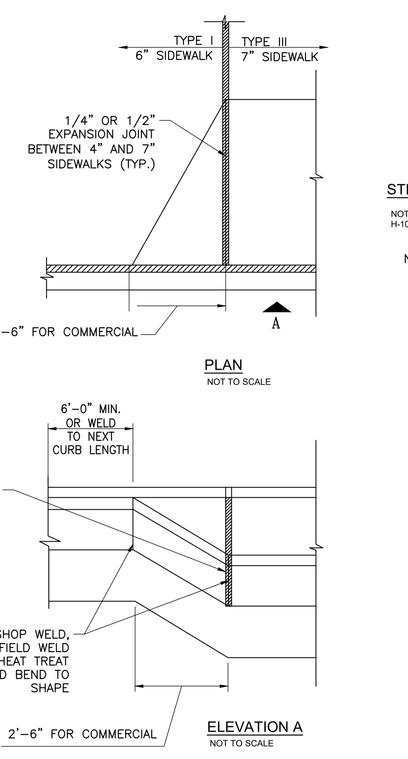


SECTION

ROADWAY ASPHALTIC CONCRETE PAVEMENT DETAIL
NOT TO SCALE
H-1010

ROADWAY/SIDEWALK REPAIR LEGEND

PROPOSED ASPHALT PAVEMENT RESTORATION IN RIGHT-OF-WAY	
PROPOSED 6" THICK CONCRETE SIDEWALKS PER NYCDOT H-1045 TYPE I	
PROPOSED STEEL FACED CONCRETE CURB	
PROPOSED GRADE AT PROPERTY LINE	PPL 14.00
PROPOSED TOP AND BOTTOM OF CURB ELEVATION	PTC 14.00 BTC 13.50
PROPERTY LINE	
PROPOSED PROPERTY LINE GRADE	PPL
EXISTING PROPERTY LINE GRADE	EPL
PROPOSED TOP OF CURB GRADE	PTC
EXISTING TOP OF CURB GRADE	ETC
PROPOSED BOTTOM OF CURB GRADE	PBC
EXISTING BOTTOM OF CURB GRADE	EBC
EXISTING CENTER LINE GRADE	ECL

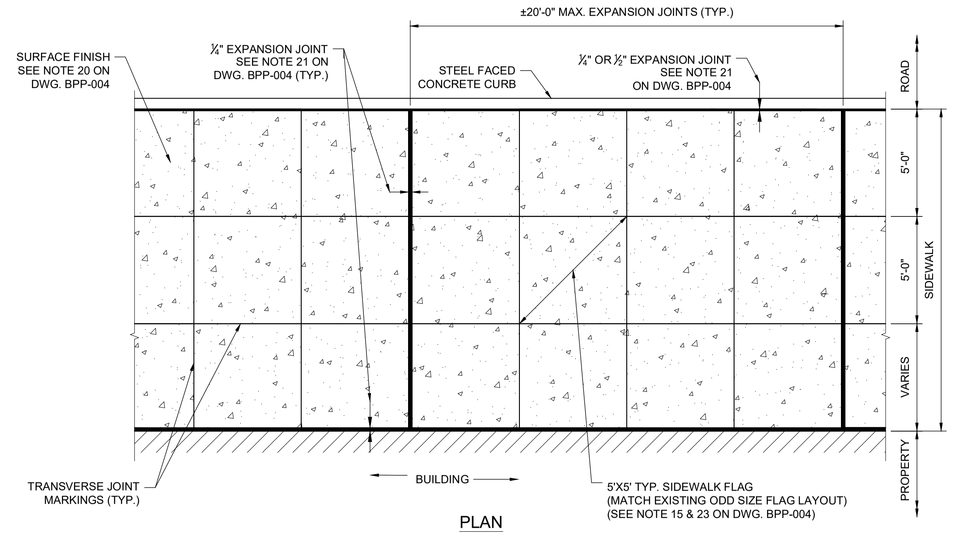


PLAN
NOT TO SCALE

ELEVATION A
NOT TO SCALE

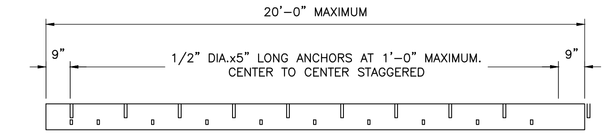
STEEL FACED DROP CURB DRIVEWAY - DETAILS
NOT TO SCALE
H-1015

NOTE: STEEL FACED DROP CURB DRIVEWAYS SHALL BE CONSTRUCTED AS INDICATED ON THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION HIGHWAY DRAWING H-1015 "STEEL FACED DROP CURB DRIVEWAYS"

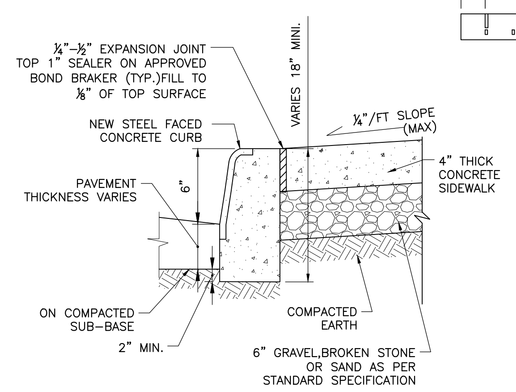


PLAN

CONCRETE SIDEWALK DETAIL
NOT TO SCALE



ELEVATION-STEEL FACING
NOT TO SCALE
H-1010



TYPICAL SECTION
NOT TO SCALE
H-1010

NOTES:

1. EXPANSION JOINT IN THE STEEL CURB FACING AND CONCRETE BACKING SHALL BE AT MAXIMUM SPACING OF 24 FEET.
2. THE EXPANSION JOINTS OF THE CURB AND STEEL CURB FACING SHALL LINE UP WITH THE EXPANSION JOINTS OF THE CONCRETE SIDEWALK, WHEREVER POSSIBLE.
3. NO PIECE OF STEEL CURB FENCING HAVING LESS THAN TWO WELDED DOWELS MAY BE INSTALLED UNLESS IT IS WELDED TO THE ADJACENT STEEL CURB FACING.
4. 1/2" DIA. X 6" HEADED ANCHORS STUDS (GRANULAR OR SOLID FLUX FILLED) MAY BE SUBSTITUTED.
5. STRUCTURAL STEEL (A.S.T.M. DESIGNATION A36).
6. SURFACE TO BE CLEANED AND PAINTED AS PER NYCDOT STANDARD HIGHWAY SPECIFICATION, SECTION 2.13 COLOR OF TOP COAT SHALL BE GRAY AS APPROVED BY THE ENGINEER.
7. WHERE TWO PIECES OF STEEL CURB FACING ARE JOINTED BUT NOT WELDED, TWO (2) ONE-HALF (½") INCH RODS, TWENTY FOUR (24") INCHES LONG SHALL BE INSERTED INTO THE CONCRETE BACKING, ONE-HALF (½) THE LENGTH AT EACH SIDE OF THE JOINT.
8. CONCRETE TO BE CLASS B-32, AIR ENTRAINED.
9. CONCRETE CURB-VERTICAL FACE SHALL BE ACCEPTABLE FOR CORNER CURBS PROVIDING THE ENDS ARE WARPED TO FORM A TRANSITION WITH ADJACENT BATTERED FACE CURBS.

STEEL FACED CONCRETE CURB STEEL FACING TYPE D - DETAIL (VANDERBILT & TOMPKINS AVE)
NOT TO SCALE
H-1010

GRAPHIC SCALE
10 0 10 20 40

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
-	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
BUILDERS PAVEMENT PLAN PROFILE & DETAILS

SEAL & SIGNATURE
STATE OF NEW YORK · RAFAEL PAUL LOSCALZO · LICENSED PROFESSIONAL ENGINEER · 097841

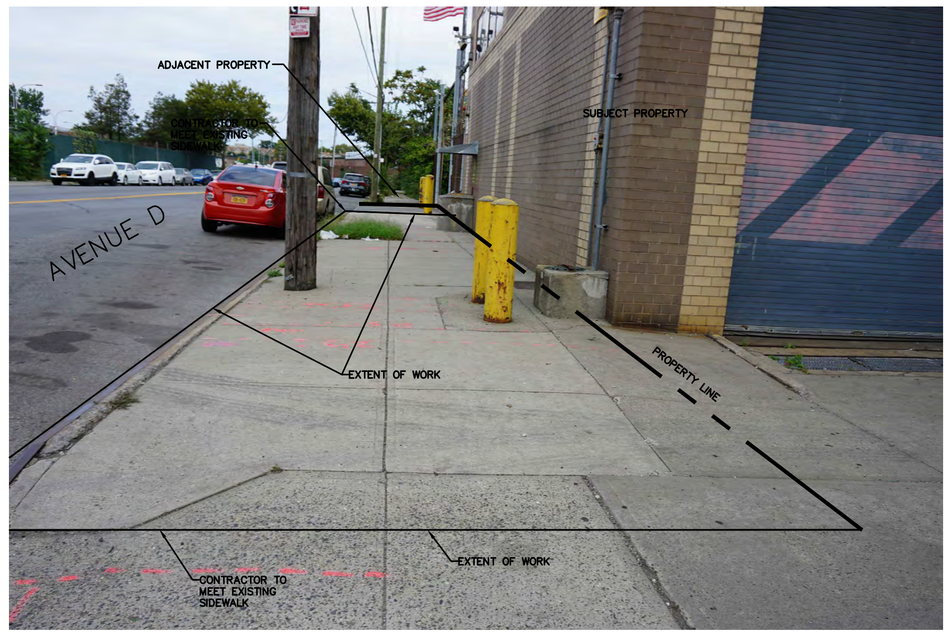
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PROJECT NO:	DDC30000
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CHECKED BY:	DL
DRAWING NUMBER:	BPP-002.00



SOUTH SIDE OF AVENUE D – EAST TO WEST



SOUTH SIDE OF AVENUE D – EAST TO WEST



SOUTH SIDE OF AVENUE D – EAST



SOUTH SIDE OF AVENUE D – EAST



SOUTH SIDE OF AVENUE D – EAST



SOUTH SIDE OF AVENUE D – WEST

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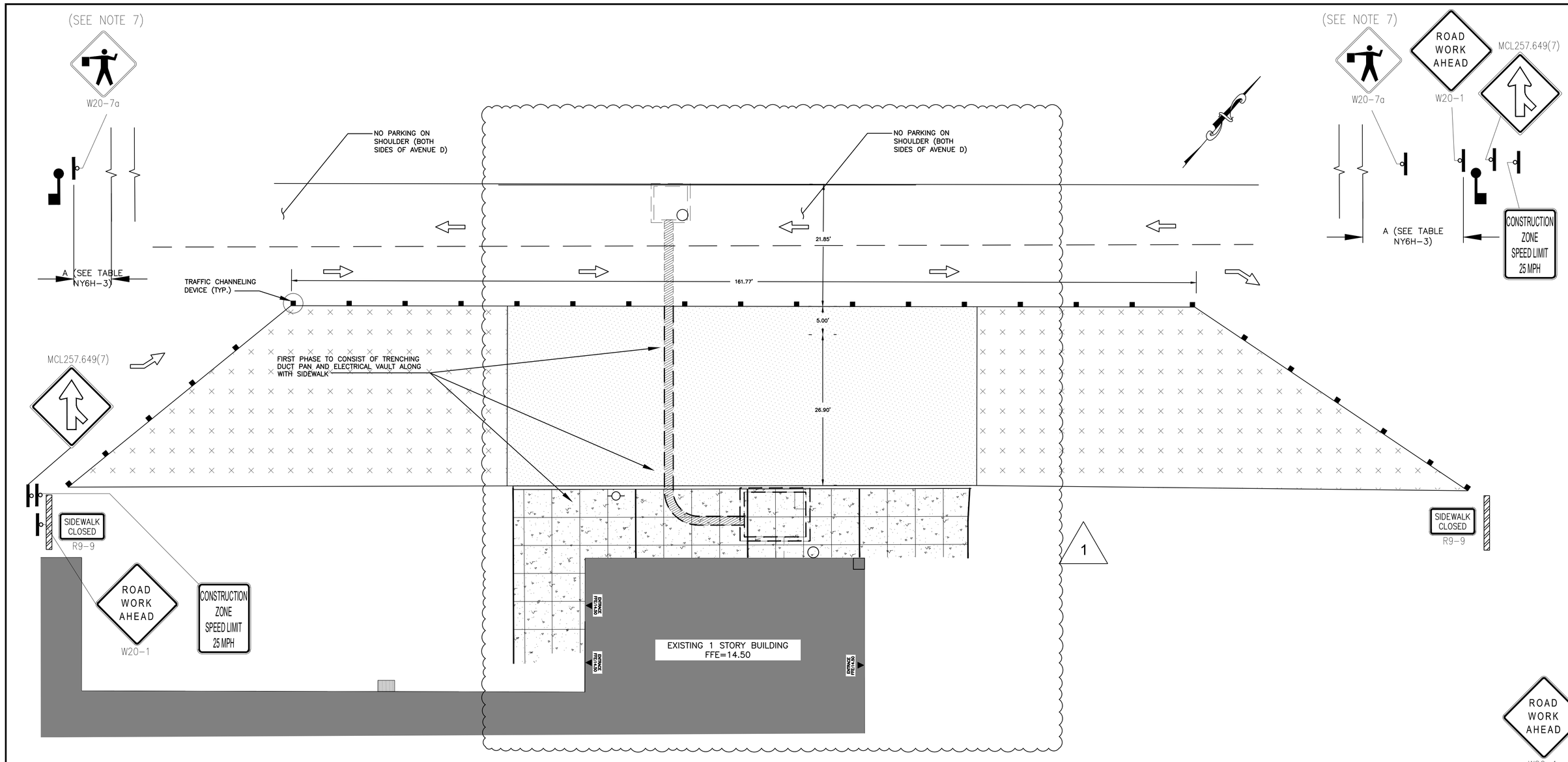
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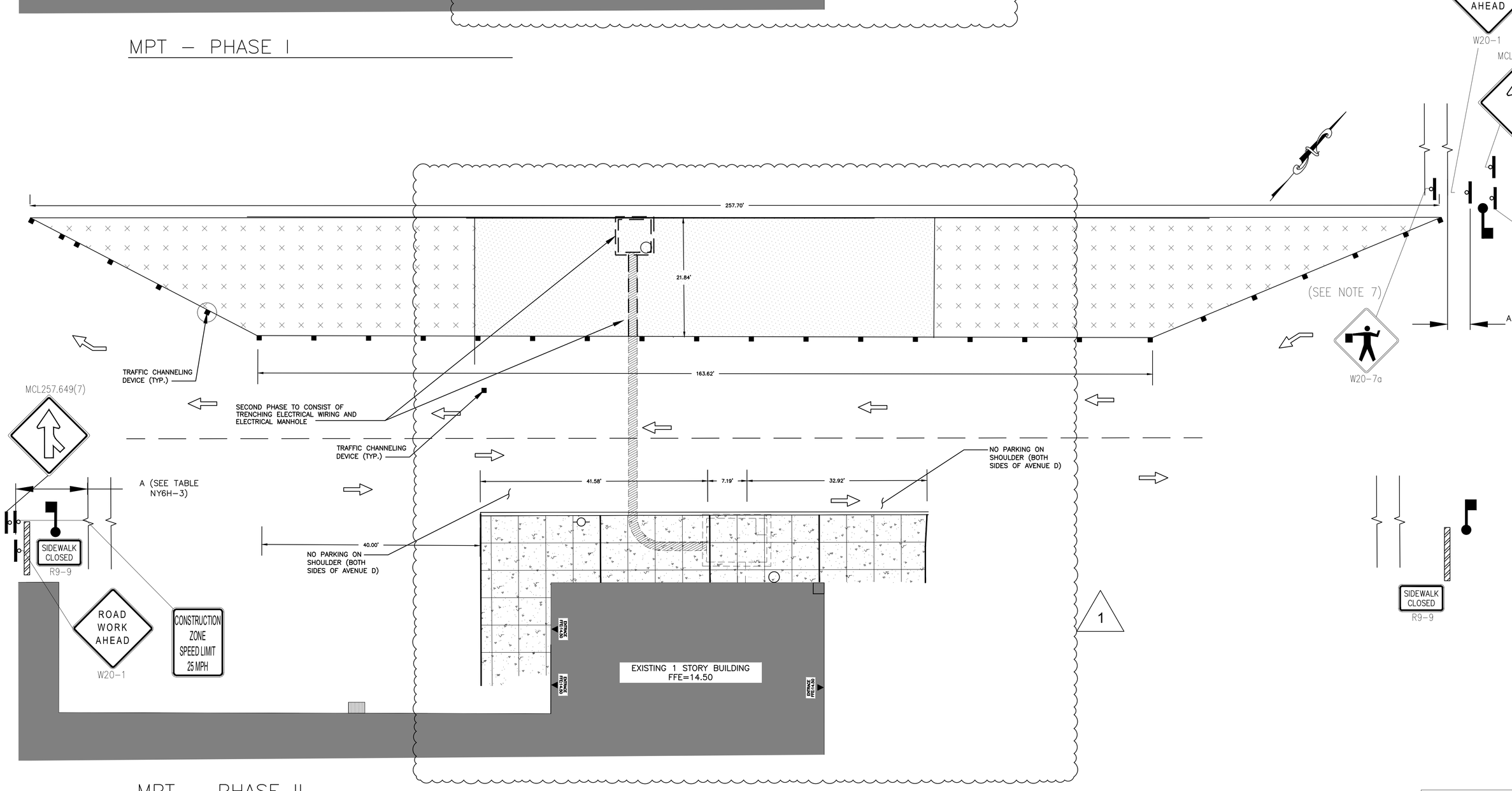
BUILDERS PAVEMENT PLAN PHOTOS

SEAL & SIGNATURE
STATE OF NEW YORK DANIEL PAUL LOSCALZO 097841 LICENSED PROFESSIONAL ENGINEER

DATE:	09/30/2019
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CHECKED BY:	DL
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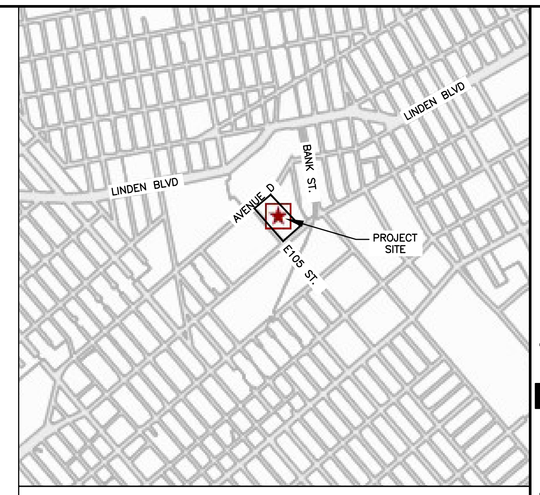


MPT – PHASE I



MPT – PHASE II

NYC DOT TABLE NY6H-3 ADVANCE WARNING SIGN SPACING			
ROAD TYPE	A (FT)	B (FT)	C (FT)
URBAN (<30 MPH)	100	100	100
URBAN (35-40 MPH)	200	200	200
URBAN (>45 MPH)	350	350	350



KEY MAP

SCALE 1"=1000'

CROSSWALK CLOSURE & PEDESTRIAN DETOUR NOTES:

1. WHEN CROSSWALKS OR OTHER PEDESTRIAN FACILITIES ARE CLOSED OR RELOCATED, TEMPORARY FACILITIES SHALL BE DETECTABLE AND SHALL INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH THE FEATURES PRESENT IN THE EXISTING FACILITY.
2. CURB PARKING SHALL BE PROHIBITED FOR AT LEAST 50' IN ADVANCE OF THE MID-BLOCK CROSSWALK.
3. PEDESTRIAN TRAFFIC SIGNAL DISPLAYS CONTROLLING CLOSED CROSSWALKS SHOULD BE COVERED OR DEACTIVATED.
4. FOR NIGHTTIME CLOSURES, FLASHING WARNING LIGHTS SHALL BE USED ON BARRICADES SUPPORTING SIGNS AND CLOSING SIDEWALKS.
5. AREA SHALL BE RECONSTRUCTED TO BE ACCESSIBLE TO PEDESTRIANS.
6. ALL MID-BLOCK CROSSINGS REQUIRE THE APPROVAL OF THE REGIONAL DIRECTOR OR HIS/HER DESIGNEE.
7. TYPE II BARRICADES MAY BE SUBSTITUTED FOR TYPE III BARRICADES AS PER 619 STANDARD SPECIFICATIONS.

LEGEND:

- AREA OF SIDEWALK REPLACEMENT (WORK ZONE)
- AREA OF ROAD TO BE MILL (WORK ZONE)
- TEMPORARY ILLUMINATED BARRICADE
- CHANNELIZING DEVICE
- FLAGGER
- FLAG TREE
- SIGN (TEMPORARY)
- MID-BLOCK CROSSING (TEMPORARY)
- DIRECTION OF TRAFFIC (TEMPORARY)
- EXISTING DIRECTION OF TRAFFIC
- EXISTING WOOD UTILITY POLE WITH STREET LIGHT
- EXISTING TRAFFIC SIGNAL POST
- EXISTING UTILITY ACCESS COVER W – WATER S – SANITARY OR COMBINED SEWER D – STORM SEWER G – GAS E – ELECTRIC T – TELEPHONE
- EXISTING CATCH BASIN
- EXISTING VALVE BOX/VALVE W – WATER G – GAS
- EXISTING HYDRANT
- NEW SIAMESE CONNECTION
- NEW VALVE BOX/VALVE W – WATER
- EXISTING STANCHION WITH TRAFFIC SIGNAL/PEDESTRIAN SIGNAL
- EXISTING WOOD UTILITY POLE WITH: T– TRAFFIC SIGNAL S– PEDESTRIAN SIGNAL

ROADWAY/SIDEWALK REPAIR LEGEND

- AREA OF ROAD TO BE MILLED (WORK ZONE)
- PROPOSED AREA TO BE CLOSED OFF TO TRAFFIC
- PROPOSED STEEL FACED CONCRETE CURB
- PROPOSED GRADE AT PROPERTY LINE — PPL 14.00
- PROPOSED TOP AND BOTTOM OF CURB ELEVATION — PTC 14.00, BTC 13.50
- PROPERTY LINE
- PROPOSED PROPERTY LINE GRADE — PPL
- EXISTING PROPERTY LINE GRADE — EPL
- PROPOSED TOP OF CURB GRADE — PTC
- EXISTING TOP OF CURB GRADE — ETC
- PROPOSED BOTTOM OF CURB GRADE — PBC
- EXISTING BOTTOM OF CURB GRADE — EBC
- EXISTING CENTER LINE GRADE — ECL

FLAGGING OPERATION NOTES

1. AT SIGNALIZED INTERSECTIONS, SIGNALS SHALL BE TURNED OFF FOR ANY FLAGGING OPERATIONS, UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.
2. WHEN PAVED SHOULDERS HAVING A WIDTH OF 8' OR MORE ARE CLOSED, CHANNELIZING DEVICES SHALL BE USED TO CLOSE THE SHOULDER IN ADVANCE TO DELINEATE THE BEGINNING OF THE WORK AREA AND DIRECT VEHICULAR TRAFFIC TO REMAIN IN THE TRAVEL WAY.
3. CHANNELIZING DEVICE SPACING (CENTER TO CENTER) SHALL NOT EXCEED 40' IN THE ACTIVE WORK SPACE.
4. THE END ROAD WORK SIGN (G20-2) SHALL BE PLACED A MAXIMUM OF 500' PAST THE END OF THE WORK SPACE.
5. WHERE DIRECTED BY THE ENGINEER, A BUFFER SPACE SHALL BE PROVIDED IN ORDER TO LOCATE THE ONE-LANE, TWO-WAY TRAFFIC TAPER PRIOR TO ANY HORIZONTAL OR VERTICAL CURVE, IN ORDER TO PROVIDE ADEQUATE SIGHT DISTANCE FOR THE FLAGGERS AND/OR A QUEUE OF STOPPED VEHICLES.
6. THE FLAG TREE SHALL BE LOCATED ON THE SHOULDER, AT APPROXIMATELY * THE DISTANCE BETWEEN THE FLAGGER SIGN (W20-7a) AND THE FLAGGER.
7. FLAGGER SIGN (W20-7a) AND ONE LANE ROAD AHEAD SIGN (W20-4) SHALL BE REMOVED, COVERED OR TURNED AWAY FROM ROAD USERS WHEN FLAGGING OPERATIONS ARE NOT OCCURRING.
8. FLAGGER AND FLAG TREE SHALL BE ILLUMINATED TO LEVEL II ILLUMINATION DURING NIGHT TIME OPERATIONS.
9. ALL FLAGGERS SHALL USE 24" (MIN.) OCTAGON SHAPED STOP/SLOW PADDLES HAVING 6' STAFF.
10. ADDITIONAL FLAGGERS SHALL BE LOCATED AT ALL INTERSECTIONS AND COMMERCIAL DRIVEWAYS LOCATED WITHIN OR NEAR THE ACTIVE WORK AREA.
11. CENTERLINE CHANNELIZING DEVICES ARE OPTIONAL AND MAY BE ELIMINATED WHERE SPACE CONSTRAINTS EXIST.
12. NO WORK ACTIVITY, EQUIPMENT, OR STORAGE OF VEHICLES, OR MATERIAL SHALL OCCUR WITHIN THE BUFFER SPACE AT ANY TIME.
13. FOR PEDESTRIAN DETOUR ACCOMMODATIONS REFER TO THE STANDARD SHEETS TITLED "SIDEWALK DETOUR OR DIVERSION" AND "CROSSWALK CLOSURE AND PEDESTRIAN DETOUR".

GRAPHIC SCALE

10 0 10 20 40

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BUILDERS PAVEMENT PLAN MPT

SEAL & SIGNATURE

STATE OF NEW YORK – DANIEL PAUL LOCATELLI – LICENSED PROFESSIONAL ENGINEER – 097841

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CHECKED BY:	DL
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ABBREVIATIONS

-#-	
2WAY	TWO-WAY
3WAY	THREE-WAY
-A-	
A/C	AIR CONDITION
AD	ACCESS DOOR
ADA	AMERICAN DISABILITIES ACT
ADDL	ADDITIONAL
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AIA	AMERICAN INSTITUTE OF ARCH
AMP	AMPHERE
ARCH	ARCHITECT
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATION & AIR CONDITIONING ENGINEERS
AUTO	AUTOMATIC
AVG	AVERAGE
-B-	
BDD	BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTOR
BLDG	BUILDING
BLW	BELOW
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT/ HOUR
-C-	
CAP	CAPACITY
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CFSD	COMBINATION FIRE/SMOKE DAMPER
CH	CHILLER
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CL	CENTER LINE
CLG	CEILING
CNDS	CONDENSATE DRAIN
CO2	CARBON DIOXIDE
COND	CONDENSER
CONN	CONNECT
CP	CONTROL PANEL
CV	CONSTANT VOLUME
CWP	CONDENSER WATER PUMP
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
-D-	
(D)	EXISTING TO BE DEMOLISHED
DB	DRY BULB
dB	DECIBEL
DBA	UNIT OF SOUND LEVEL
DBT	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DIA	DIAMETER
DMPR	DAMPER
DN	DOWN
DPT	DEW POINT TEMPERATURE
DR	DRAIN
DWG	DRAWING
-E-	
(E)	EXISTING TO REMAIN
(ER)	EXISTING TO BE RELOCATED
EA	EXHAUST AIR
EAR	EXHAUST AIR REGISTER
EAT	ENTERING AIR TEMPERATURE
EDBT	ENTERING DRY BULB TEMP
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EL	ELEVATION
ELEC	ELECTRIC / ELECTRICAL
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
EWBT	ENTERING WET BULB TEMP
EWT	ENTERING WATER TEMP
EXH	EXHAUST
EXIST	EXISTING
-F-	
F	FAHRENHEIT
FA	FACE/FREE AREA
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FIN FLR	FINISH FLOOR
FLA	FULL LOAD AMPERES
FLEX	FLEXIBLE
FLTR	FILTER
FPM	FEET PER MINUTE
FT	FEET / FOOT
-G-	
GAL	GALLON
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GRL	GRILLE
-H-	
HD	HEAD
HORIZ	HORIZONTAL
HP	HORSEPOWER
HVAC	HEATING, VENTILATION, & AIR CONDITIONING
HWP	HOT WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HZ	HERTZ
-I-	
ID	INSIDE DIMENSION
IN	INCH
INSUL	INSULATION
-K-	
KW	KILOWATT
-L-	
(L)	LINED
LAT	LEAVING AIR TEMPERATURE
LBS	POUND(S)
LH	LATENT HEAT
LTH	LENGTH
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
-M-	
MAT	MIXED AIR TEMPERATURE
MAX	MAXIMUM
MBTUH	THOUSAND BTU PER HOUR
MECH	MECHANICAL
MED	MEDIUM
MER	MECHANICAL EQUIPMENT ROOM
MFR	MANUFACTURER
MHP	MOTOR HORSEPOWER
MIN	MINIMUM OR MINUTE
MOT	MOTOR
MS	MOTOR STARTER
MTD	MEAN TEMP DIFFERENCE
MTGHT	MOUNTING HEIGHT
MU	MAKE UP AIR UNIT
-N-	
NIC	NOT IN CONTRACT
NO	NUMBER
NTS	NOT TO SCALE
-O-	
OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER
-P-	
PD	PRESSURE DROP/DIFFERENCE
PERF	PERFORATED
PH	PHASE
PLBG	PLUMBING
POS	POSITIVE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
-R-	
(R)	REMOVE
R	RISE
RA	RETURN AIR
RAG	RETURN AIR GRILLE
REC	RECESSED
REFR	REFRIGERATION
REG	REGISTER
REM	REMOVABLE
REQD	REQUIRED
RFGT	REFRIGERANT
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RLA	RUNNING LOAD AMPERES
RLL	REFRIGERANT LIQUID LINE
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RSL	REFRIGERANT SUCTION LINE
-S-	
SA	SUPPLY AIR
SAR	SUPPLY AIR REGISTER
SD	SMOKE DAMPER/DETECTOR
SEER	SEASONAL ENERGY EFFICIENCY
SF	SUPPLY FAN
SF	SQUARE FOOT (FEET)
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SS	STAINLESS STEEL
STRUC	STRUCTURAL
-T-	
T	THROAT
TA	TRANSFER AIR
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TSTAT	THERMOSTAT
TYP	TYPICAL
-V-	
V	VOLT
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
-W-	
W	WIDTH
W/	WITH
W/O	WITHOUT
WB	WET BULB
WMS	WIRE MESH SCREEN
WP	WEATHERPROOF

SYMBOLS LEGEND

ANNOTATION

- TITLE MARK DETAIL OR PLAN NO. - 1 FOUND IN M-201 (1 / M-201 SCALE: NTS)
- DETAIL REFERENCE DETAIL NO. - 1 FOUND IN M-501 (1 / M-501)
- SECTION MARK SECTION NO. - 1 FOUND IN M-501 (1 / M-501)
- SHEET KEYNOTE (1)
- REVISION CLOUD (DELTA 1) (1)
- DETAIL BOUNDARY B DETAIL NO. - 2 (2 / M-201)
- EQUIPMENT TAG; DESIGNATION AC, DESIGNATION NUMBER 1-1 (AC 1-1)
- LOUVER IN DOOR MINIMUM 1.0 SQ FT, FREE AREA (1.0 FA)
- POINT OF CONNECTION
- POINT OF DISCONNECTION

DUCT

- DUCTWORK (NEW)
- DUCTWORK (EXISTING) ((E))
- DUCTWORK (EXISTING TO BE DEMOLISHED) ((D))
- DUCTWORK WITH ACOUSTIC LINING
- DUCT UNDER POSITIVE PRESSURE
- DUCT UNDER NEGATIVE PRESSURE
- RISE IN DUCT (IN DIRECTION OF AIR FLOW) (UP)
- DROP IN DUCT (IN DIRECTION OF AIR FLOW) (DN)
- REHEAT COIL
- FLEX DUCT
- DUCT TRANSITION
- VANED ELBOW
- RADIUS ELBOW
- DUCT FITTING (SEE DETAILS)
- FLEXIBLE DUCT CONNECTION
- TRANSFER AIR BOOT (STRAIGHT) SEE SCHEDULE REQUIREMENTS
- TRANSFER AIR ELBOW WITH ACOUSTIC LINING
- SOUND ATTENUATOR (SA)
- ACCESS PANEL

DIFFUSERS

- CEILING SUPPLY DIFFUSER, TYPE A, THROW PATTERN 4-WAY, 100 CFM (CD-A / 100)
- CEILING RETURN REGISTER (GRILLE), TYPE A, 100 CFM (CR-A / 100)
- CEILING EXHAUST, TYPE A, 100 CFM (EG-A / 100)
- CEILING SUPPLY WITH BLANKING PLATE (3-WAY)
- EXISTING TO REMAIN
- EXISTING TO BE DEMOLISHED

- SIDEWALL SUPPLY DIFFUSER
- LINEAR SLOT DIFFUSER
- 12X6 WR 150 — 12"X6" SIDEWALL SUPPLY REGISTER, 150 CFM
- 12X6 WG 150 — 12"X6" SIDEWALL RETURN / EXHAUST REGISTER, 150 CFM
- ROUND SUPPLY DIFFUSER
- ROUND RETURN DIFFUSER
- FLOOR REGISTER (GRILLE)

VAV BOXES

- SINGLE DUCT VAV BOX
- SINGLE DUCT VAV BOX WITH ATTENUATOR
- SINGLE DUCT VAV WITH REHEAT
- SINGLE DUCT VAV BOX WITH REHEAT AND ATTENUATOR
- SHUT-OFF VAV BOX WITH HYDRONIC HEATING COIL AND OUTLET BOX

DAMPERS AND CONTROLS

- COMBINATION SMOKE/FIRE DAMPER AND ACCESS DOOR
- SMOKE DAMPER AND ACCESS DOOR
- BACK DRAFT DAMPER
- VOLUME DAMPER
- THERMOSTAT (T)
- SMOKE DECTOR (SD)
- CARBON MONOXIDE SENSOR (CO)

PIPING

- NEW PIPING (SEE ABBREVIATION FOR PIPE I.D.)
- (E) — EXISTING TO REMAIN
- (D) - - - EXISTING TO BE DEMOLISHED

VALVES

- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- FLOAT VALVE
- FUSIBLE LINK
- GATE VALVE
- GATE VALVE - OS&Y
- GLOBE VALVE
- MOTORIZED BALL VALVE
- PLUG VALVE
- PLUG SAFETY VALVE
- PRESSURE REDUCING VALVE
- RELIEF VALVE
- SOLENOID VALVE
- VALVED AND CAPPED OUTLET
- BACK FLOW PREVENTER (BFP)

FITTINGS

- ELBOW DOWN
- ELBOW DOWN TO TEE
- ELBOW UP
- END CAP
- TEE DOWN
- TEE UP
- UNION

GENERAL NOTES

1. WHERE THERE IS A DISCREPANCY BETWEEN THE DRAWINGS AND SPECIFICATIONS, NOTIFY THE ENGINEER PRIOR TO BID. FOR BIDDING PURPOSES THE MORE STRINGENT SHALL APPLY.
2. THE CONTRACTOR SHALL EXAMINE THE COMPLETE SET OF CONTRACT DOCUMENTS FOR ALL TRADES, AS ISSUED BY THE ARCHITECT AND REVIEW DIMENSIONS, SPACE REQUIREMENTS AND POINT OF CONNECTIONS TO ALL EQUIPMENT. MAKE ANY MINOR ADJUSTMENTS NECESSARY TO AVOID CONFLICTS WITH THE BUILDING STRUCTURE AND THE WORK OF OTHER TRADES.
3. UNLESS INSTRUCTED OTHERWISE. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES, AND FEES REQUIRED FOR INSTALLATION OF THE MECHANICAL WORK. FURNISH FINAL CERTIFICATE OF INSPECTION OR WRITTEN EVIDENCE OF ACCEPTANCE BY INSPECTION AUTHORITIES FOR ALL WORK INSTALLED.
4. REFER TO COMPLETE DRAWING PACKAGE FOR EXTENT OF CONSTRUCTION, AND EXACT LOCATION OF FIXTURES, EQUIPMENT, DEVICES , ETC.
5. CONTRACTOR SHALL COORDINATE WITH ALL TRADES TO ENSURE AN UNDERSTANDING OF THE COMPLETE SCOPE OF PROJECT PRIOR TO START OF WORK.
6. ALL EQUIPMENT & MATERIALS SHALL MATCH DESIGN SPECIFICATIONS AND MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS.
7. LOCATION OF DUCTWORK IS APPROXIMATE. ALL DRAWINGS AND LAYOUT ARE DIAGRAMMATIC TO SHOW DESIGN INTENT ONLY. CONTRACTOR TO COORDINATE ALL DUCTWORK AND PIPING WITH ALL OTHER WORK IF FIELD CONDITIONS DIFFER SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWINGS AND AFFECT WORK, INFORM ARCHITECT IMMEDIATELY BEFORE PROCEEDING WITH THAT AREA.
8. INSTALL FIRE DAMPER OR COMBINATION FIRE/SMOKE DAMPER ON ALL DUCTS PENETRATING FIRE RATED ENCLOSURES AND PARTITIONS, AND RATED CEILINGS OF HORIZONTAL EXITS. THE CONTRACTOR SHALL INTERLOCK ALL COMBINATION FIRE/SMOKE DAMPERS WITH LISTED AREA TYPE SMOKE DETECTORS IN THE BUILDING FIRE LIFE SAFETY SYSTEM. VERIFY WITH LIFE SAFETY SYSTEM CONTRACTOR. SEE FIRE ALARM SPECIFICATION AND SMOKE CONTROL NOTES FOR ADDITIONAL INFORMATION.
9. AIR HANDLING UNITS AND FAN COIL UNITS SHALL BE PROVIDED WITH DUCT SMOKE DETECTORS AT THE UNITS OUTLET WHEN THE UNITS CAPACITY EQUALS 2000 CFM OR GREATER.
10. A MINIMUM OF 36" CLEAR WORKING SPACE, NOT LESS THAN 30" WIDE, SHALL BE MAINTAINED IN FRONT OF ALL SWITCHES, OVERCURRENT DEVICES AND ELECTRIC CONTROL COMPONENTS. THE WORKING SPACE SHALL BE CLEAR AND EXTEND FROM THE GRADE, FLOOR, OR PLATFORM TO MINIMUM OF 6'-8" FT. WHERE THE ELECTRICAL EQUIPMENT EXCEEDS 6-1/2 FT IN HEIGHT, THE MINIMUM HEADROOM SHALL NOT BE LESS THAN THE HEIGHT OF THE EQUIPMENT
11. A MINIMUM OF 24" CLEAR WORKING SPACE SHALL BE PROVIDED IN FRONT OF THE ACCESS PANELS.
12. THE SMOKE DETECTORS LOCATED AT AIR MOVING EQUIPMENT SHALL SHUT DOWN ALL AIR HANDLING EQUIPMENT VIA THE LIFE SAFETY SYSTEM. WHEN SMOKE IS DETECTED AT EQUIPMENT, ALL OTHER AIR MOVING EQUIPMENT LOCATED IN OR CONNECTED TO COMMON PLENUM OR SMOKE ZONE SHALL SHUT DOWN.
13. ALL ELECTRICAL CONTROLS FOR THE SMOKE CONTROL SHALL BE RATED FOR SUCH USE.
14. PROVIDE ACCESS PANELS (MATCH WALL OR CEILING RATING) IN ALL WALLS OR CEILINGS WHERE ACCESS TO DAMPERS, CONTROLS, ETC ARE REQUIRED BY CODE. COORDINATE LOCATIONS WITH ARCHITECT.
15. CONTRACTOR SHALL NOTE THE CRITICAL SPACE AVAILABLE ABOVE CEILINGS. PROVIDE TRANSITION PIECES AT CROSSOVERS, UNDER BEAMS, OVER/UNDER PIPES, AS REQUIRED TO ACCOMMODATE DUCTS WITHIN SPACE AVAILABLE, PROVIDING EQUIVALENT DUCT SIZE TO THE DIAMETER SHOWN. COORDINATE CLOSELY WITH OTHER TRADES TO REDUCE NECESSITY OF TRANSITIONS TO A MINIMUM. NO ADDITIONAL COSTS WILL BE PAID FOR ANY REQUIRED TRANSITIONS OR OTHER SPECIAL CHANGE SHAPE PIECES. ALL DUCTWORK SHALL BE SUPPORTED AND SEISMICALLY RESTRAINED PER THE CALIFORNIA BUILDING CODES AND SMACNA STANDARD.
16. THERE SHALL BE NO PIPING AND/OR DUCTWORK RUN THROUGH ELECTRICAL ROOMS UNLESS THAT DUCTWORK AND/OR PIPING IS SERVING THAT ELECTRICAL SPACE.
17. ALL FLEXIBLE DUCT CONNECTIONS TO AIR DISTRIBUTION DEVICES TO BE MIN. 5'-0" ACOUSTICAL FLEX DUCT PER SPECIFICATIONS.
18. LOCATE EXISTING REINFORCING STEEL UTILIZING ANY SUITABLE METAL DETECTION SYSTEM. DO NOT CUT ANY EXISTING STEEL REINFORCEMENT. SHIFT ANCHOR OR CORE TO MISS THE REBAR.
19. BOLTS MUST BE INSTALLED TO AVOID DAMAGING EXISTING STEEL REINFORCEMENT. IN CASE OF CONFLICT, ADJUST BOLT LOCATION, ALLOWING FOR 1" CONCRETE COVER BETWEEN REBAR AND BOLT.
20. PROVIDE TRANSFER DUCTS AS NECESSARY ABOVE CEILING FOR RETURN AIR PATH TO AIR HANDLING EQUIPMENT SERVING THAT SPACE. REFER TO DETAILS FOR TRANSFER DUCT SIZES.
21. ALL EXISTING SUPPLY, RETURN & TOILET EXHAUST AIR DUCTWORK SHALL BE CLEANED.
22. ALL NEW WALL MOUNTED DEVICES SHALL BE PER ADA ACCESSIBILITY GUIDELINES.

ENERGY CONSERVATION NOTES

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2016 NEW YORK CITY ENERGY CONSERVATION CODE.

SHEET INDEX

NO.		SCALE
M-001.00	MECHANICAL SYMBOLS, ABBREVIATIONS AND NOTES	NONE
DM-101.00	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17	3/32"=1'-0"
DM-102.00	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17	3/32"=1'-0"
DM-103.00	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18	3/32"=1'-0"
DM-104.00	MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18	3/32"=1'-0"
DM-105.00	MECHANICAL 2ND FL DEMOLITION PART PLAN-DISTRICT 17	3/32"=1'-0"
DM-106.00	MECHANICAL 2ND FL DEMOLITION PART PLAN-DISTRICT 18	3/32"=1'-0"
DM-107.00	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17	3/32"=1'-0"
DM-108.00	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17	3/32"=1'-0"
DM-109.00	MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18	3/32"=1'-0"
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M-110.00	MECHANICAL ROOF PART PLAN-DISTRICT 18	3/32"=1'-0"
M-501.00	MECHANICAL DETAILS	NONE
M-502.00	MECHANICAL DETAILS	NONE
M-503.00	MECHANICAL DETAILS	NONE
M-701.00	MECHANICAL SCHEDULES	NONE
M-702.00	MECHANICAL SCHEDULES	NONE
M-801.00	BMS SYMBOLS, ABBREVIATIONS, AND NOTES	NONE
M-802.00	BMS DETAILS	NONE
M-803.00	BMS DETAILS	NONE
M-804.00	BMS DETAILS	NONE
M-805.00	BMS DETAILS	NONE

NYC BUILDING DEPARTMENT NOTES

A. A CONTROLLED INSPECTION AND TEST WILL BE CONDUCTED BY A LICENSED ENGINEER HAVING NOT LESS THAN (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF VENTILATING SYSTEMS. THE TEST WILL SHOW COMPLIANCE WITH THE BUILDING ADMINISTRATIVE CODE AND REFERENCE STANDARDS. CONTRACTOR SHALL SUBMIT TO SYSKA HENNESSY GROUP FOR APPROVAL.

B. THE LICENSED PROFESSIONAL ENGINEER OR ARCHITECT OR OTHER PERSON NOT HAVING LESS THAN (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF VENTILAING SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE A CERTIFICATE AND REPORT OF TEST THAT THE SYSTEM COMPLIES WITH THE APPLICABLE LAWS.

C. A STATEMENT WILL BE FILED BY THE OWNER IN POSSESSION THAT THE VENTILATING SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION DURING NORMAL OCCUPANCY OF THE PREMISES.

D. ALL FIRE DAMPERS ARE TO BE OF TYPE APPROVED BY THE BOARD OF FIRE UNDERWRITERS. WHERE ENTERING OR LEAVING SHAFTS, FIRE DAMPERS ARE TO BE EQUIVALENT TO WALL RATING.

E. THE LATEST RULES OF BUILDING CODES ARE TO BE COMPLIED WITH.

F. SMOKE AND FIRE DETECTION SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH THE BUILDING ADMINISTRATIVE CODE AND REFERENCE STANDARDS.

G. ALL EQUIPMENT SUPPLIED FOR THIS PROJECT REQUIRING NYC APPROVAL SHALL HAVE MEA OR BSA APPROVAL NUMBERS.

H. ALL MECHANICAL SYSTEM PIPING SUPPORTS SHALL BE INSTALLED IN ACCORDANCE WITH CHAPTER 3, SECTION 305 (2014 NYC MECHANICAL CODE).

I. ALL CONDENSED LIQUID BYPRODUCT DRAIN SYSTEMS PROVIDED FOR MECHANICAL SYSTEM EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH CHAPTER 3, SECTION 307 (2014 NYC MECHANICAL CODE).

J. ALL REFRIGERANT PIPING SHALL BE INSTALLED IN ACCORDANCE WITH CHAPTER 11, SECTION 1107 (2014 NYC MECHANICAL CODE).

K. ALL MECHANICAL EQUIPMENT, HYDRONIC / STEAM PIPING SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH CHAPTER 12 (2014 NYC MECHANICAL CODE).

L. CONTRACTOR SHALL PREPARE A CERTIFICATE OF TEST IN ACCORDANCE WITH 2014 NYC MECHANICAL CODE (REF. CHAP. 11, SECTION 1108.4) UPON THE COMPLETION OF WORK RELATING TO REFRIGERATION EQUIPMENT INSTALLATION.

M. THE DESIGN AND INSTALLATION OF MECHANICAL EQUIPMENT VIBRATION ISOLATION SHALL BE IN ACCORDANCE WITH 2014 NYC MECHANICAL CODE (REF. CHAP. 3, SECTION 301.1, CHAP. 9, SECTION 928.3)

N. ALL WORK PERFORMED BY CONTRACTOR SHALL BE IN ACCORDANCE WITH SECTION 608 OF THE 1990 US CLEAN AIR ACT (AMENDED: 58FR28660, 59 FR 42950, 59 FR 55912) AND TITLE 40 CFR, PART 82, SUBPART F FOR THE REQUIREMENTS TO SAFELY HANDLE / DISPOSE CLASS I AND CLASS II REFRIGERANTS. IN THE EVENT OF ACCIDENTAL DISCHARGE OF REFRIGERANT, CONTRACTOR SHALL FOLLOW PROCEDURES FOR REPORTING RELEASE OF HAZARDOUS MATERIALS IN ACCORDANCE WITH 2014 NYC FC (REF. SECTION 606.13) AND ALL OTHER APPLICABLE NY STATE AND FEDERAL REGULATIONS.

BUILDING DEPARTMENT APPROVAL NOTE:
THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTER SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

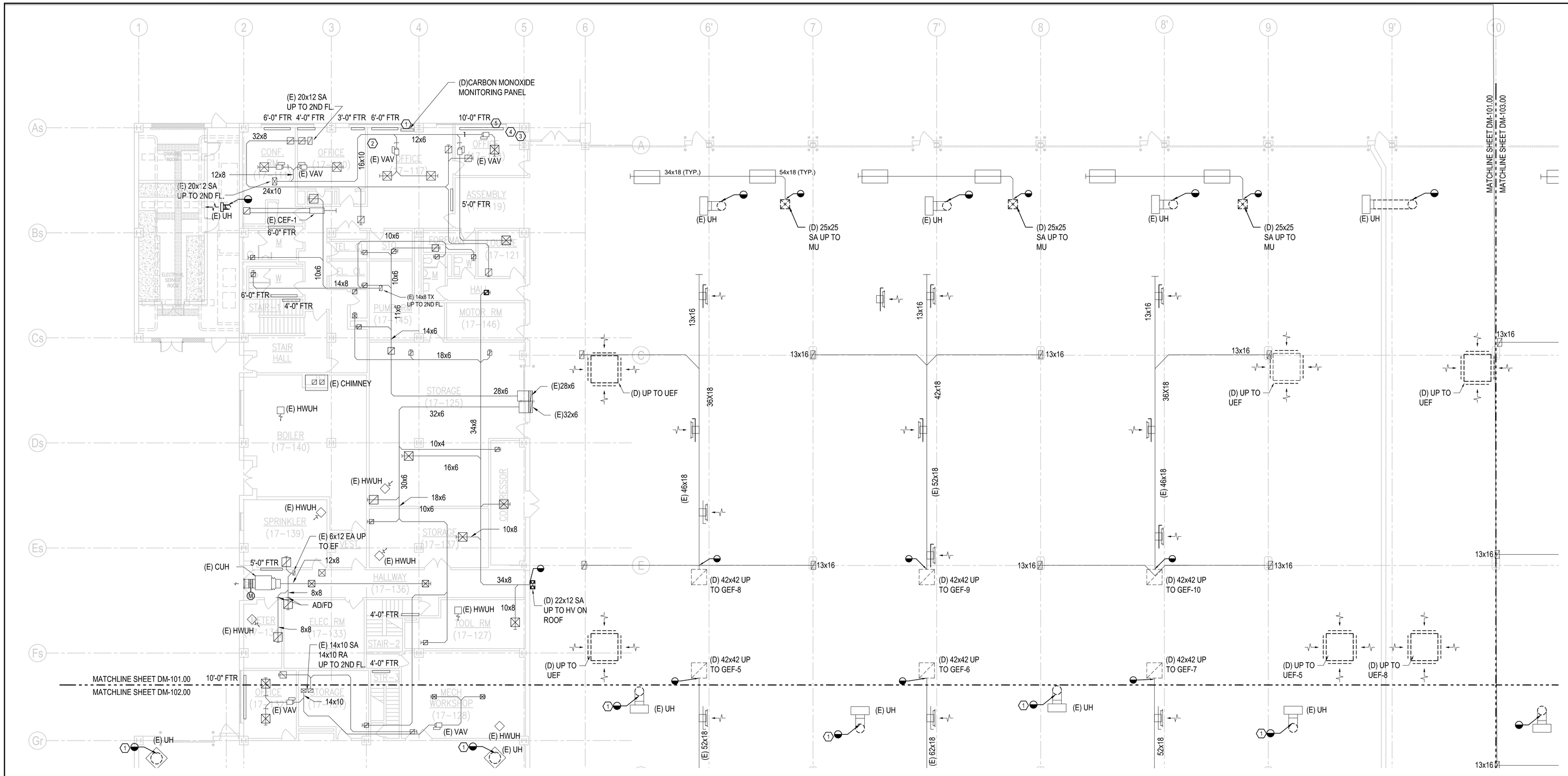
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DRAWING TITLE:
MECHANICAL SYMBOLS, ABBREVIATIONS AND NOTES

SEAL & SIGNATURE
STATE OF NEW YORK — SCOTT WITH FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

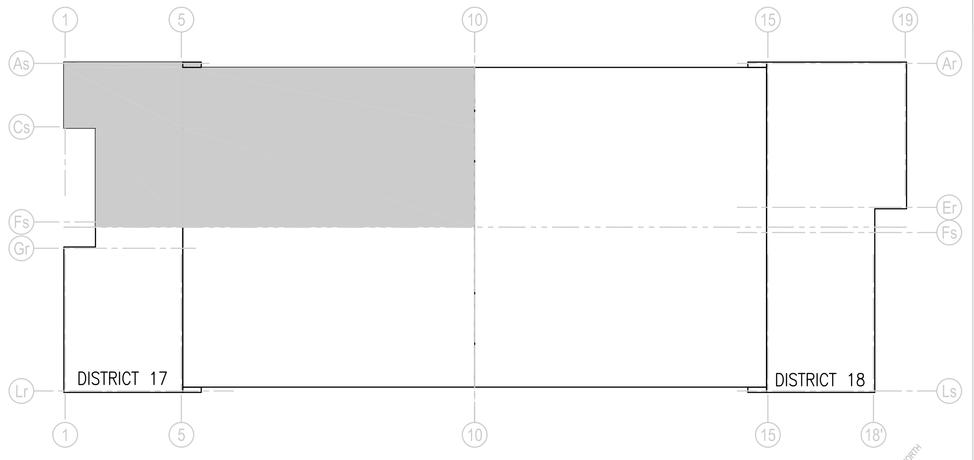
DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: SL
CHECKED BY: SL
DRAWING NUMBER:
M-001.00

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1 1ST FL MECHANICAL DEMOLITION PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE EXISTING GAS FIRED UNIT HEATERS FLUE AND PROVIDE NEW FLUE VENT.
2. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED RISER DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS SHOWN ON PLAN.
3. IN OFFICE AREA, ALL VAV BOXES AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS. VAV BOXES SHALL BE RE-BALANCE.
4. IN OFFICE AREA, ALL CABINET UNIT HEATERS (CUH) AND CABINET EXHAUST FANS (CEF) AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
5. ALL SUPPLY, EXHAUST, RETURN DIFFUSERS AND GRILLES SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
6. IN OFFICE AREA, ALL HOT WATER UNIT HEATER AND PARAMETER FIN TUBE RADIATOR SHALL REMAIN.

SHEET KEYNOTES

1. DISCONNECT AND REMOVE CARBON MONOXIDE MONITORING SYSTEM IN ENTIRETY. DEMOLITION SCOPE INCLUDES BUT NOT LIMITED TO REMOVAL OF THE CO MONITORING PANEL, ALL INTER CONNECTED CO SENSING DEVICES, ALL ELECTRICAL/CONTROL CONDUITS AND WIRING WHETHER SPECIFICALLY SHOWN OR NOT.
2. DISCONNECT AND REMOVE EXISTING CONTROL SYSTEM SERVING MAKE UP AIR UNITS/ H&V UNITS IN ENTIRETY. REMOVE CONTROL PANEL, ALL INTER CONNECTED SENSORS, THERMOSTATS ETC., ALL ELECTRICAL/CONTROL CONDUITS AND WIRING WHETHER SPECIFICALLY SHOWN OR NOT.
3. DISCONNECT AND REMOVE EXISTING CONTROL PANEL SERVING ROOFTOP AC UNITS (TRANE PANEL) ALONG WITH INTERCONNECTED WIRING AND CONDUIT. HONEYWELL CONTROLS SERVING VAVS SHALL REMAIN.
4. DISCONNECT AND REMOVE EXISTING SMOKE CONTROL SYSTEM IN ENTIRETY. REMOVE CONTROL PANEL, ALL INTER CONNECTED DEVICES, ALL ELECTRICAL/CONTROL CONDUITS AND WIRING WHETHER SPECIFICALLY SHOWN OR NOT.
5. THE CONTRACTOR SHALL PROVIDE PROTECTION OF THE PERIMETER FINNED-TUBE RADIATOR ENCLOSURES, AT THE COMPLETION OF DEMOLITION, VACUUM-CLEAN THE INTERIOR OF THE ENCLOSURE.

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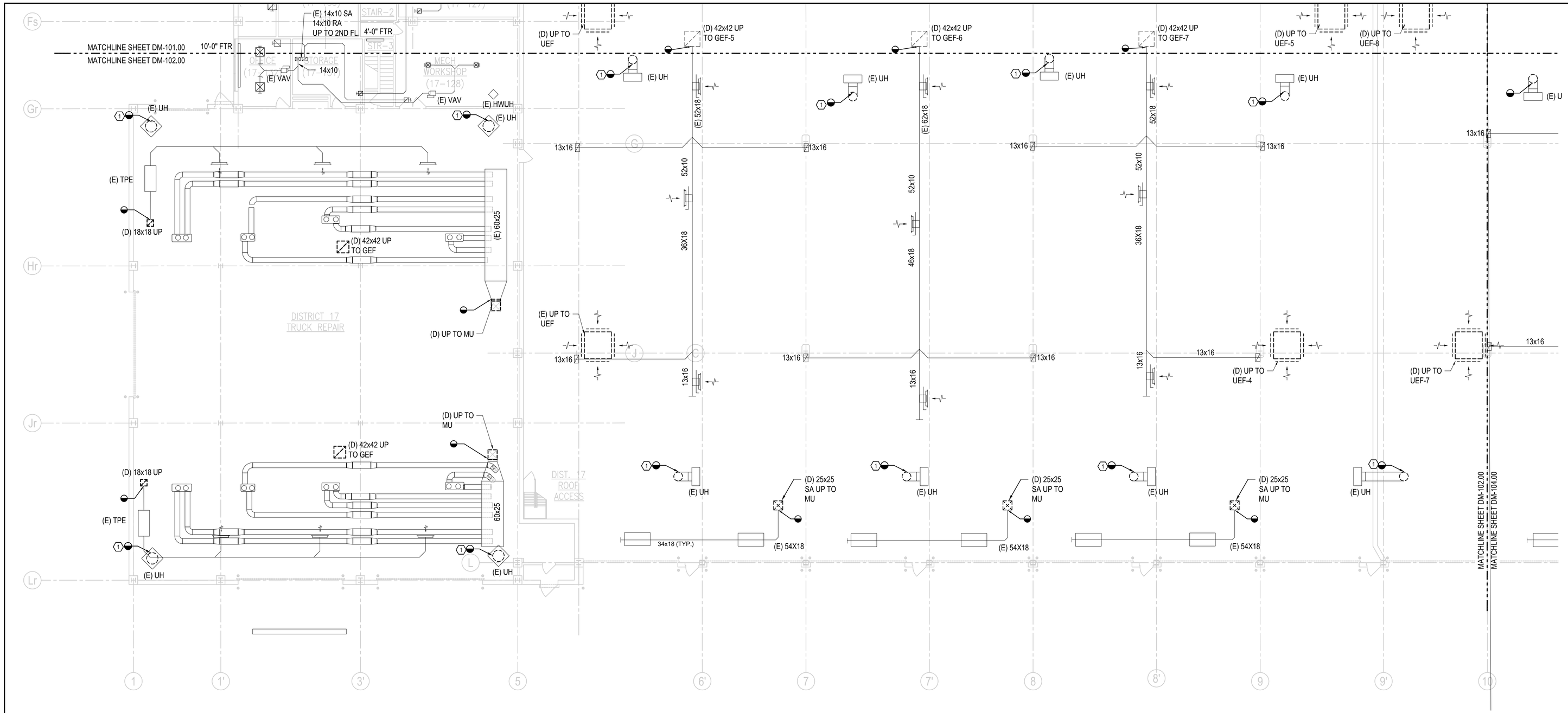
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DRAWING TITLE:
MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH TITTEL — 074116 — PROFESSIONAL ENGINEER

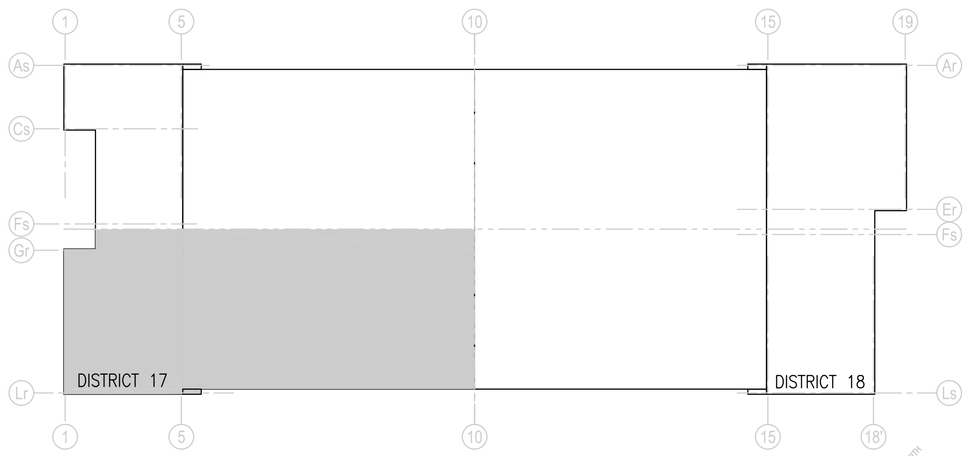
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1 1ST FL MECHANICAL DEMOLITION PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS SHOWN ON PLAN.
2. IN OFFICE AREA, ALL VAV BOXES AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.VAV BOXES SHALL BE RE-BALANCE.
3. IN OFFICE AREA, ALL CABINET UNIT HEATERS (CUH) AND CABINET EXHAUST FANS (CEF) AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
4. ALL SUPPLY, EXHAUST, RETURN DIFFUSERS AND GRILLES SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
5. IN OFFICE AREA, ALL HOT WATER UNIT HEATER AND PARAMETER FIN TUBE RADIATOR SHALL REMAIN.

SHEET KEYNOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE EXISTING GAS FIRED UNIT HEATERS FLUE VENT AND PROVIDE NEW FLUE VENT. REFER TO DETAILS IN M-501.00 FOR FLUE POINT OF CONNECTION.

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DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

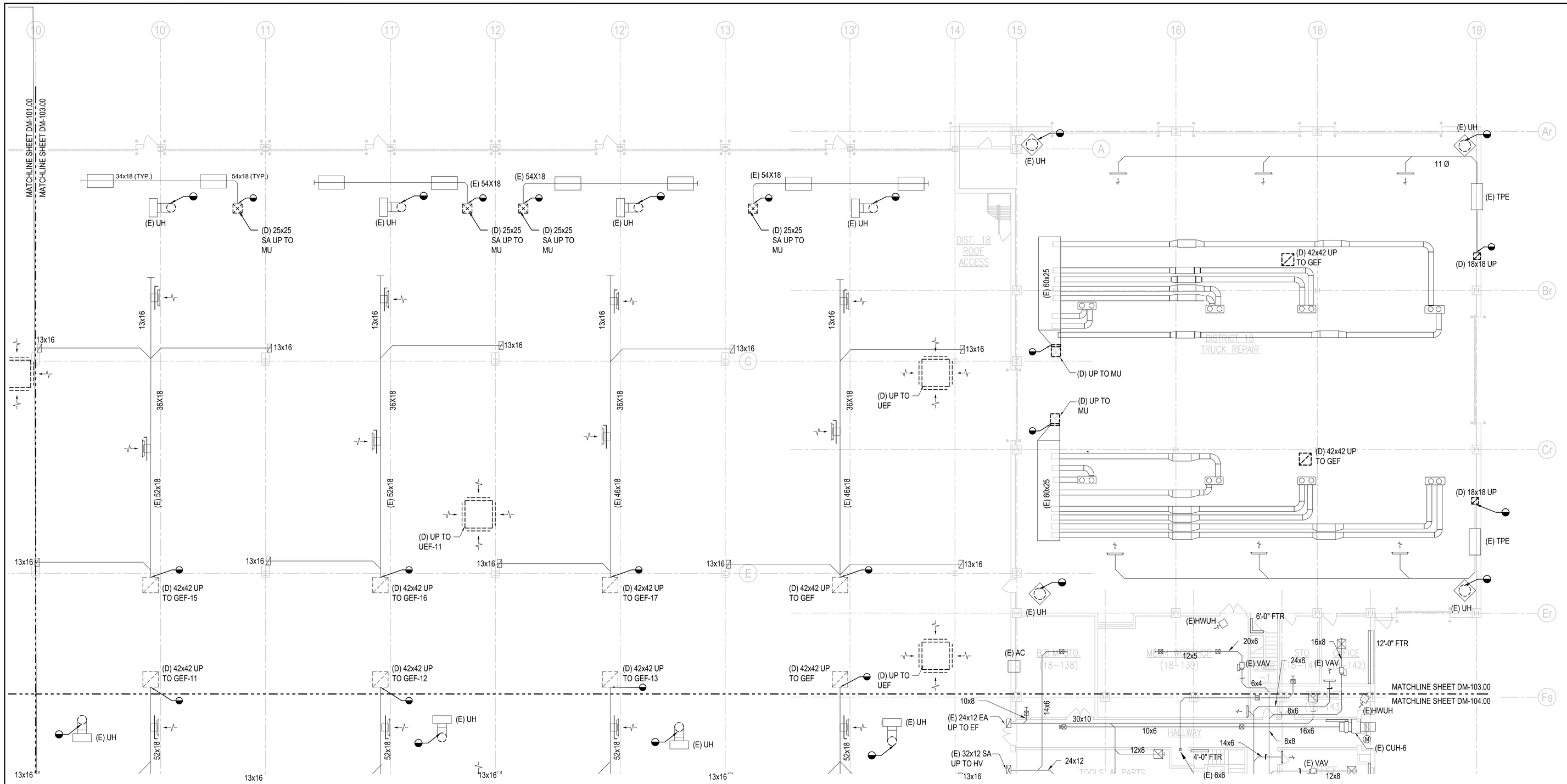
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DRAWING TITLE:
MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTA · 074116 · LICENSED PROFESSIONAL ENGINEER

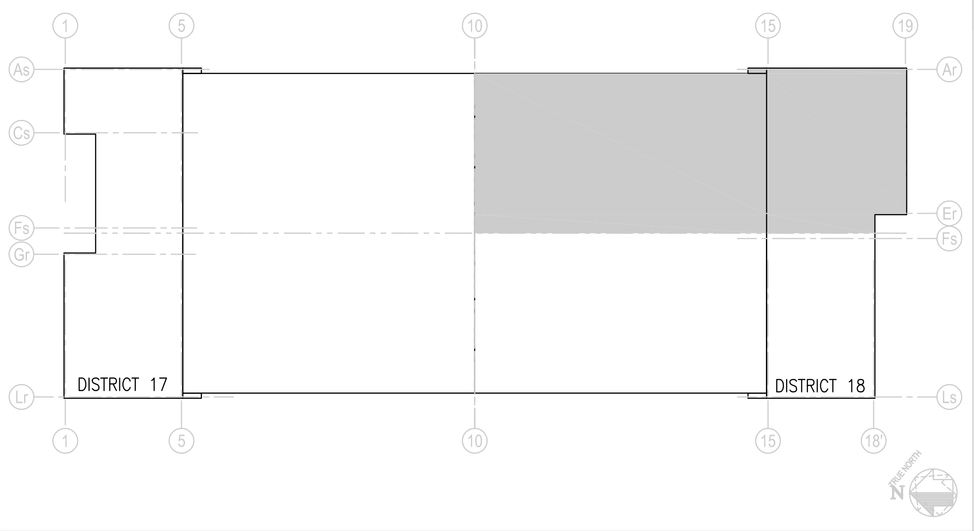
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CHECKED BY:	HG
DRAWING NUMBER:	DMM-102.00

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1 1ST FL MECHANICAL DEMOLITION PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE EXISTING GAS FIRED UNIT HEATERS FLUE AND PROVIDE NEW FLUE VENT.
2. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS SHOWN ON PLAN.
3. IN OFFICE AREA, ALL VAV BOXES AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.VAV BOXES SHALL BE RE-BALANCE.
4. IN OFFICE AREA, ALL CABINET UNIT HEATERS (CUH) AND CABINET EXHAUST FANS (CEF) AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
5. ALL SUPPLY, EXHAUST, RETURN DIFFUSERS AND GRILLES SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
6. IN OFFICE AREA, ALL HOT WATER UNIT HEATER AND PARAMETER FIN TUBE RADIATOR SHALL REMAIN.

SHEET KEYNOTES

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PROJECT
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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

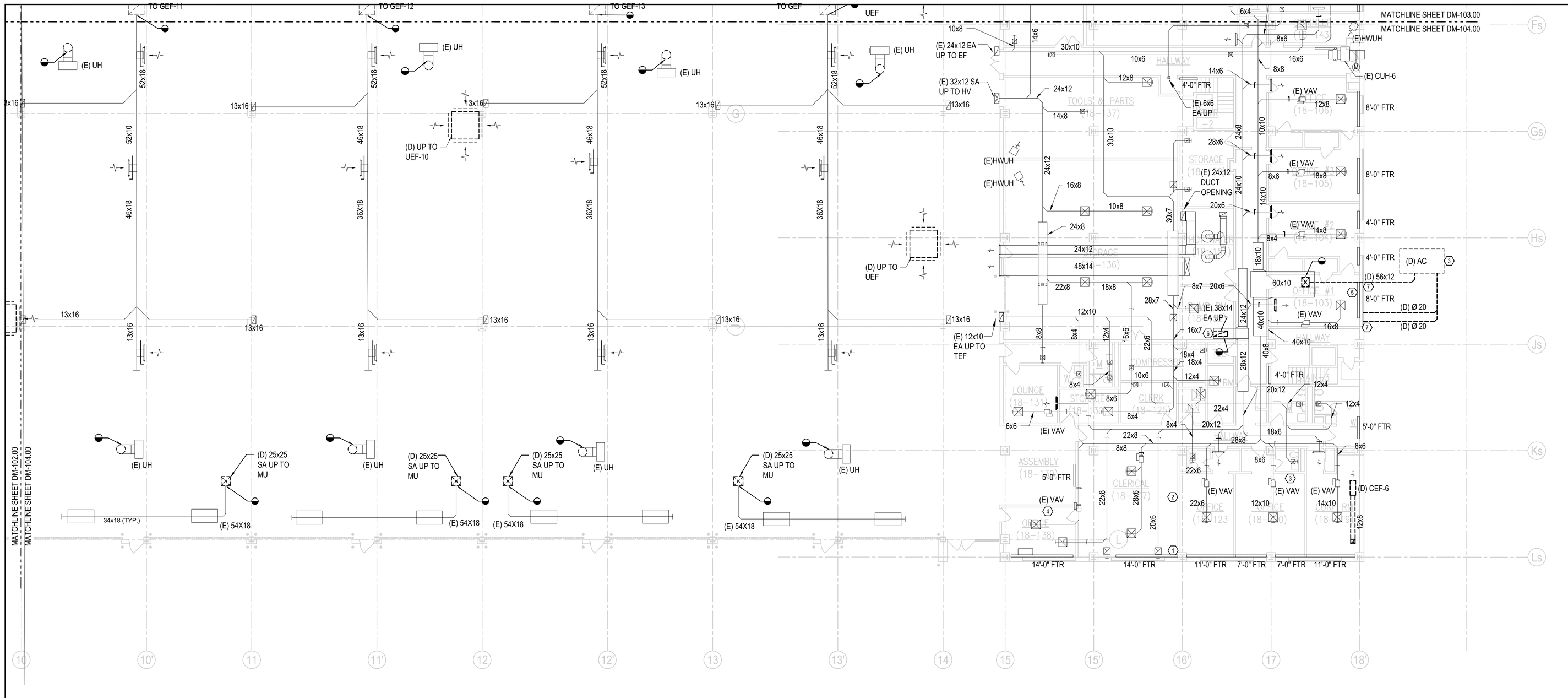
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DRAWING TITLE:
MECHANICALGROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18

SEAL & SIGNATURE
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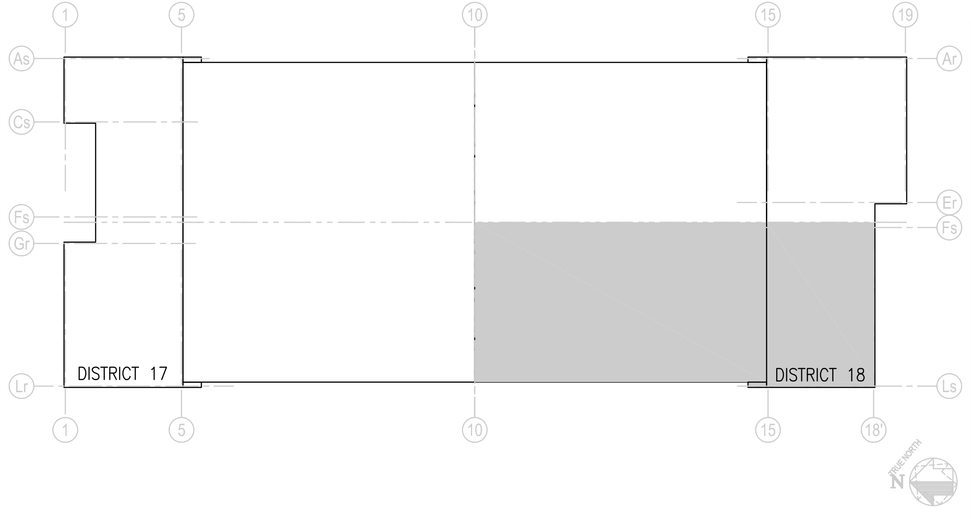
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1 1ST FLOOR MECHANICAL DEMOLITION PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE EXISTING GAS FIRED UNIT HEATERS FLUE AND PROVIDE NEW FLUE VENT.
2. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS SHOWN ON PLAN.
3. IN OFFICE AREA, ALL VAV BOXES AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.VAV BOXES SHALL BE RE-BALANCE.
4. IN OFFICE AREA, ALL CABINET UNIT HEATERS (CUH) AND CABINET EXHAUST FANS (CEF) AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
5. ALL SUPPLY, EXHAUST, RETURN DIFFUSERS AND GRILLES SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
6. IN OFFICE AREA, ALL HOT WATER UNIT HEATER AND PARAMETER FIN TUBE RADIATOR SHALL REMAIN.

SHEET KEYNOTES

1. DISCONNECT AND REMOVE CARBON MONOXIDE MONITORING SYSTEM IN ENTIRETY. DEMOLITION SCOPE INCLUDES BUT NOT LIMITED TO REMOVAL OF THE CO MONITORING PANEL, ALL INTER CONNECTED CO SENSING DEVICES, ALL ELECTRICAL/CONTROL CONDUITS AND WIRING WHETHER SPECIFICALLY SHOWN OR NOT.
2. DISCONNECT AND REMOVE EXISTING CONTROL SYSTEM SERVING MAKE UP AIR UNITS/ H&V UNITS IN ENTIRETY, REMOVE CONTROL PANEL, ALL INTER CONNECTED SENSORS, THERMOSTATS ETC., ALL ELECTRICAL/CONTROL CONDUITS AND WIRING WHETHER SPECIFICALLY SHOWN OR NOT.
3. DISCONNECT AND REMOVE EXISTING CONTROL PANEL SERVING ROOFTOP AC UNITS (TRANE PANEL) ALONG WITH INTERCONNECTED WIRING AND CONDUIT, HONEYWELL CONTROLS SERVING VAVS SHALL REMAIN.
4. DISCONNECT AND REMOVE EXISTING SMOKE CONTROL SYSTEM IN ENTIRETY. REMOVE CONTROL PANEL, ALL INTER CONNECTED DEVICES, ALL ELECTRICAL/CONTROL CONDUITS AND WIRING WHETHER SPECIFICALLY SHOWN OR NOT.
5. THE CONTRACTOR SHALL PROVIDE PROTECTION OF THE PERIMETER FINNED-TUBE RADIATOR ENCLOSURES. AT THE COMPLETION OF DEMOLITION, VACUUM-CLEAN THE INTERIOR OF THE ENCLOSURE.
6. CONTRACTOR SHALL INSPECT AND SEAL ALL OPEN DUCTWORK AFTER DEMOLITION.
7. SEAL AND PATCH EXISTING WALL AFTER REMOVAL OF DUCTWORK. COORDINATE WITH GENERAL CONTRACTOR

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FOR THE: DEPARTMENT OF SANITATION

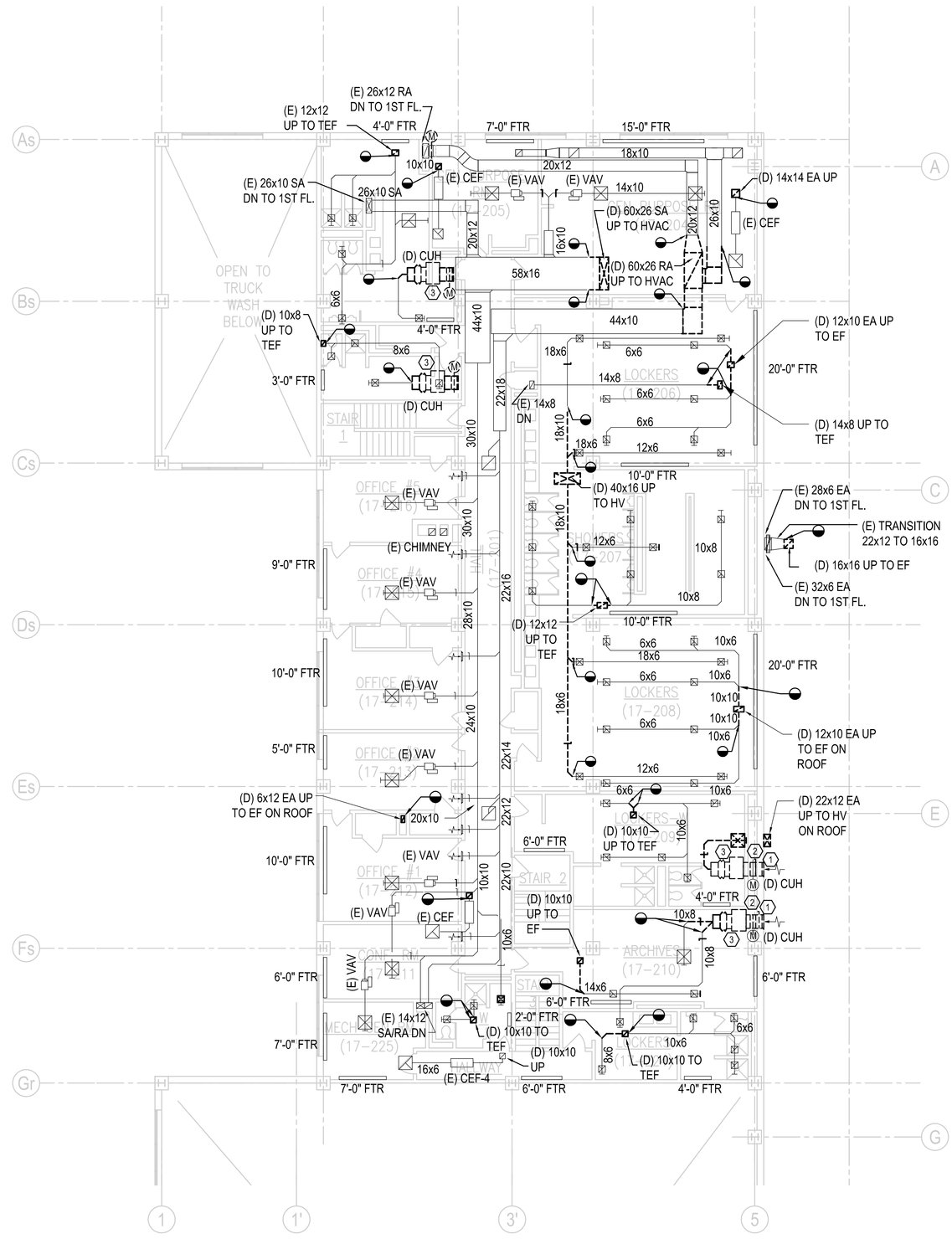
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DRAWING TITLE:
MECHANICALGROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18

SEAL & SIGNATURE
KEITH TITTEL 074116 LICENSED PROFESSIONAL ENGINEER STATE OF NEW YORK

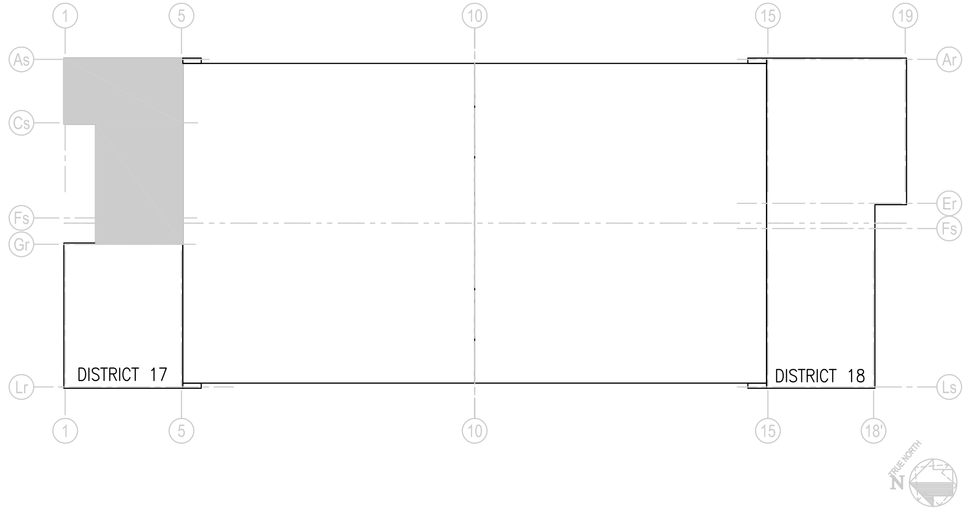
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DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	DDMM-104.00

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1 2ND FL MECHANICAL DEMOLITION PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN OFFICE AREA, ALL VAV BOXES AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.
2. IN OFFICE AREA, ALL CABINET EXHAUST FANS (CEF) AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS.

SHEET KEYNOTES

1. BLANK OFF EXISTING LOUVER. PROVIDE INSULATION AND SEAL AIRTIGHT.
2. CONTRACTOR SHALL PROVIDE PROTECTION OF THE PERIMETER FINNED-TUBE RADIATOR ENCLOSURES. AT THE COMPLETION OF DEMOLITION, VACUUM-CLEAN THE INTERIOR OF THE ENCLOSURE.
3. DEMOLISH HOT WATER CABINET UNIT HEATER, DUCT AND ALL ASSOCIATED CONTROLS IN THE AREAS SHOWN, CUT AND CAP HOT WATER PIPING.

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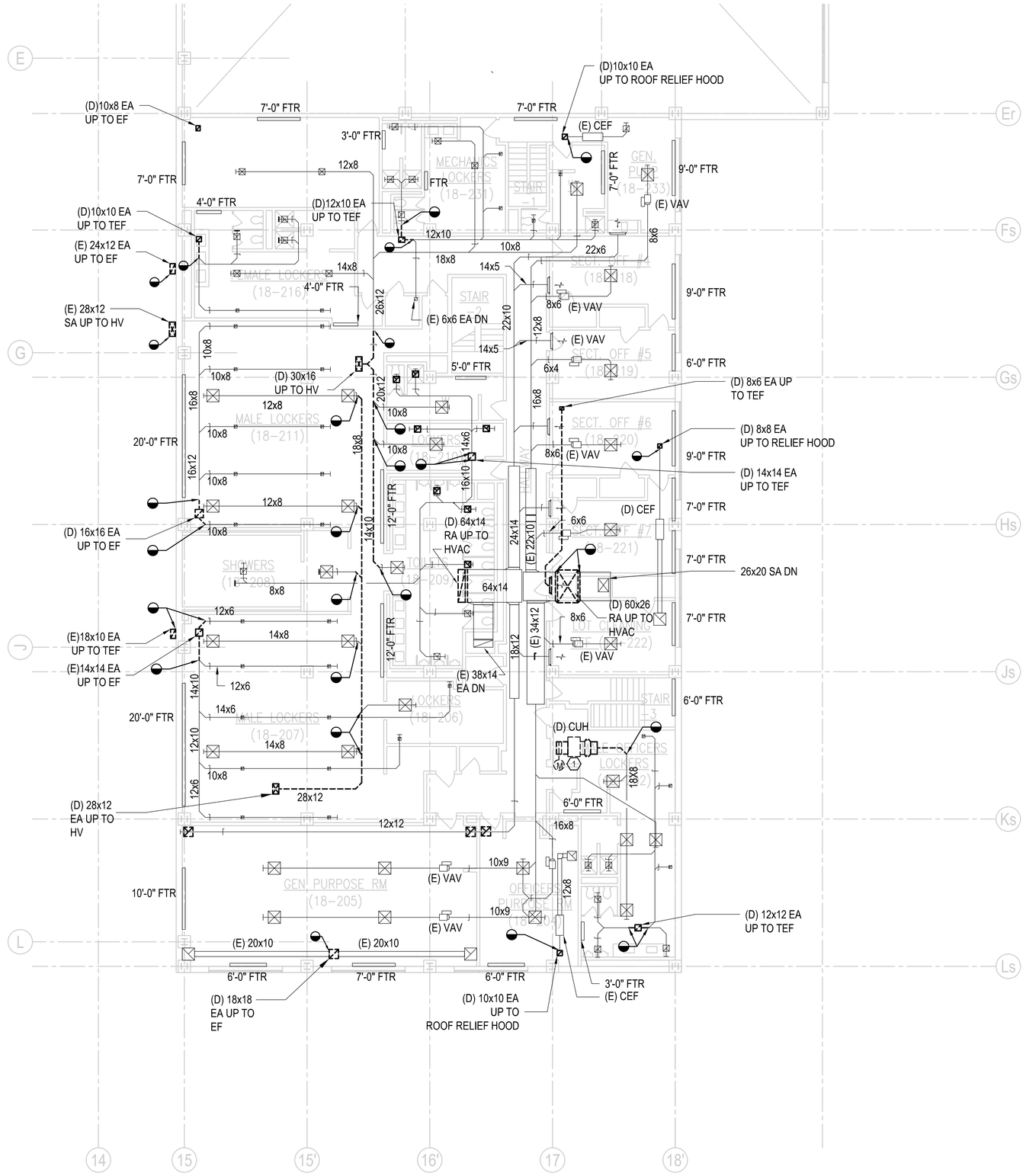
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DRAWING TITLE:
MECHANICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17

SEAL & SIGNATURE
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074116
LICENSED PROFESSIONAL ENGINEER
STATE OF NEW YORK

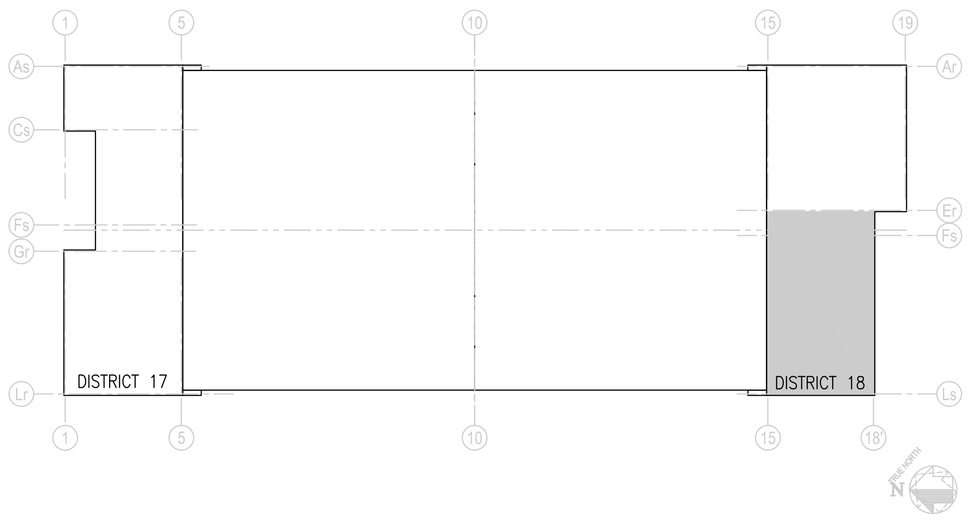
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PROJECT NO:	DDC33000
DRAWN BY:	HG
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DRAWING NUMBER:	DMM-105.00

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1 2ND FL MECHANICAL DEMOLITION PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. IN OFFICE AREA, ALL VAV BOXES AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS. 2. IN OFFICE AREA, ALL CABINET UNIT HEATERS (CUH) AND CABINET EXHAUST FANS (CEF) AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS. 3. ALL SUPPLY, EXHAUST, RETURN DIFFUSERS AND GRILLES SHALL REMAIN AS EXISTING AS INDICATED ON FLOOR PLANS. 4. IN OFFICE AREA, ALL HOT WATER UNIT HEATER AND PARAMETER FIN TUBE RADIATOR SHALL REMAIN.	1. HOT WATER COIL PIPING AND ASSOCIATED CONTROLS SHALL BE CUT AND CAPPED BACK TO DISTRIBUTION LINE.

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

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FOR THE: DEPARTMENT OF SANITATION

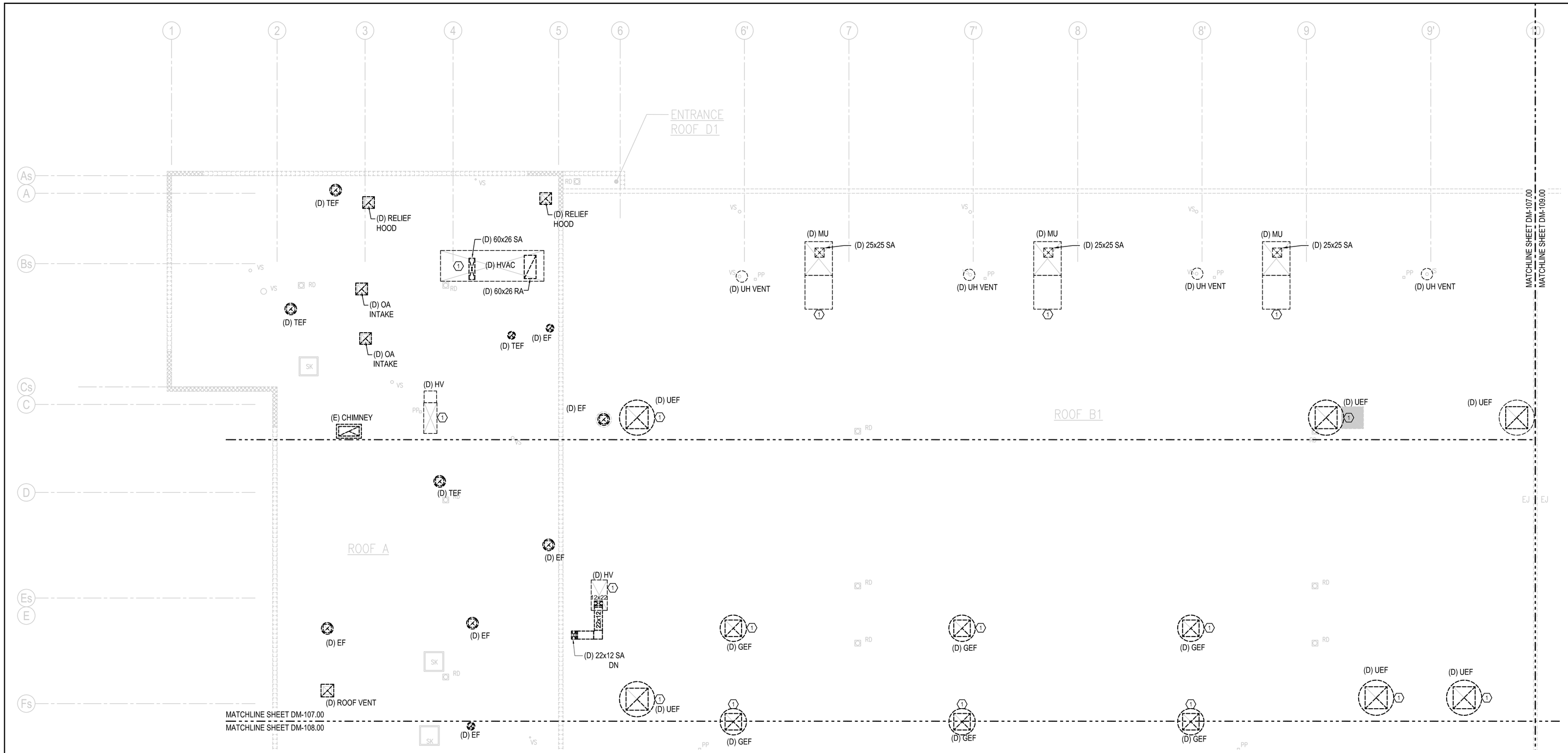
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DRAWING TITLE:
MECHANICAL 2ND FL DEMOLITION PART PLAN-DISTRICT 18

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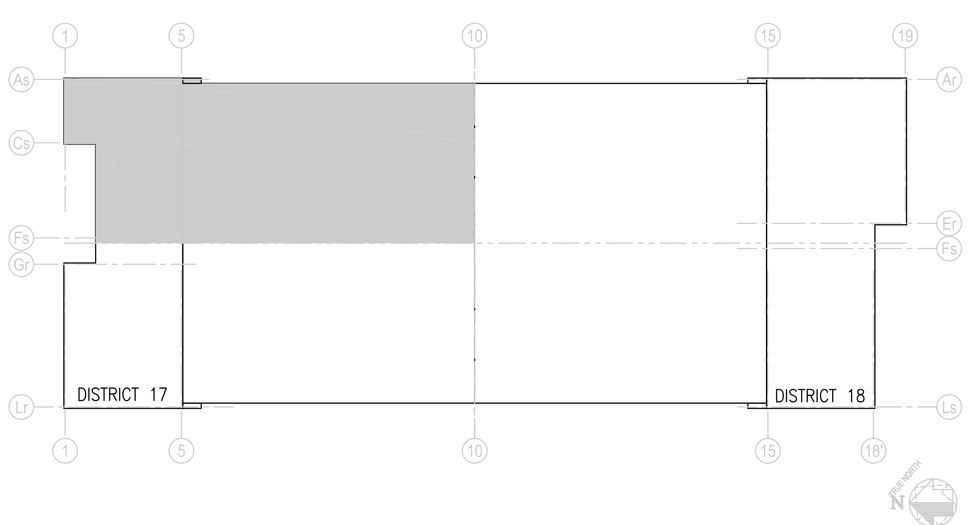
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1 MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE ALL THE DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS ASSOCIATED WITH EXISTING MAKE UP AIR UNITS.	1. DISCONNECT AND REMOVE EXISTING HVAC UNIT, DISCONNECT AND REMOVE DUCTWORK, ASSOCIATED DUCT ACCESSORIES (SMOKE DETECTOR, FIRE/SMOKE DAMPER, MOTORIZED DAMPER, VOLUME DAMPERS, ETC.), ROOF CURB, ELECTRICAL AND CONTROL WIRING, PROVIDE TEMPORARY WEATHERPROOF PROTECTION AT THE ROOF AS REQUIRED, CAP THE DUCT UNDERSIDE OF THE ROOF FOR FUTURE TIE-IN. REPAIR THE SLAB/DECK AND FIRE PROOFING AS REQUIRED, REPAIR/SEAL ANY OPEN PENETRATIONS DUE TO PIPING/DUCT OPENINGS.
2. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED.	
4. IN OFFICE AREA, ALL HVAC UNITS SHALL BE DISCONNECTED AND DEMOLISHED, DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS INDICATED ON FLOOR PLANS.	
5. IN OFFICE AREA, ALL HEATING AND VENTILATION UNITS SHALL BE DISCONNECTED AND DEMOLISHED, DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS INDICATED ON FLOOR PLANS.	

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DIVISION OF BUILDINGS

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PROJECT
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10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

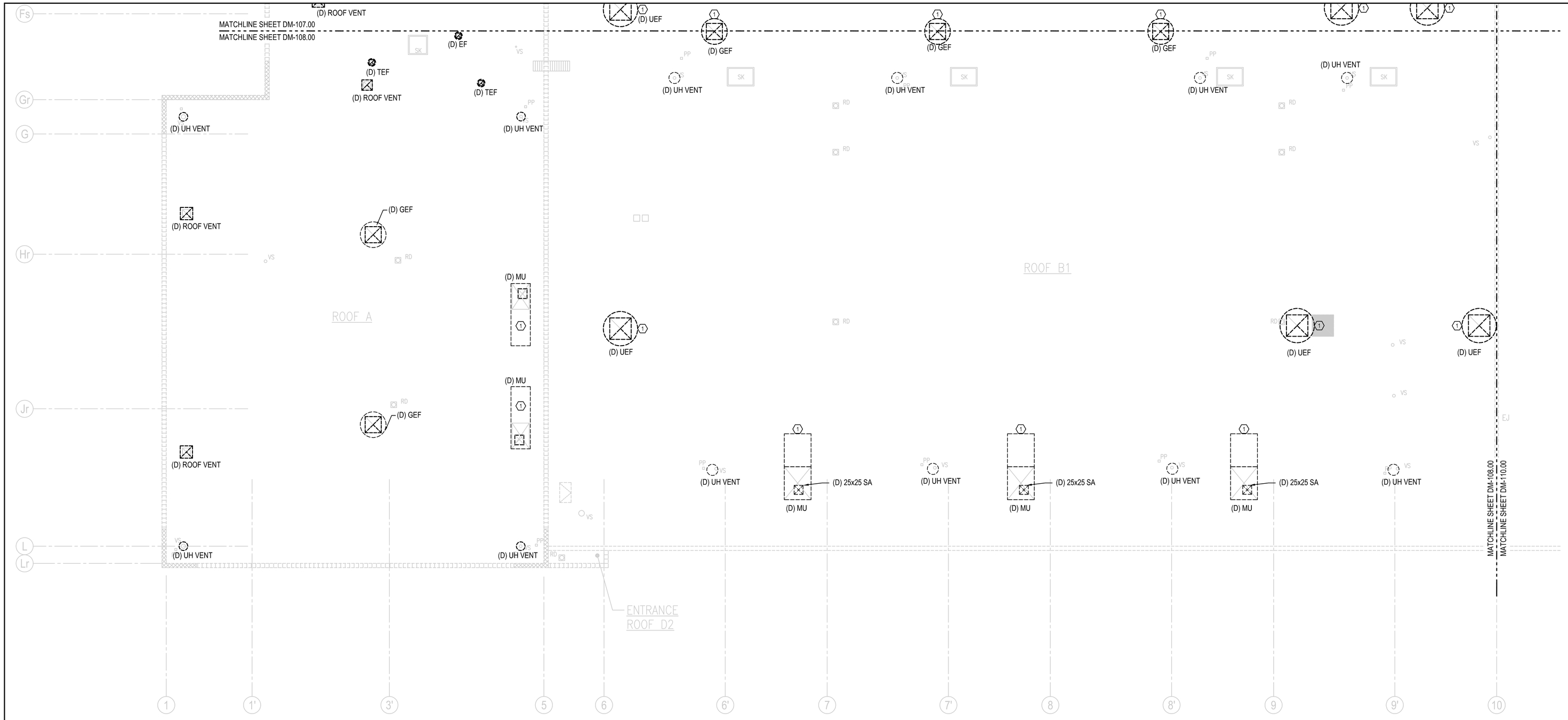
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MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17

SEAL & SIGNATURE

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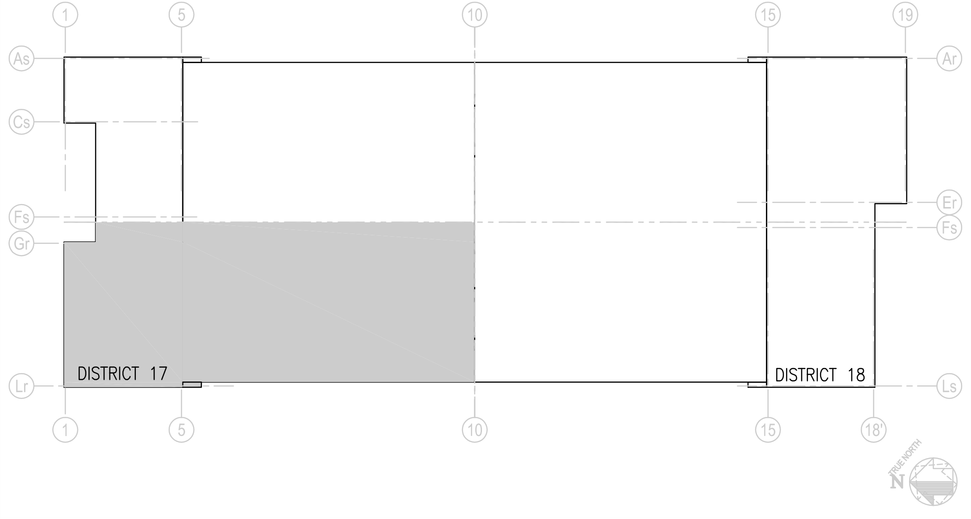
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DRAWING NUMBER:	DMM-107.00

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1 MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE ALL THE DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS ASSOCIATED WITH EXISTING MAKE UP AIR UNITS.
2. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED.
3. IN OFFICE AREA, ALL EXHAUST FANS SHALL BE DISCONNECTED AND DEMOLISHED. DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS INDICATED ON FLOOR PLANS.

SHEET KEYNOTES

1. DISCONNECT AND REMOVE EXISTING HVAC UNIT. DISCONNECT AND REMOVE DUCTWORK, ASSOCIATED DUCT ACCESSORIES (SMOKE DETECTOR, FIRE/SMOKE DAMPER, MOTORIZED DAMPER, VOLUME DAMPERS, ETC.), ROOF CURB, ELECTRICAL AND CONTROL WIRING. PROVIDE TEMPORARY WEATHERPROOF PROTECTION AT THE ROOF AS REQUIRED, CAP THE DUCT UNDERSIDE OF THE ROOF FOR FUTURE TIE-IN, REPAIR THE SLAB/DECK AND FIRE PROOFING AS REQUIRED, REPAIR/SEAL ANY OPEN PENETRATIONS DUE TO PIPING/DUCT OPENINGS.

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FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

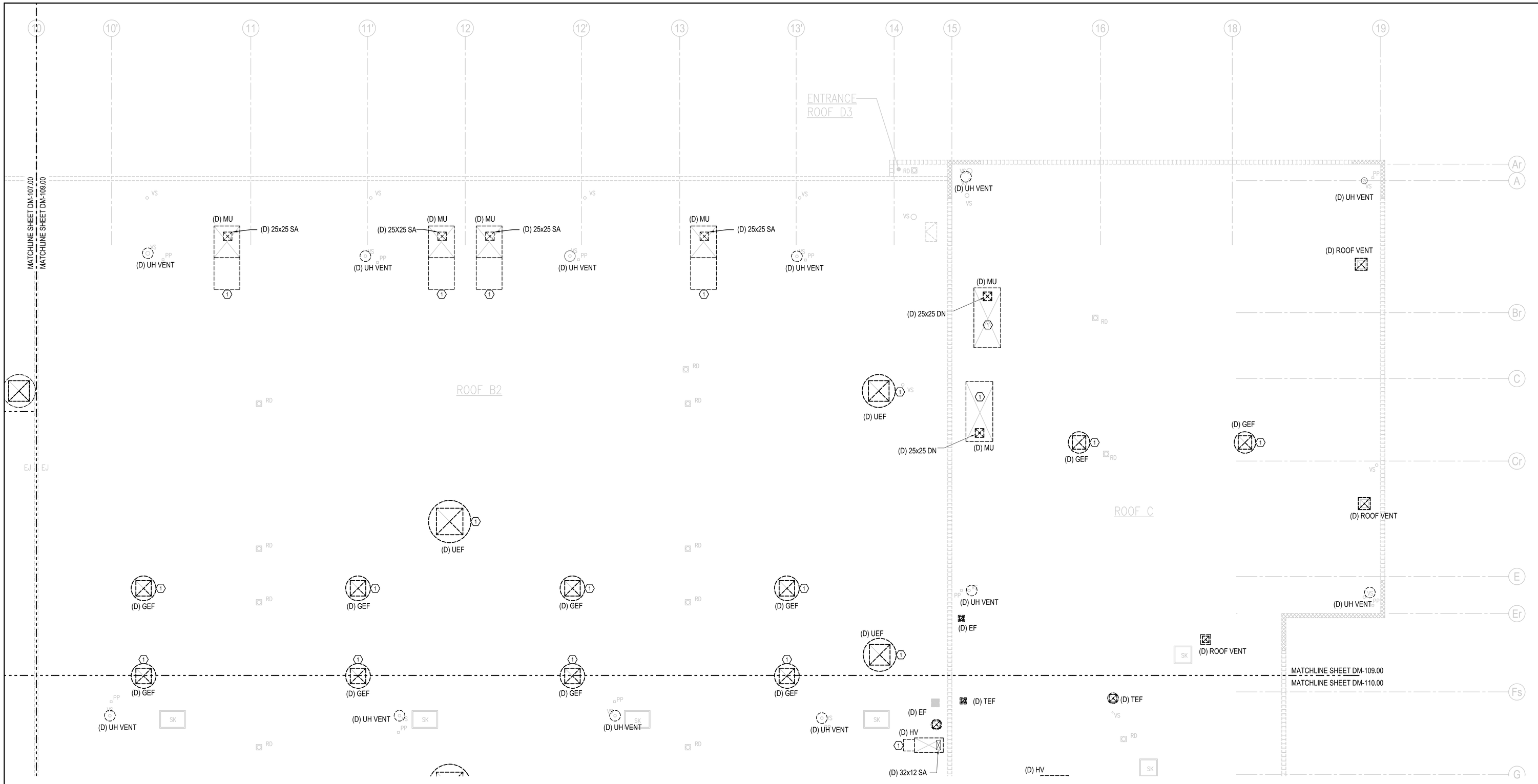
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MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 17

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

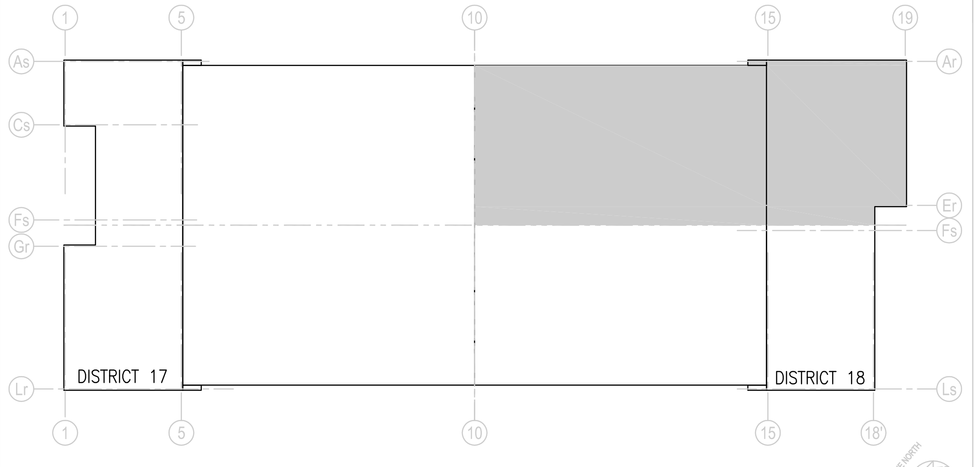
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CHECKED BY:	HG
DRAWING NUMBER:	DMM-108.00

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1 MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE ALL THE DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS ASSOCIATED WITH EXISTING MAKE UP AIR UNITS.
2. IN TRUCK STORAGE AND TRUCK REPAIR AREA, ALL EXHAUST FANS AND ASSOCIATED DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED.
3. IN OFFICE AREA, ALL EXHAUST FANS SHALL BE DISCONNECTED AND DEMOLISHED. DUCTWORK, DUCT ACCESSORIES, HANGERS AND SUPPORTS SHALL BE DISCONNECTED AND REMOVED AS INDICATED ON FLOOR PLANS.

SHEET KEYNOTES

1. DISCONNECT AND REMOVE EXISTING HVAC UNIT. DISCONNECT AND REMOVE DUCTWORK, ASSOCIATED DUCT ACCESSORIES (SMOKE DETECTOR, FIRE/SMOKE DAMPER, MOTORIZED DAMPER, VOLUME DAMPERS, ETC.), ROOF CURB, ELECTRICAL AND CONTROL WIRING. PROVIDE TEMPORARY WEATHERPROOF PROTECTION AT THE ROOF AS REQUIRED, CAP THE DUCT UNDERSIDE OF THE ROOF FOR FUTURE TIE-IN. REPAIR THE SLAB/DECK AND FIRE PROOFING AS REQUIRED. REPAIR/SEAL ANY OPEN PENETRATIONS DUE TO PIPING/DUCT OPENINGS.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

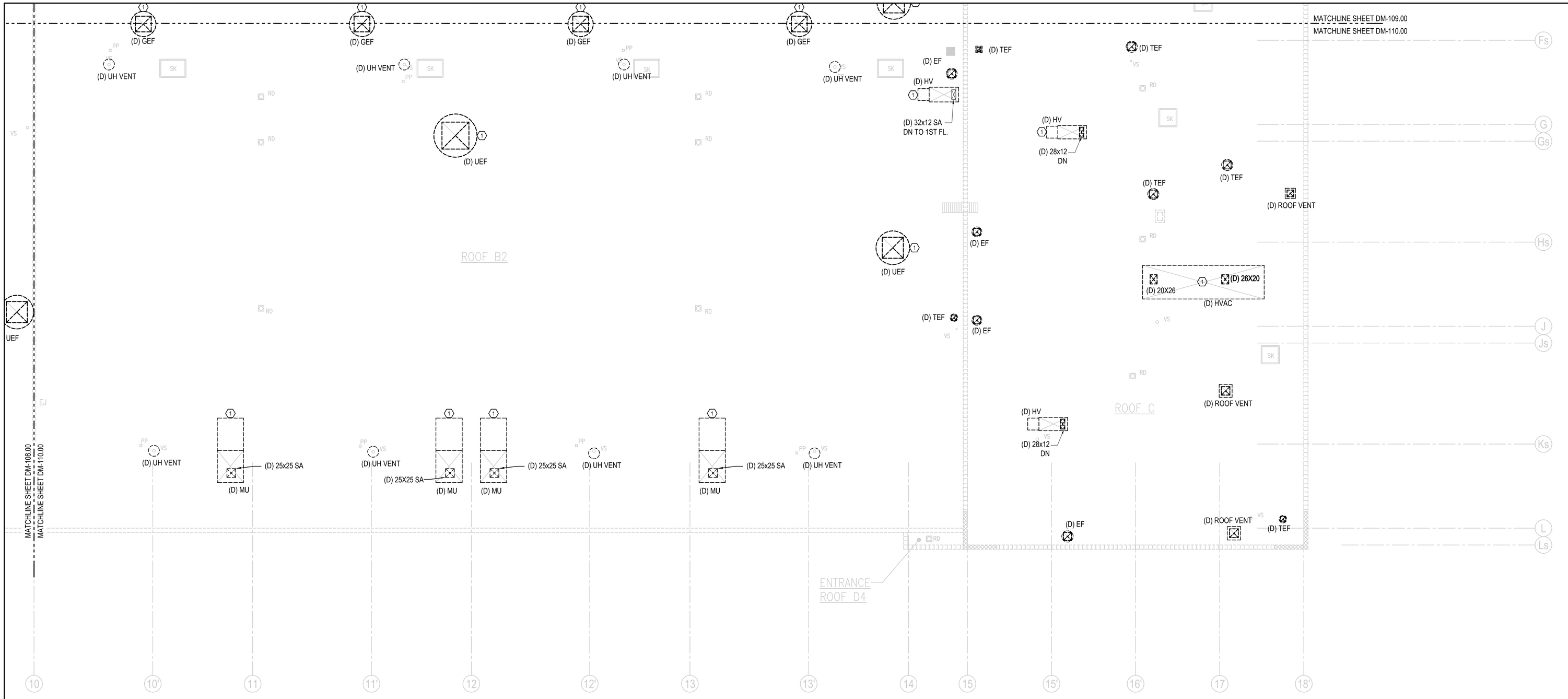
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SEAL & SIGNATURE

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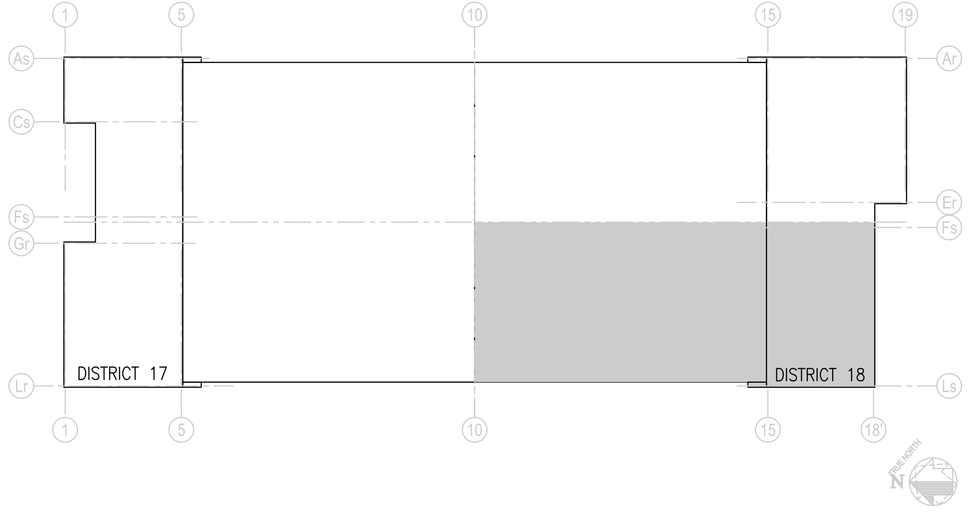
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1 MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. IN TRUCK STORAGE AND TRUCK REPAIR AREA, CONTRACTOR TO DISCONNECT AND REMOVE ALL THE DUCTWORK, DUCT ACCESSORIES, AIR OUTLETS, HANGERS AND SUPPORTS ASSOCIATED WITH EXISTING MAKE UP AIR UNITS.
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SHEET KEYNOTES

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

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S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

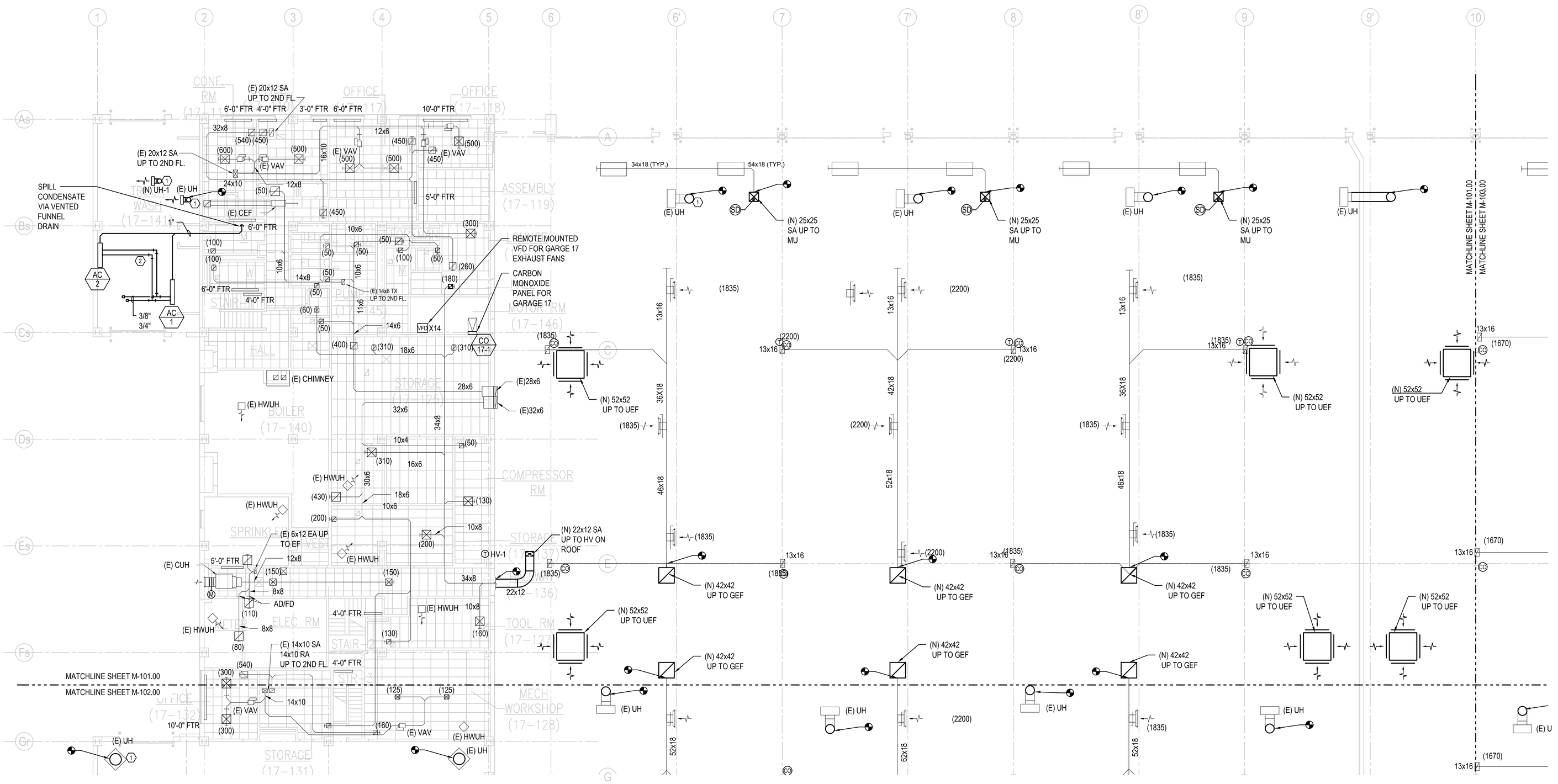
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DRAWING TITLE:
MECHANICAL DEMOLITION ROOF PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

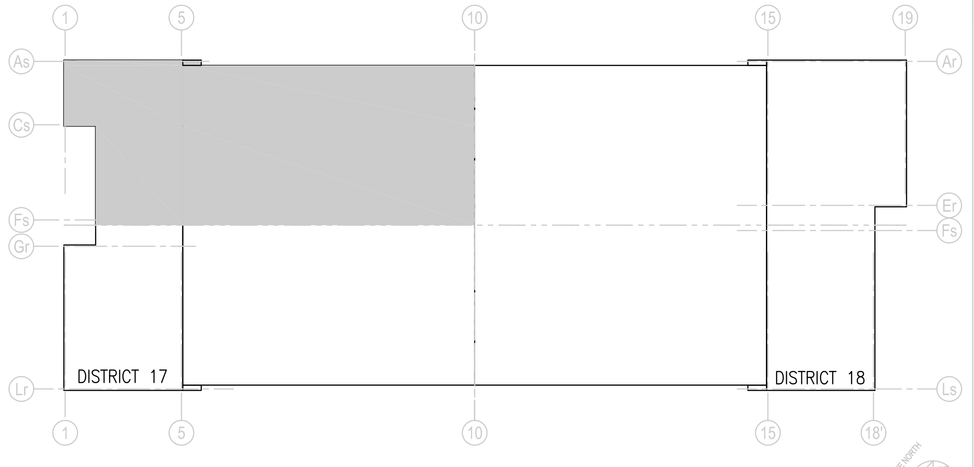
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1 1ST FL MECHANICAL PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. NEW DIFFUSERS SHALL BE PROVIDED WITH NEW VOLUME DAMPERS. 2. PROVIDE AN INDIVIDUAL THERMOSTAT INTERLOCKED WITH EACH TERMINAL VAV BOX.	1. REFER TO UNIT HEATER DETAIL FOR FLUE CONNECTION. 2. THE REFRIGERANT PIPES SIZES INDICATED FOR THE VRF SYSTEM IS BASED ON THE DESIGN PIPE ROUTES AND LENGTHS, SHOWN FOR COORDINATION. THIS CONTRACTOR SHALL PROVIDE THE PIPE SIZES REQUIRED FOR THE NET PIPE LENGTHS, ACCOUNTING FOR THE ACTUAL ROUTES AND OFFSETS, AND AS REQUIRED BY THE EQUIPMENT MANUFACTURER

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REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

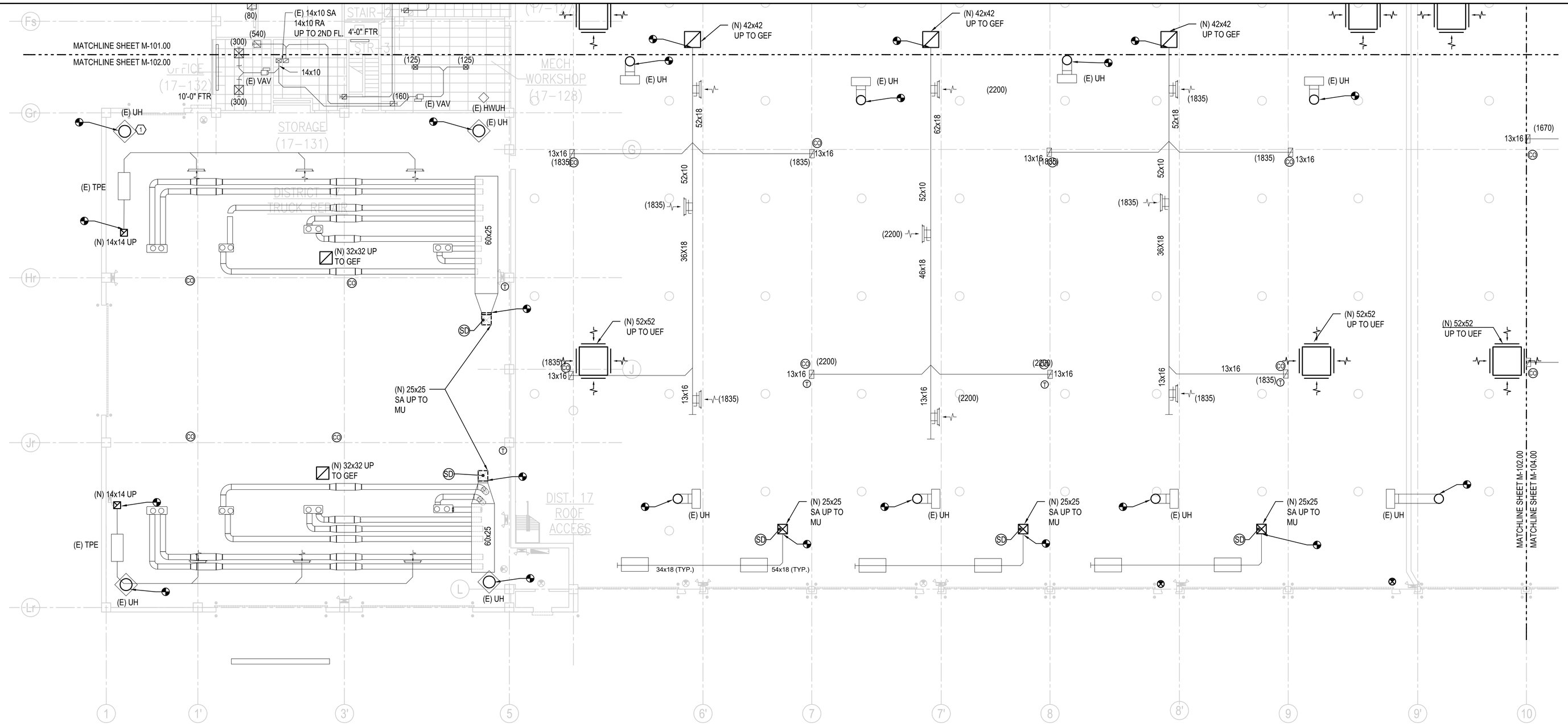
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MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 17

SEAL & SIGNATURE

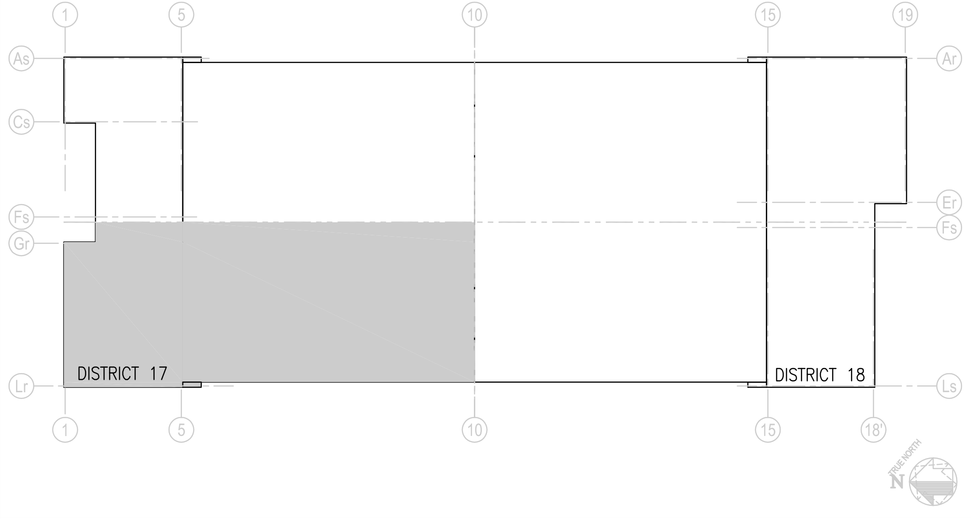
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1 1ST FL MECHANICAL PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. NEW DIFFUSERS SHALL BE PROVIDED WITH NEW VOLUME DAMPERS. 2. PROVIDE AN INDIVIDUAL THERMOSTAT INTERLOCKED WITH EACH TERMINAL VAV BOX.	1. REFER TO UNIT HEATER DETAIL FOR FLUE CONNECTION.

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

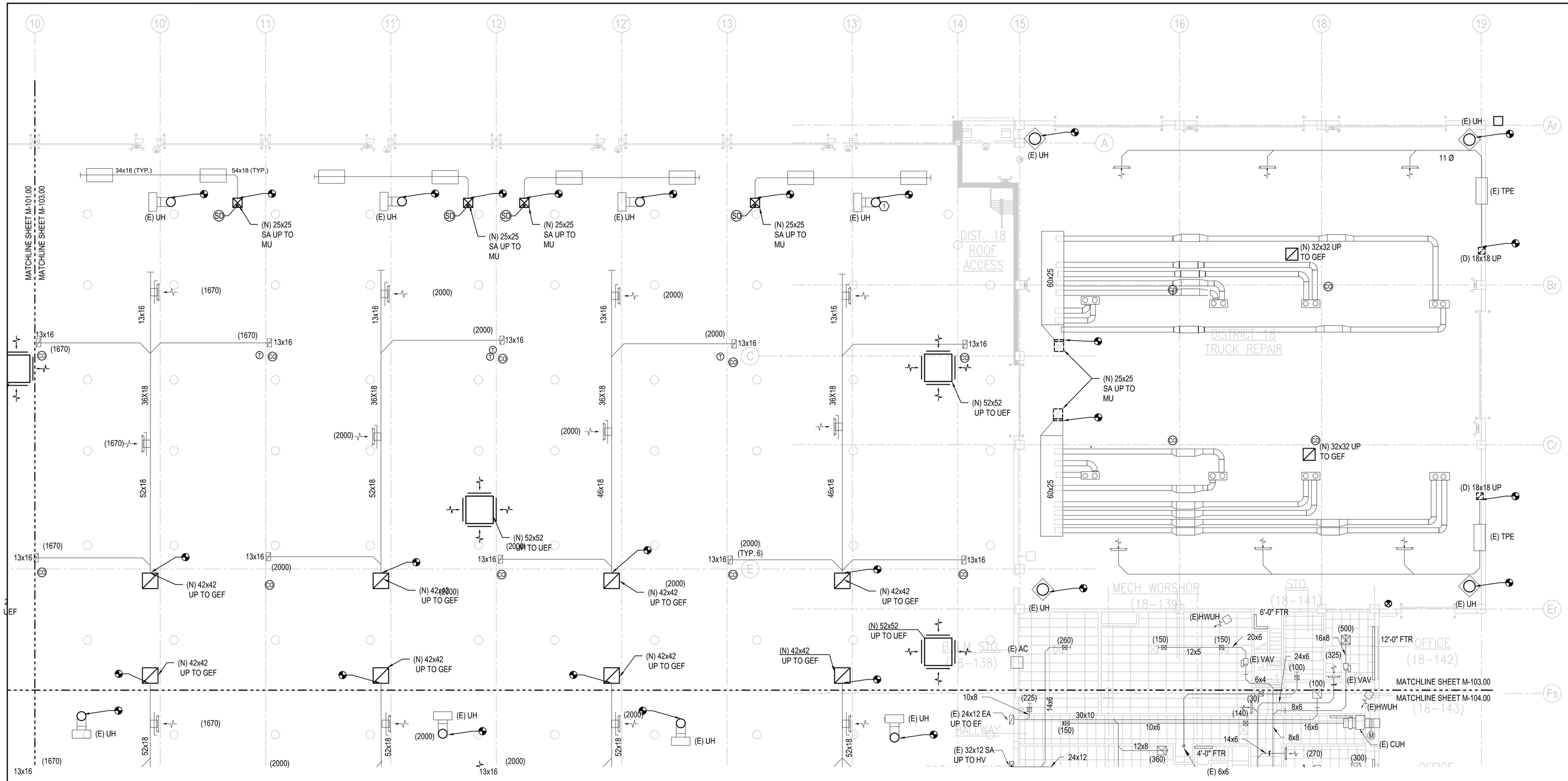
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MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

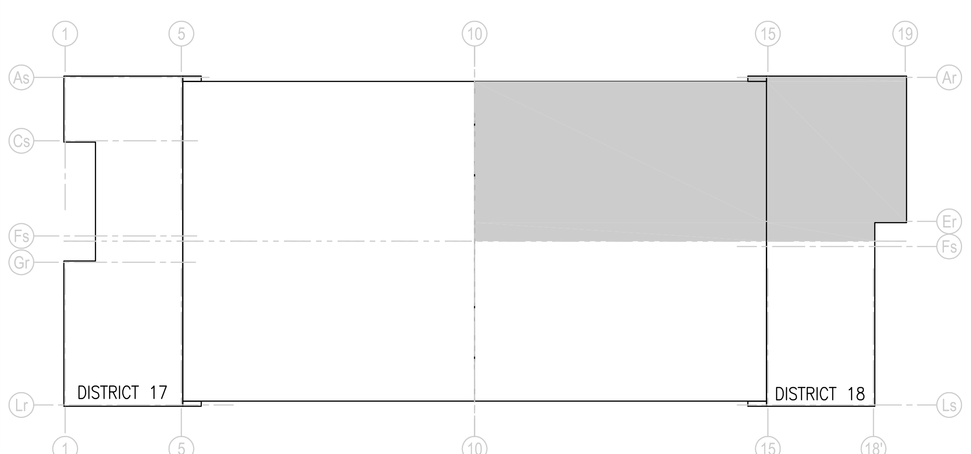
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1 1ST FL MECHANICAL PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. NEW DIFFUSERS SHALL BE PROVIDED WITH NEW VOLUME DAMPERS. 2. PROVIDE AN INDIVIDUAL THERMOSTAT INTERLOCKED WITH EACH TERMINAL VAV BOX.	1. REFER TO UNIT HEATER DETAIL FOR FLUE CONNECTION.

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

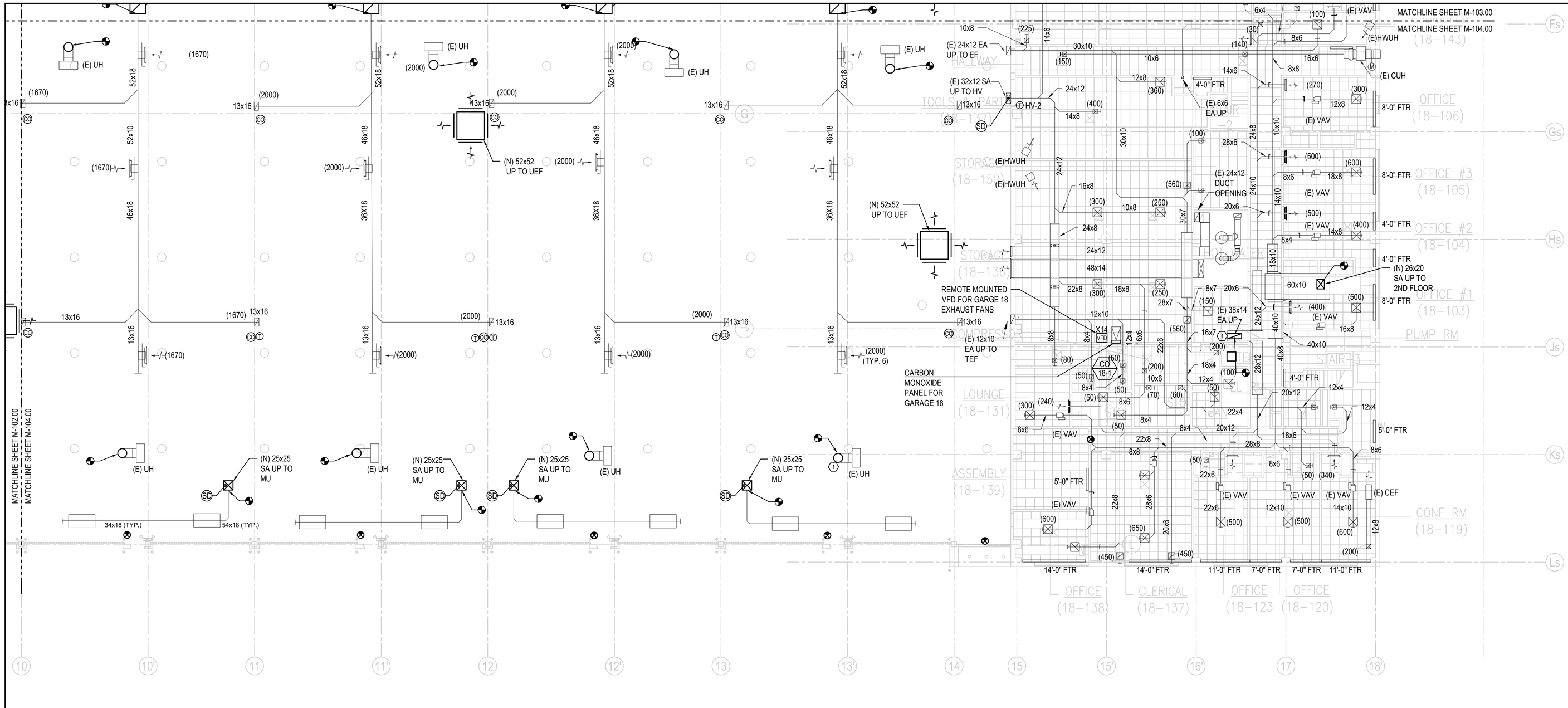
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DRAWING TITLE:
MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 024116 · LICENSED PROFESSIONAL ENGINEER

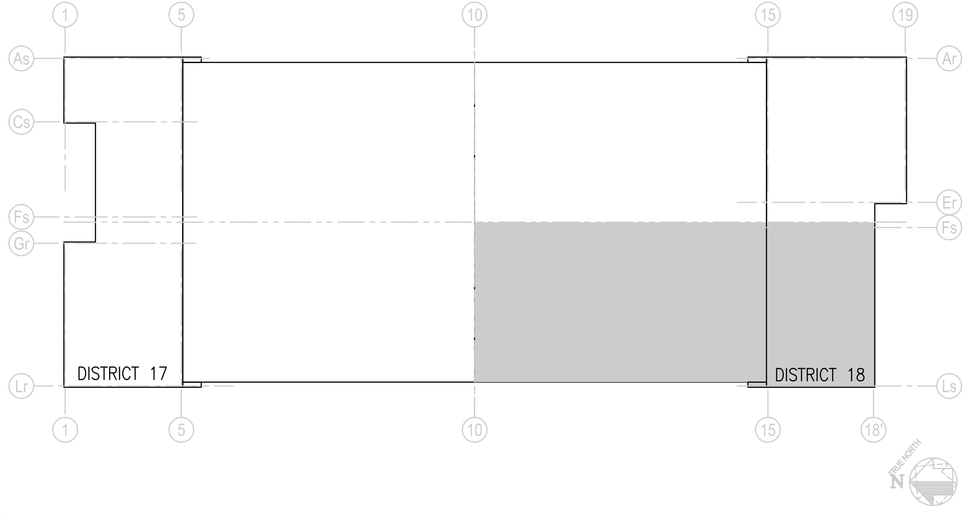
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1 1ST FL MECHANCIAL PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. NEW DIFFUSERS SHALL BE PROVIDED WITH NEW VOLUME DAMPERS. 2. PROVIDE AN INDIVIDUAL THERMOSTAT INTERLOCKED WITH EACH TERMINAL VAV BOX.	1. REFER TO UNIT HEATER DETAIL FOR FLUE CONNECTION.

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

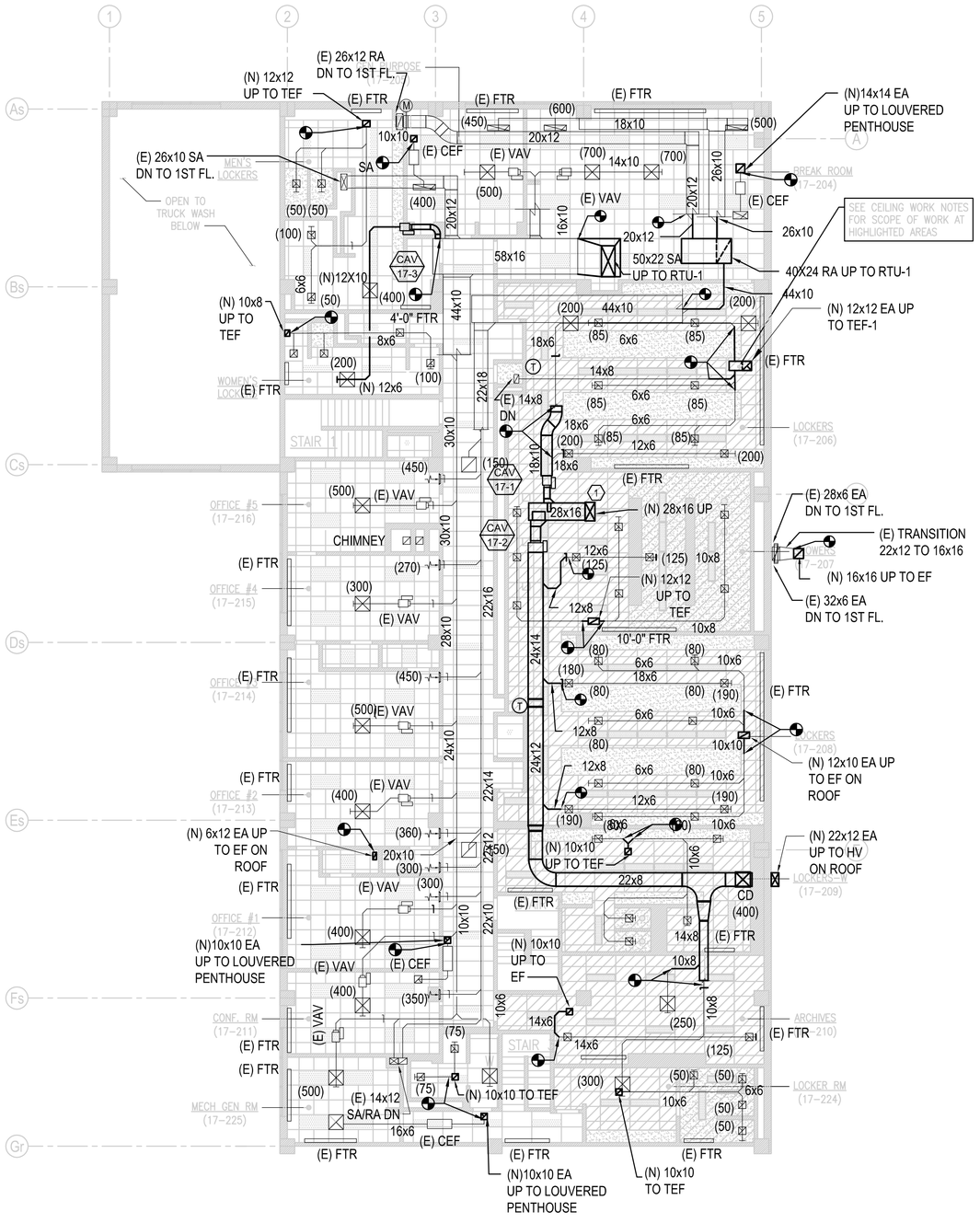
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MECHANICAL GROUND FLOOR PART PLAN-DISTRICT 18

SEAL & SIGNATURE

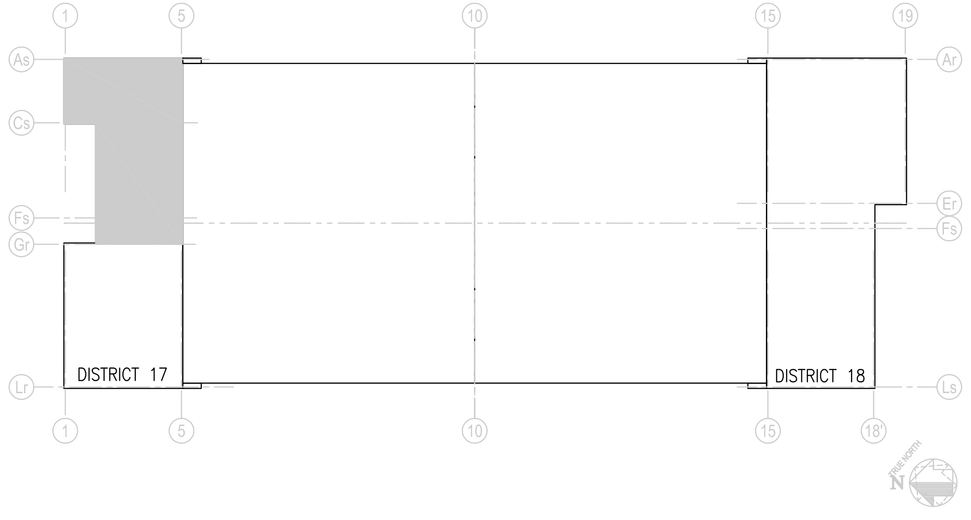
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1 2ND FL MECHANICAL PART PLA-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. PROVIDE AN INDIVIDUAL THERMOSTAT INTERLOCKED WITH EACH NEW TERMINAL VAV BOX.	1. PROVIDE NEW DUCT PENETRATION. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.

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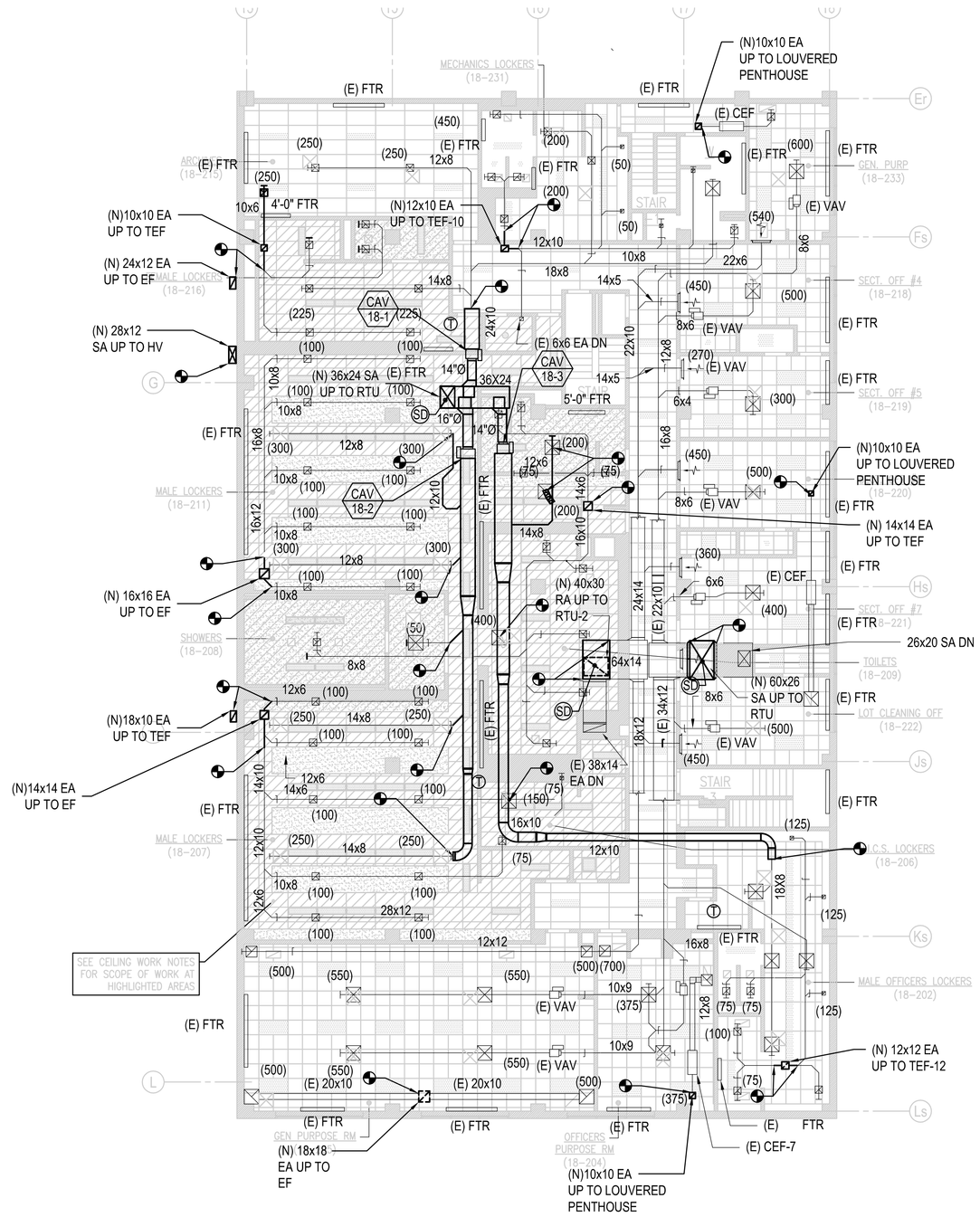
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DRAWING TITLE:
MECHANICAL 2ND FLOOR PART PLA-DISTRICT 17

SEAL & SIGNATURE
SETH TITTERTON — 074116 — REGISTERED PROFESSIONAL ENGINEER

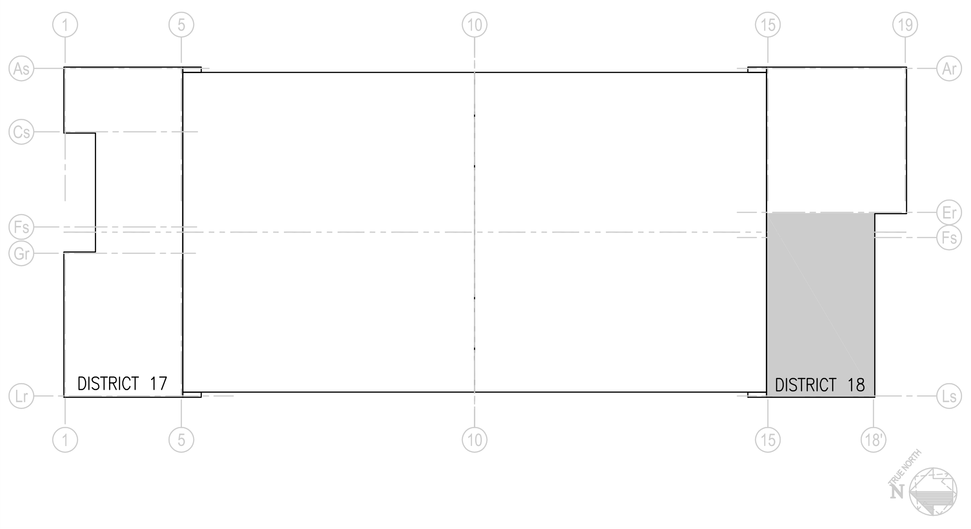
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1 2ND FL MECHANICAL PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



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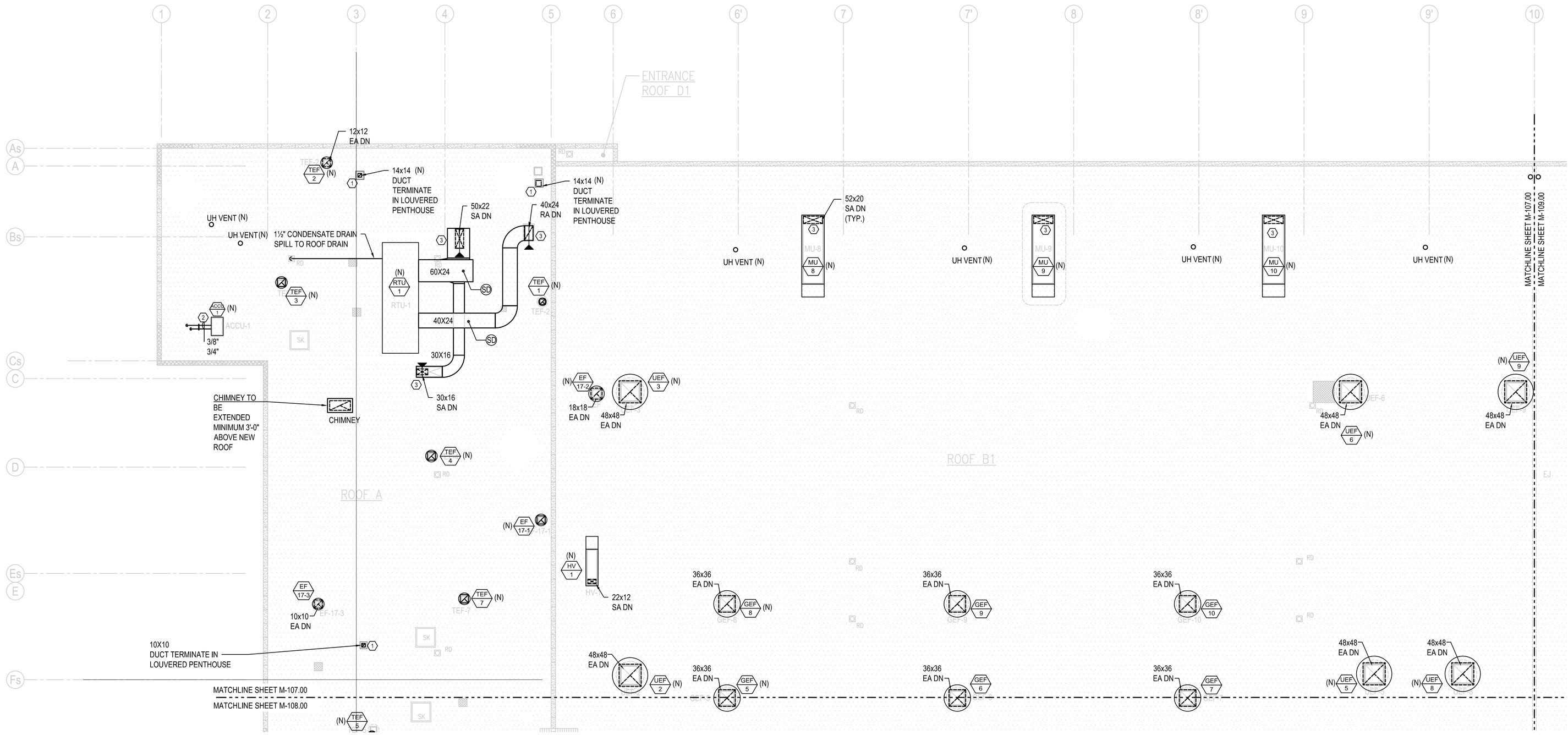
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DRAWING TITLE:
MECHANICAL 2ND FLOOR PART PLAN-DISTRICT 18

SEAL & SIGNATURE
KEITH FITZPATRICK 074116 LICENSED PROFESSIONAL ENGINEER STATE OF NEW YORK

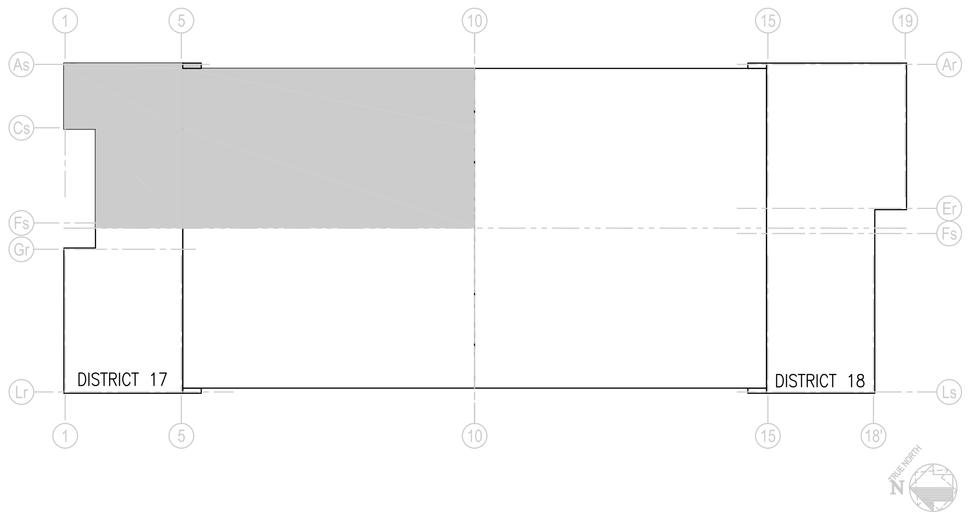
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	SL
CHECKED BY:	SL
DRAWING NUMBER:	M-106.00

Plotted: 9/27/2019 7:55:28 AM P:\NYO\MEP_EIN\PP\DDC33000\DRAWINGS\SHEETS\M-106.00_DDC33000.DWG - kskimpson



1 MECHANICAL ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
	1. LOUVERED GRAVITY INTAKE VENTILATOR. GREENHECK WIH MODEL OR EQUIVALENT 1.5 SQ. FT. FREE AREA. PROVIDE DUCTED CONNECTION WITH MOTORIZED DAMPER. 2. THE REFRIGERANT PIPES SIZES INDICATED FOR THE VRF SYSTEM IS BASED ON THE DESIGN PIPE ROUTES AND LENGTHS, SHOWN FOR COORDINATION. THIS CONTRACTOR SHALL PROVIDE THE PIPE SIZES REQUIRED FOR THE NET PIPE LENGTHS, ACCOUNTING FOR THE ACTUAL ROUTES AND OFFSETS, AND AS REQUIRED BY THE EQUIPMENT MANUFACTURER. 3. PROVIDE NEW DUCT PENETRATION. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.

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New York, NY 10036
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Fax: 212.556.3333
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96 Morton Street, NY, New York 10014-3309

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Tel: 516-248-1010 Fax: 516-248-9018
www.hiranigroup.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

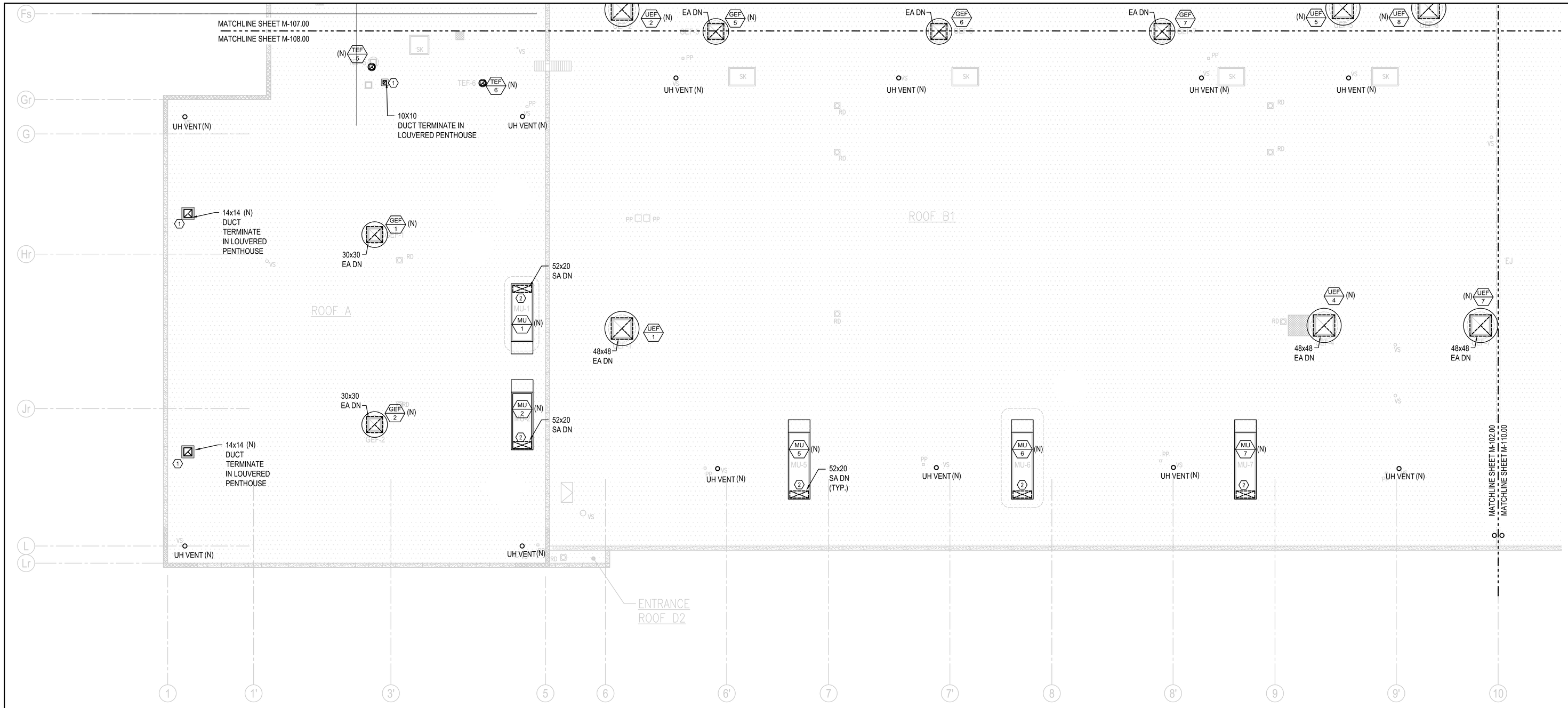
LOT: 1 BLOCK: 8138

DRAWING TITLE:
MECHANICAL ROOF PART PLAN-DISTRICT 17

SEAL & SIGNATURE

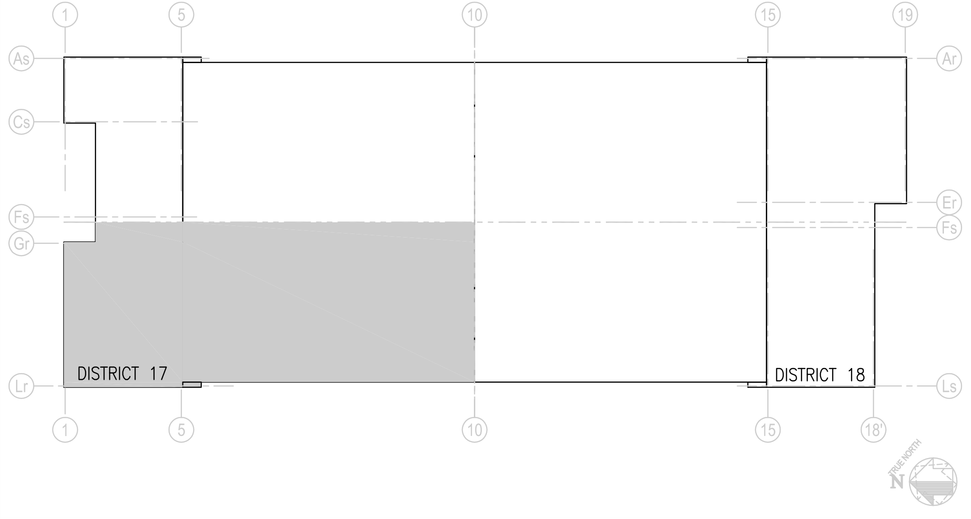
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PROJECT NO:	DDC33000
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CHECKED BY:	SL
DRAWING NUMBER:	M-107.00

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1 MECHANICAL ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

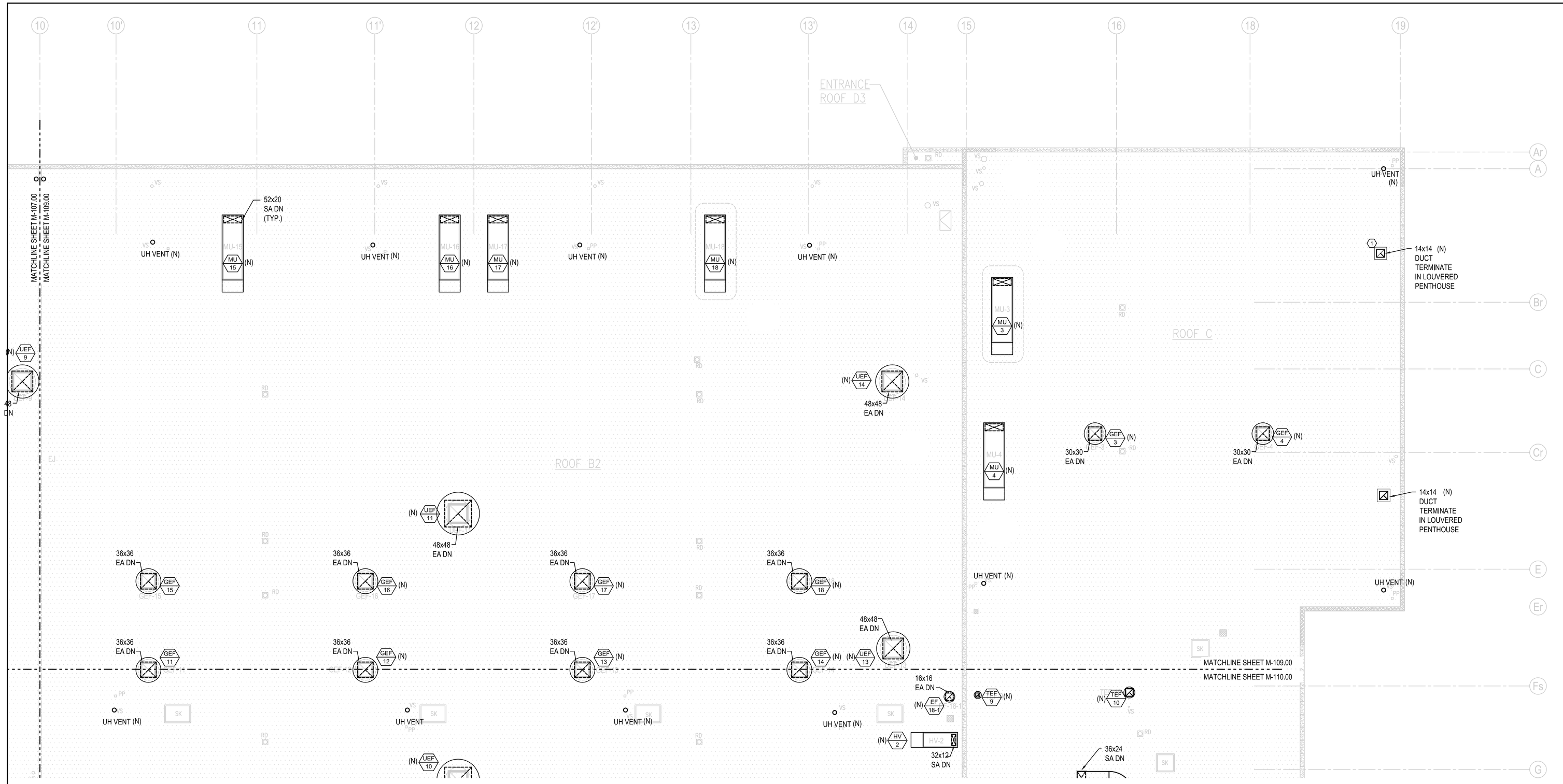
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DRAWING TITLE:
MECHANICAL ROOF PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

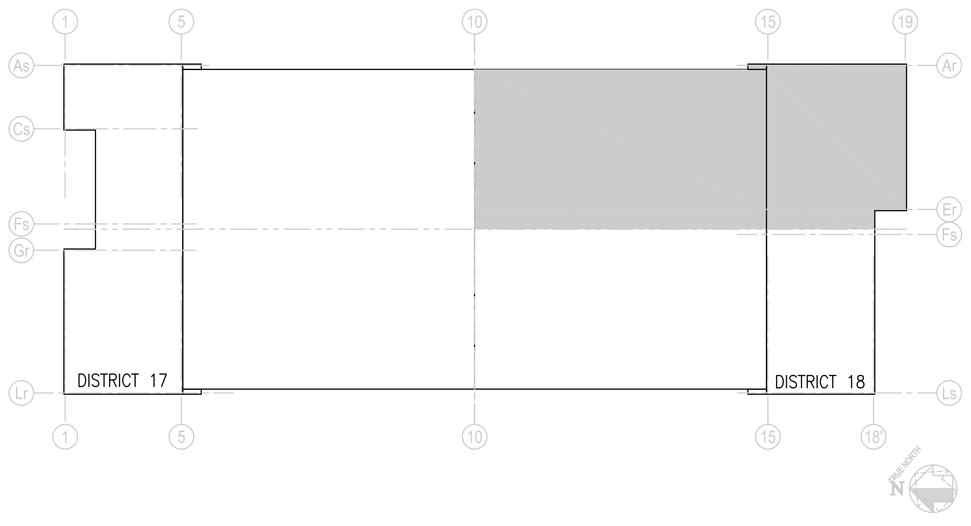
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PROJECT NO: DDC33000
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CHECKED BY: SL
DRAWING NUMBER:
M-108.00

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1 MECHANICAL ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



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DIVISION OF BUILDINGS

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

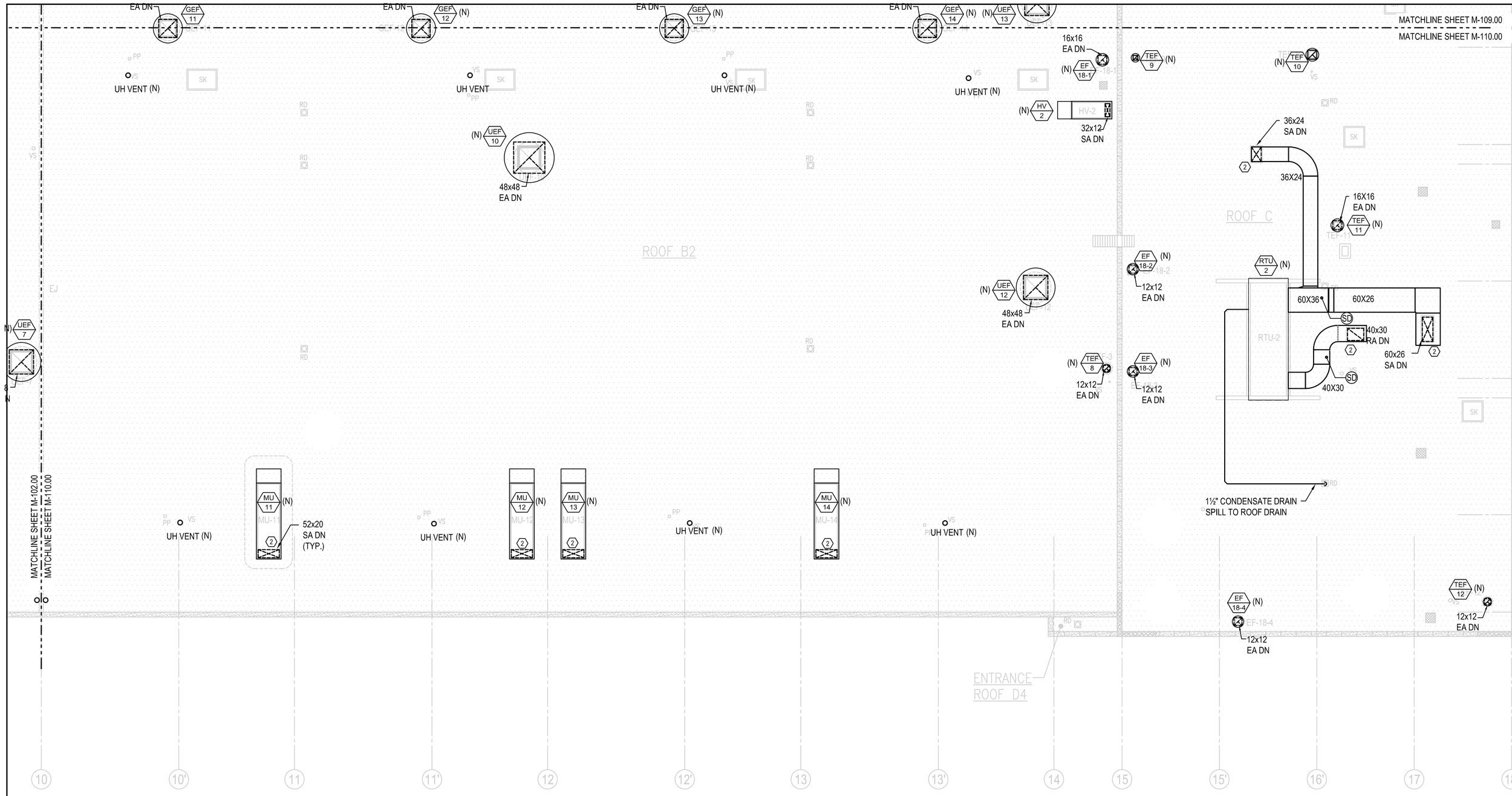
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DRAWING TITLE:
MECHANICAL ROOF PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

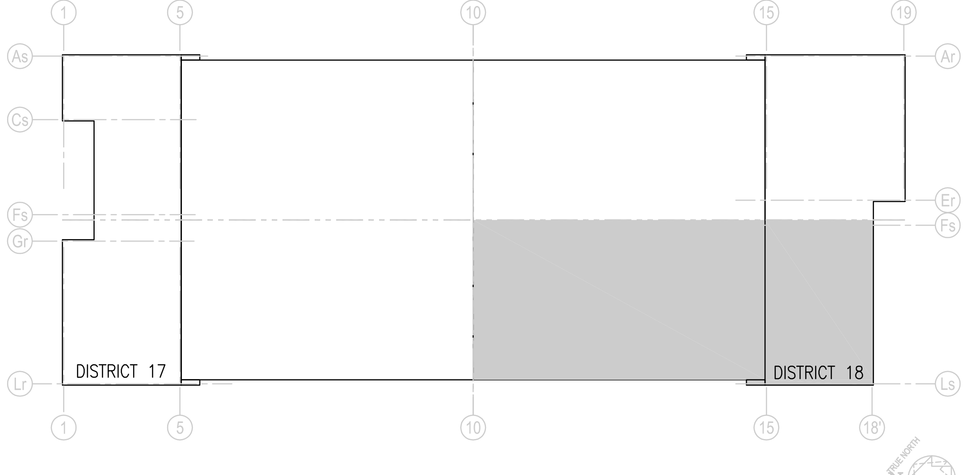
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CHECKED BY:	SL
DRAWING NUMBER:	M-109.00

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3/32"=1'-0"

KEY PLAN



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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

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10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

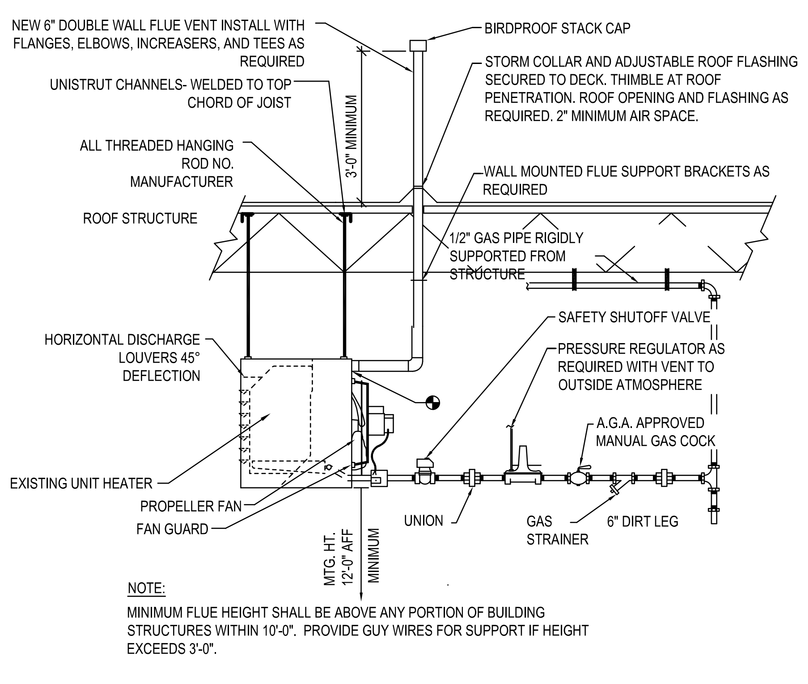
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DRAWING TITLE:
MECHANICAL ROOF PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK — SETH TITTERTON — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	SL
CHECKED BY:	SL
DRAWING NUMBER:	M-110.00

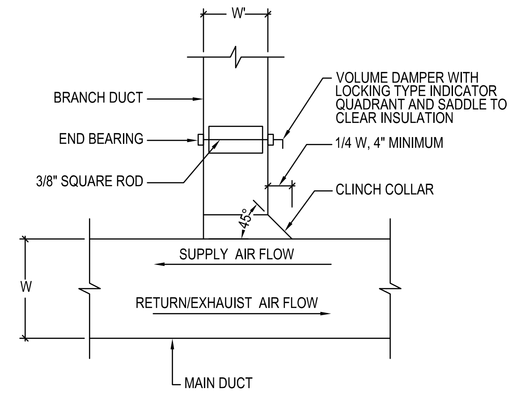
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NOTE:
MINIMUM FLUE HEIGHT SHALL BE ABOVE ANY PORTION OF BUILDING STRUCTURES WITHIN 10'-0". PROVIDE GUY WIRES FOR SUPPORT IF HEIGHT EXCEEDS 3'-0".

9 GAS FIRED UNIT HEATER IN NEW STORAGE ROOM IN GARAGE 17

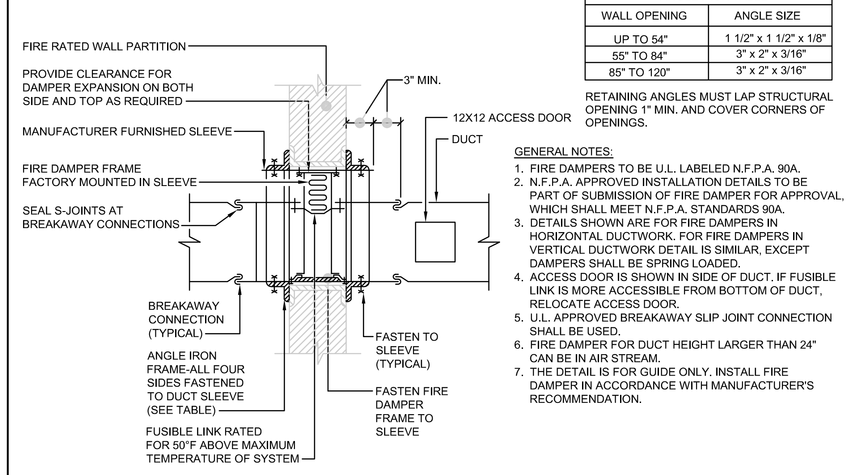
SCALE:



NOTES:
1. USE FOR SYMBOL, WHERE BRANCH DUCT AIR QUANTITY IS LESS THAN 1000 CFM.
2. NOT TO BE USED AS SUBSTITUTE FOR ELBOW.
3. BRANCH DUCT DEPTH SHALL BE A MINIMUM OF 2" LESS THAN MAIN DUCT.

6 RECTANGULAR DUCT ANGULAR TAP W/ VOLUMN DAMPER

SCALE: NONE



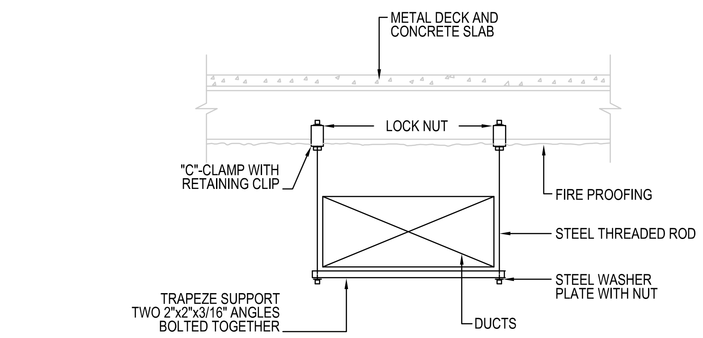
ANGLE IRON TABLE	
WALL OPENING	ANGLE SIZE
UP TO 54"	1 1/2" x 1 1/2" x 1/8"
55" TO 84"	3" x 2" x 3/16"
85" TO 120"	3" x 2" x 3/16"

RETAINING ANGLES MUST LAP STRUCTURAL OPENING 1" MIN. AND COVER CORNERS OF OPENINGS.

GENERAL NOTES:
1. FIRE DAMPERS TO BE U.L. LABELED N.F.P.A. 90A.
2. N.F.P.A. APPROVED INSTALLATION DETAILS TO BE PART OF SUBMISSION OF FIRE DAMPER FOR APPROVAL, WHICH SHALL MEET N.F.P.A. STANDARDS 90A.
3. DETAILS SHOWN ARE FOR FIRE DAMPERS IN HORIZONTAL DUCTWORK. FOR FIRE DAMPERS IN VERTICAL DUCTWORK DETAIL IS SIMILAR, EXCEPT DAMPERS SHALL BE SPRING LOADED.
4. ACCESS DOOR IS SHOWN IN SIDE OF DUCT. IF FUSIBLE LINK IS MORE ACCESSIBLE FROM BOTTOM OF DUCT, RELOCATE ACCESS DOOR.
5. U.L. APPROVED BREAKAWAY SLIP JOINT CONNECTION SHALL BE USED.
6. FIRE DAMPER FOR DUCT HEIGHT LARGER THAN 24" CAN BE IN AIR STREAM.
7. THE DETAIL IS FOR GUIDE ONLY. INSTALL FIRE DAMPER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.

3 FIRE DAMPER

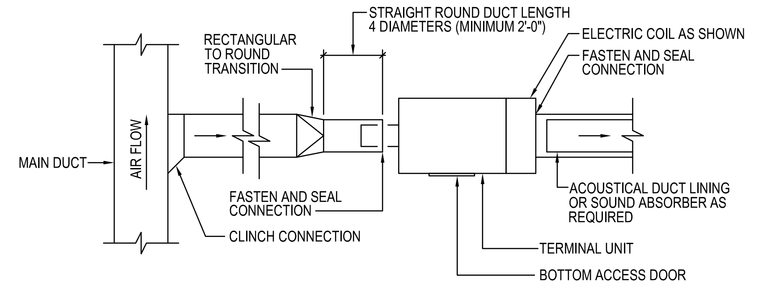
SCALE: NONE



NOTES:
1. PROVIDE VIBRATION ISOLATION AS REQUIRED OR INDICATED ON DRAWINGS.
2. FOR SIZE OF STEEL THREADED RODS, REFER TO SMACNA HVAC DUCT CONSTRUCTION STANDARD. METAL AND FLEXIBLE.

8 DUCT SUPPORT FROM BEAMS

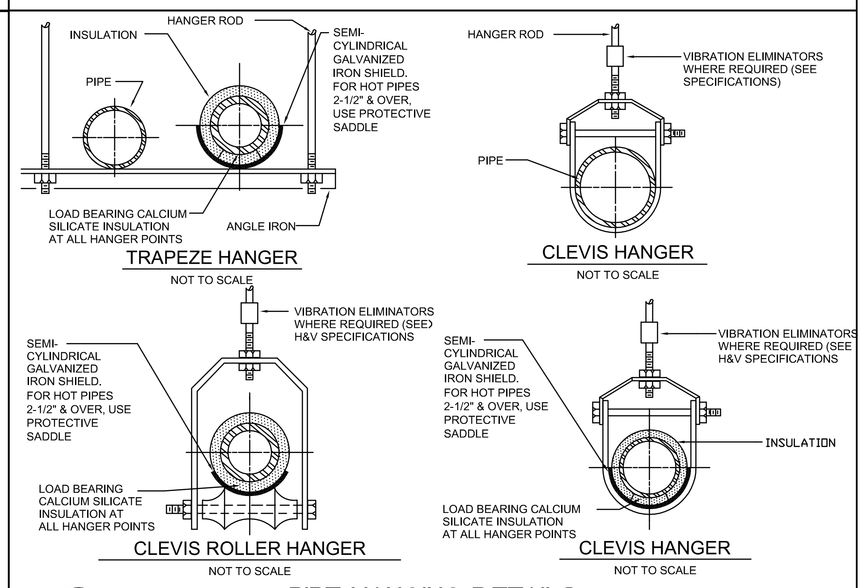
SCALE: NONE



NOTES:
1. THE OPERATION OF VARIABLE VOLUME TERMINAL UNITS ARE AFFECTED BY EXCESSIVE TURBULENCE ON THE ENTERING SIDE OF EACH TERMINAL UNIT. THEREFORE, TERMINAL UNITS MUST NOT BE INSTALLED TOO CLOSE TO MAIN DUCTS, ELBOWS AND FITTINGS.
2. WHEN MINIMUM UPSTREAM STRAIGHT DUCT CONNECTION TO TERMINALS, AS INDICATED ABOVE, CANNOT BE MAINTAINED, PROVIDE ORIFICE PLATE, STRAIGHTENING VANES OR OTHER DEVICE AS RECOMMENDED BY THE MANUFACTURER AND SUBMIT TO ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
3. MANUFACTURER OF TERMINAL UNIT SHALL PROVIDE CONTROLS ON LEFT OR RIGHT SIDE, AS REQUIRED BY FIELD CONDITIONS.
4. ARRANGE ACCESS TO PERMIT EASY FIELD BALANCE AND MAINTENANCE OF TERMINAL UNIT.

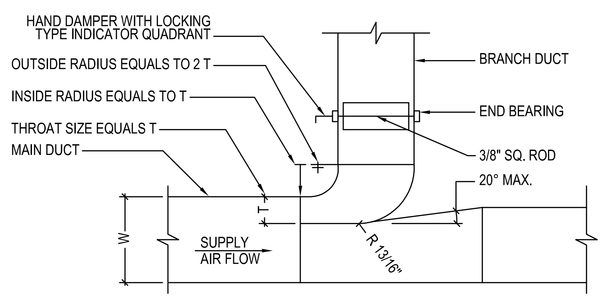
5 TERMINAL UNIT INSTALLATION (PLAN VIEW)

SCALE: NONE



2 PIPE HANGING DETAILS

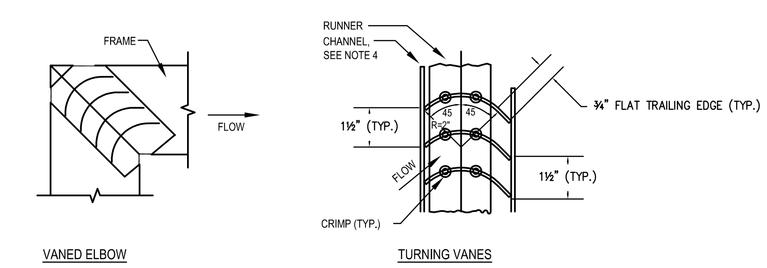
SCALE: NONE



NOTES:
1. FURNISH THIS TYPE CONNECTION WHERE NOTED AND WHEN SINGLE LINE DUCTWORK IS INDICATED AS THIS ⊥ FOR BRANCHES WITH MORE THAN 1000 CFM.
2. FURNISH THIS TYPE CONNECTION WITHOUT HAND DAMPERS FOR ALL HIGH PRESSURE DUCTWORK BRANCHES.
3. MUST BE USED WHEN W > 36".
4. MINIMUM T = 4".
5. UNLESS OTHERWISE NOTED THROAT SIZES SHALL BE PROPORTIONAL TO AIR QUANTITIES. (NOTE TO ENGINEER: SIZES SHOULD BE INDICATED ON DRAWINGS)

7 RECTANGULAR DUCT BRANCH W/ THROAT AND VOLUME DAMPER

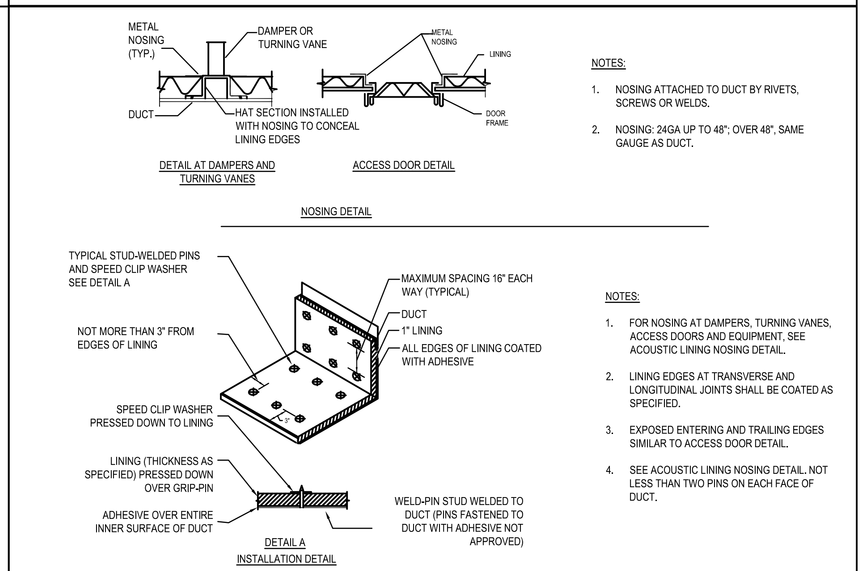
SCALE: NONE



NOTES:
1. FOR HIGH VELOCITY APPLICATIONS PROVIDE 18 GAUGE CHANNEL AND TACK WELD VANE EDGES TO CHANNEL, TYPICAL BOTH ENDS.
2. FRAMES AND CHANNELS - BOLTED OR TACK WELDED TO ELBOW.
3. DUCT INLET AND OUTLET DIMENSIONS TO BE EQUAL.
4. MAXIMUM UNSUPPORTED VANE LENGTH 36".
5. VANES AND FRAMES - 24 GAUGE.

4 TURNING VANES

SCALE:



NOTES:
1. NOSING ATTACHED TO DUCT BY RIVETS, SCREWS OR WELDS.
2. NOSING: 24GA UP TO 48"; OVER 48", SAME GAUGE AS DUCT.

NOTES:
1. FOR NOSING AT DAMPERS, TURNING VANES, ACCESS DOORS AND EQUIPMENT, SEE ACOUSTIC LINING NOSING DETAIL.
2. LINING EDGES AT TRANSVERSE AND LONGITUDINAL JOINTS SHALL BE COATED AS SPECIFIED.
3. EXPOSED ENTERING AND TRAILING EDGES SIMILAR TO ACCESS DOOR DETAIL.
4. SEE ACOUSTIC LINING NOSING DETAIL. NOT LESS THAN TWO PINS ON EACH FACE OF DUCT.

1 ACOUSTIC LINING DETAIL

SCALE:

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FOR THE: DEPARTMENT OF SANITATION

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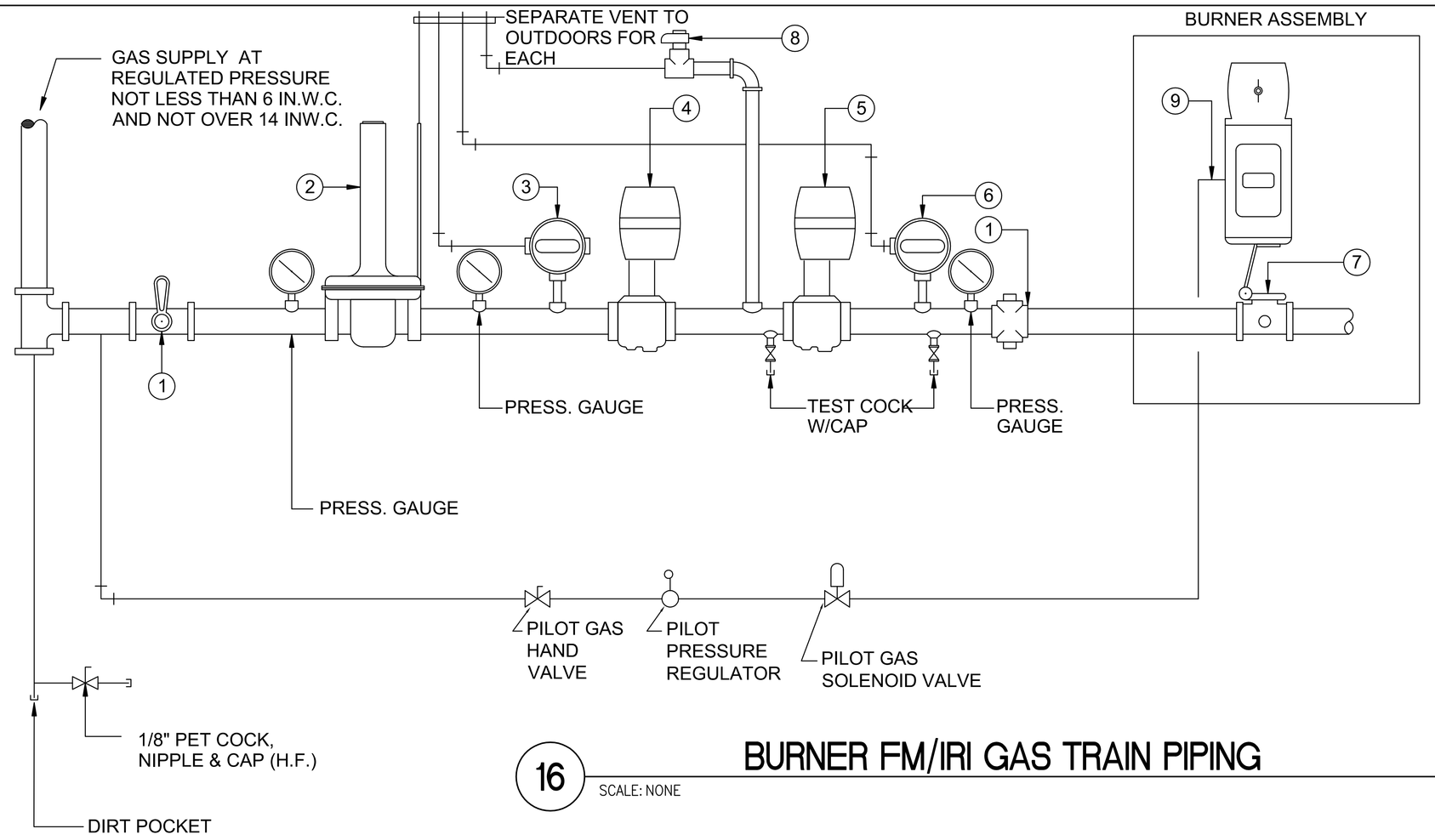
DRAWING TITLE:
MECHANICAL DETAILS

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

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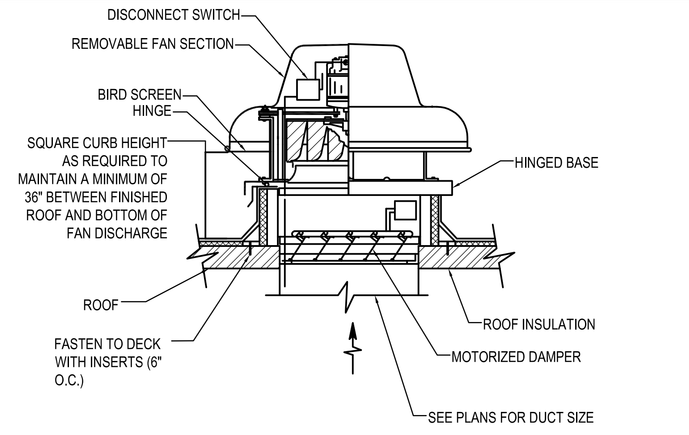


16 SCALE: NONE

BURNER FM/IRI GAS TRAIN PIPING

ITEM	DESCRIPTION
1	LUBRICATED SHUT-OFF COCK
2	MAIN GAS PRESSURE REGULATOR RANGE: 6 TO 14 IN. WC
3	LOW GAS PRESSURE SWITCH (MANUAL RESET)
4	SAFETY SHUT-OFF VALVE WITH VALVE ACTUATOR (MOTORIZED)
5	SAFETY SHUT-OFF VALVE WITH VALVE ACTUATOR (MOTORIZED)
6	HIGH GAS PRESSURE SWITCH WITH MANUAL RESET
7	FIRING RATE CONTROL VALVE - BURNER MOUNTED
8	SOLENOID VENT VALVE (NORMALLY OPEN)
9	BURNER GAS PILOT

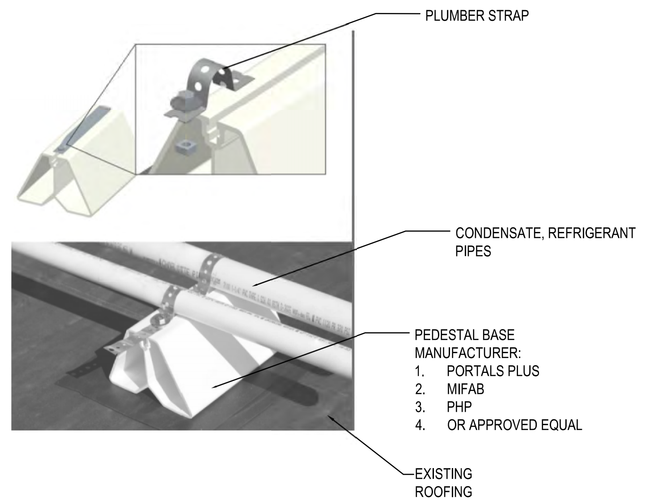
TEST GAUGE SHIPPED LOOSE. INSTALL ON BURNER
MANIFOLD AND ADJUST TO MAINTAIN MIN. 6 IN. W.C.
WITH RATE OF FIRE VALVE IN HIGH FIRE POSITION.



NOTES:
DUCT SHALL BE 1" SMALLER THAN ROOF OPENING. ROOF OPENING SHALL CONFORM TO CURB SIZE.

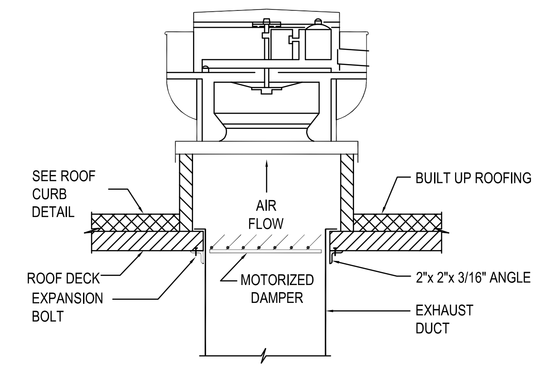
15 SCALE: NONE

ROOF MOUNTED EXHAUST FAN



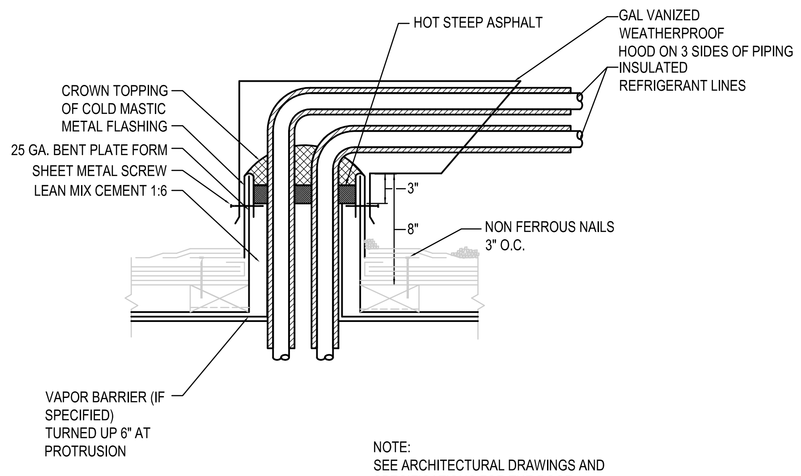
13 SCALE: NONE

PIPING SUPPORT ON ROOF



11 SCALE:

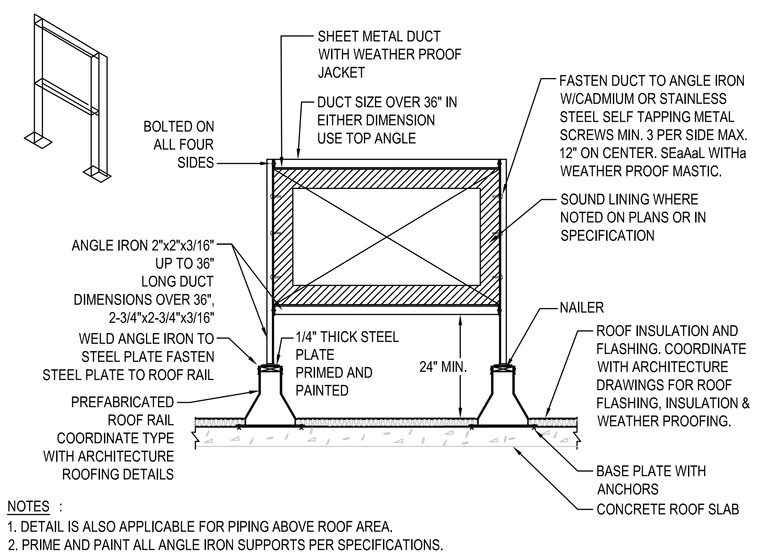
ROOF MOUNTED EXHAUST FAN (UPBLAST)



NOTE:
SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR THE ROOF CONSTRUCTION.

14 SCALE: NONE

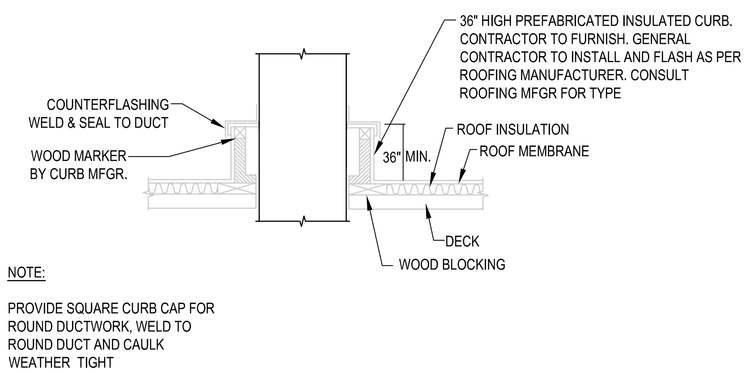
REFRIGERATION LINE PENETRATION THROUGH ROOF



NOTES :
1. DETAIL IS ALSO APPLICABLE FOR PIPING ABOVE ROOF AREA.
2. PRIME AND PAINT ALL ANGLE IRON SUPPORTS PER SPECIFICATIONS.

12 SCALE: NONE

ROOF MOUNTED DUCTWORK SUPPORT AND INSULATION



NOTE:

PROVIDE SQUARE CURB CAP FOR ROUND DUCTWORK, WELD TO ROUND DUCT AND CAULK WEATHER TIGHT

10 SCALE: NONE

DUCTWORK CURB DETAIL

SYSKA HENNESSY GROUP
A member company of SH Group, Inc.
Syska Hennessy Group, Inc.
1515 Broadway
New York, NY 10036
Tel: 212.921.2300
Fax: 212.556.3333
www.syska.com

AMANN & WHITNEY
A&W ARCHITECTS & ENGINEERS, P.C.
96 Morton Street, NY, New York 10014-3309

VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

Hirani Engineering & Land Surveying, P.C. Hirani Group
Engineers ■ Land Surveyors ■ Construction Managers
120 West John Street Hicksville, NY 11801
Tel: 516-248-1010 Fax: 516-248-9018
www.hiranigroup.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
MECHANICAL DETAILS

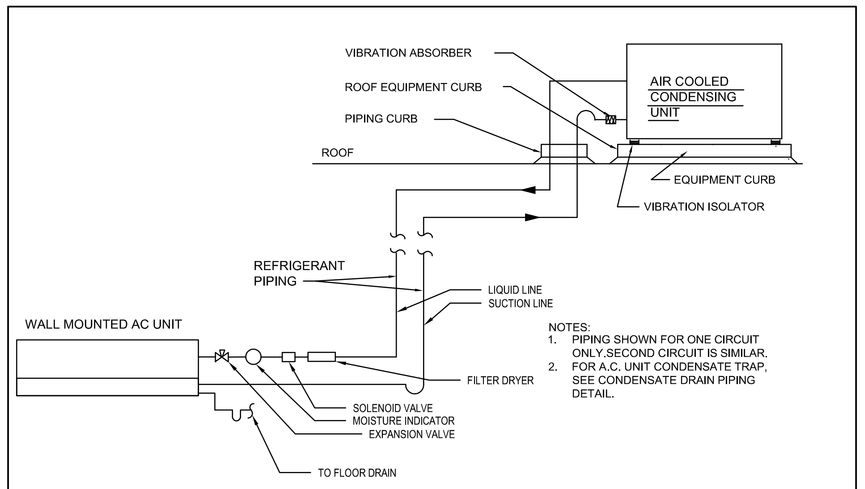
SEAL & SIGNATURE

STATE OF NEW YORK · STEVEN LITTLEFIELD · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: SL
CHECKED BY: SL
DRAWING NUMBER:
M-502.00

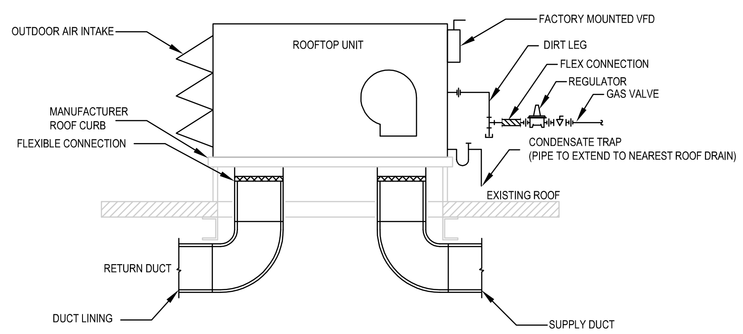
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2 DX AIR CONDITIONING UNIT

SCALE: NONE



1 ROOFTOP UNIT INSTALLATION DETAIL

SCALE: NONE

SYSKA HENNESSY GROUP
A member company of SH Group, Inc.
Syska Hennessy Group, Inc.
1515 Broadway
New York, NY 10036
Tel: 212.921.2300
Fax: 212.556.3333
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DATE: 09/27/2019
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DRAWN BY: SL
CHECKED BY: SL
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M-503.00

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PACKAGED ROOF TOP UNIT SCHEDULE - INDIRECT GAS FIRED HEATING (1 OF 2)

DESIGNATION	SERVICE	LOCATION	REFRIGERANT	MIN. OA CFM	EVAPORATOR FAN					DX COIL COOING									INDIRECT GAS HEATING PERFORMANCE						CONDENSER FAN (S)				RETURN FAN				COMPRESSOR		FILTER	ELECTRIC DATA			OPERATING WEIGHT (LB.)	BASIS OF DESIGN	REMARKS
					CFM	ESP (IN WG)	MOTOR			CAPACITY (MBH)		EER	IEER	EAT		LAT		MAX. FACE VEL (FPM)	MIN. NO. OF ROWS	INPUT, MAX. (MBH)	OUTPUT, MAX. (MBH)	EAT (°F)	LAT (°F)	EFFICIENCY (%)	MIN. / MAX. GAS PRESS. (IN WG)	STAGES	QTY.	MOTOR		CFM	ESP (IN WG)	MOTOR		QTY.	TOTAL KW/HP	TYPE	V/PH/HZ	FLA / MCA / MOCP			
							QTY	HP	RPM	TOTAL	SENSIBLE			DB °F	WB °F	DB °F	WB °F										HP	RPM			HP	RPM									
RTU-1	DISTRICT 17 OFFICE	DISTRICT 17 - ROOF	R410A	5,700	12,000	2.75	2	10	1,300	438	346	12.1	18	77	64.5	50.8	50.8	468	3	500	405	62.8	94.1	81	2.5/14	2	3	1	-	8,000	1	5	900	4	-	MERV 13	208 / 3 / 60	-	9,852	TRANE OANG040	
RTU-2	DISTRICT 17 OFFICE	DISTRICT 18 - ROOF	R410A	8,500	16,800	2.75	2	15	1,100	506.9	447.7	10.4	18	79	65.9	54.8	54.8	655	3	1000	810	55.6	100.2	81	2.5/14	2	4	1.5	-	11,000	1.5	7.5	800	4	-	MERV 13	208 / 3 / 60	-	10,352	TRANE OANG045	

NOTES:

1. PROVIDE UNIT MOUNTED VFD FOR BOTH SUPPLY FANS AND RETURN FAN WITH INTEGRAL STARTER/ DISCONNECT SWITCH AND UNIT MOUNTED CONTROLS ENCLOSURE.
2. RTUS TO HAVE ECONOMIZER FUNCTION.
3. GAS BURNER TO HAVE 10:1 MODULAR HIGH GAS HEAT.
4. GAS TRAINS SHALL BE APPROVED TO FM, IRI, OR OTHER NYC CODE REQUIREMENTS.
5. PROVIDE HOT GAS BYPASS.
6. UL LISTED AND AUDIBLE ALARM FOR FLAME FAILURE.
7. CLOGGED FILTER INDICATOR.
8. PROVIDE MINIMUM 30" CURB. REFER TO UNIT SPECIFICATIONS FOR CURB DETAIL.

ROOFTOP DX AIR CONDITIONING UNIT SCHEDULE - INDIRECT GAS HEATING (2 OF 2)

AIR TO AIR ENERGY RECOVERY UNIT SCHEDULE

OUTSIDE AIR (°F)				EXHAUST AIR (°F)				EFFECTIVENESS - SUMMER		EFFECTIVENESS - WINTER		REMARKS
EDB (°F)	EWB (°F)	LDB (°F)	LWB (°F)	EDB (°F)	EWB (°F)	LDB (°F)	LWB (°F)	SENSIBLE(%)	LATENT (%)	SENSIBLE(%)	LATENT (%)	
92.0	74.0	79.2	66.1	87.1	70.9	75.0	63.0	0.75	0.72	0.75	0.72	
83.8	68.8	82.9	68.6	83.8	68.8	75.0	63.0	0.53	0.50	0.52	0.50	

HEATING AND VENTILATION UNIT SCHEDULE - INDIRECT GAS HEATING

DESIG.	SERVICE	LOCATION	TYPE (CAV/VAV)	MIN OA (CFM)	SUPPLY FAN DATA							INDIRECT GAS HEATING PERFORMANCE										FILTER DATA	ELECTRIC DATA		WEIGHT (LBS)	BASIS OF DESIGN		REMARKS
					CFM	ESP (IN WG)	TOTAL SP (IN WG)	BHP	MOTOR HP	FAN RPM	FAN TYPE	FUEL TYPE	MAXIMUM INPUT CAPACITY (MBH)	MAXIMUM OUTPUT CAPACITY (MBH)	EAT (DB °F)	LAT (DB °F)	EFF(%)	OUTPUT CAPACITY @ 45.1°F ΔT (MBH)	EAT (DB °F)	LAT (DB °F)	OUTPUT CAPACITY (MBH)	TYPE	V / PH / HZ	MCA / MOCP		MFR	MODEL	
HV-1	DISTRICT 17 OFFICE	DISTRICT 17 - ROOF	CAV	1,400	1,400	1.5	1.73	1.05	1-1/2	1,385	CENTRIFUGAL	NATURAL GAS	150	120	13.9	70	82	85	13.9	59	68	2" MERV-8	208 / 3 / 60	6 / -	1692	TRANE	GRCA15	
HV-2	DISTRICT 17 OFFICE	DISTRICT 18 - ROOF	CAV	2,400	2,400	1.5	1.71	1.51	2	1,210	CENTRIFUGAL	NATURAL GAS	250	200	13.9	70	82	145	13.9	59	116	2" MERV-8	208 / 3 / 60	7.75 / -	3727	TRANE	GRCA25	

NOTES:

1. MAKE-UP AIR UNIT SHALL BE BASED ON 100% OUTDOOR AIRFLOW ARRANGEMENT.
2. PROVIDE DOUBLE WALL INSULATED METAL CABINET CONSTRUCTION WITH REMOVABLE ACCESS PANELS AND BIRDSCREEN WEATHERHOOD.
3. PROVIDE LOW-LEAKAGE MOTORIZED INLET DAMPER.
4. PROVIDE UNIT-MOUNTED DISCONNECT SWITCH.
5. PROVIDE UNIT-MOUNTED NEMA 3R CONTROL PANEL.
6. PROVIDE FACTORY FURNISHED GAS PRESSURE REGULATOR.
7. PROVIDE THE FOLLOWING ELECTRICAL ACCESSORIES: FREEZE PROTECTION, DIRTY FILTER SENSOR, INLET DAMPER END SWITCH AND EXTERNAL COOLING LOCKOUT RELAY.
8. PROVIDE 36" TALL FACTORY-FURNISHED GALVANIZED STEEL ROOF CURB WITH INSULATION. CONTRACTOR SHALL COORDINATE INSTALLATION WITH ROOFING CONTRACTOR.
9. PROVIDE UNIT MOUNTED VFD.

MAKE-UP AIR UNIT SCHEDULE - INDIRECT GAS HEATING

DESIG.	SERVICE	LOCATION	TYPE (CAV/VAV)	MIN OA (CFM)	SUPPLY FAN DATA							INDIRECT GAS HEATING PERFORMANCE												FILTER DATA	ELECTRIC DATA		WEIGHT (LBS)	BASIS OF DESIGN		REMARKS
					CFM	ESP (IN WG)	TOTAL SP (IN WG)	BHP	MOTOR HP	FAN RPM	FAN TYPE	FUEL TYPE	INPUT CAPACITY (MBH)	MAXIMUM OUTPUT CAPACITY (MBH)	EAT (DB °F)	LAT (DB °F)	EFF(%)	EAT (DB °F)	LAT (DB °F)	OUTPUT CAPACITY @ 45.1°F ΔT (MBH)	MIN. INLET PRESSURE (IN WC)	STAGES	ELECTRONIC MODULATION	TYPE	V / PH / HZ	MCA / MOP		MFR	MOD	
MU-1	DISTRICT 17 TRUCK REPAIR	DISTRICT 17 - ROOF	CAV	8,500	8,500	1.00	1.87	6.25	7.5	1,054	CENTRIFUGAL	NATURAL GAS	800	640	13.9	83.7	80	13.9	59	414	4.5	2	STAGE 1	2" MERV-8	208 / 3 / 60	29.77 / 50.77	2,746	TRANE	GRAA80	
MU-2	DISTRICT 17 TRUCK REPAIR	DISTRICT 17 - ROOF	CAV	8,500	8,500	1.00	1.87	6.25	7.5	1,054	CENTRIFUGAL	NATURAL GAS	800	640	13.9	83.7	80	13.9	59	414	4.5	2	STAGE 1	2" MERV-8	208 / 3 / 60	29.77 / 50.77	2,746	TRANE	GRAA80	
MU-3	DISTRICT 18 TRUCK REPAIR	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-4	DISTRICT 18 TRUCK REPAIR	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-5	DISTRICT 17 TRUCK STORAGE	DISTRICT 17 - ROOF	CAV	11,000	11,000	1.00	2.45	12.85	15.0	1,323	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	94.7	80	13.9	59	536	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	52.15 / 89.55	3,313	TRANE	GRAA12	
MU-6	DISTRICT 17 TRUCK STORAGE	DISTRICT 17 - ROOF	CAV	11,000	11,000	1.00	2.45	12.85	15.0	1,323	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	94.7	80	13.9	59	536	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	52.15 / 89.55	3,313	TRANE	GRAA12	
MU-7	DISTRICT 17 TRUCK STORAGE	DISTRICT 17 - ROOF	CAV	11,000	11,000	1.00	2.45	12.85	15.0	1,323	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	94.7	80	13.9	59	536	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	52.15 / 89.55	3,313	TRANE	GRAA12	
MU-8	DISTRICT 17 TRUCK STORAGE	DISTRICT 17 - ROOF	CAV	11,000	11,000	1.00	2.45	12.85	15.0	1,323	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	94.7	80	13.9	59	536	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	52.15 / 89.55	3,313	TRANE	GRAA12	
MU-9	DISTRICT 17 TRUCK STORAGE	DISTRICT 17 - ROOF	CAV	11,000	11,000	1.00	2.45	12.85	15.0	1,323	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	94.7	80	13.9	59	536	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	52.15 / 89.55	3,313	TRANE	GRAA12	
MU-10	DISTRICT 17 TRUCK STORAGE	DISTRICT 17 - ROOF	CAV	11,000	11,000	1.00	2.45	12.85	15.0	1,323	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	94.7	80	13.9	59	536	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	52.15 / 89.55	3,313	TRANE	GRAA12	
MU-11	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-12	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-13	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-14	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-15	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-16	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-17	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	
MU-18	DISTRICT 18 TRUCK STORAGE	DISTRICT 18 - ROOF	CAV	10,000	10,000	1.00	2.20	10.09	15.0	1,234	CENTRIFUGAL	NATURAL GAS	1,200	960	13.9	102.8	80	13.9	59	487	4.5	3	STAGE 1	2" MERV-8	208 / 3 / 60	58.15 / 95.55	3,313	TRANE	GRAA12	

NOTES:

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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DIVISION OF BUILDINGS

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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
MECHANICAL SCHEDULES

SEAL & SIGNATURE

STATE OF NEW YORK — KEITH TITTEL — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: AT
CHECKED BY: AT
DRAWING NUMBER:
M-701.00

Plotted: 9/27/2019 7:53:46 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\M-701.00_DDC33000.DWG - aengelman

FAN SCHEDULE

DESIGNATION	QUANTITY	SERVICE	LOCATION	PERFORMANCE DATA				CONSTRUCTION DATA ARRANGEMENT			MOTOR DATA					NOMINAL EFFICIENCY (%)	BASIS OF DESIGN MANUFACTURER	MODEL	SOUND DATA		OPERATING WEIGHT (LB)	REMARKS
				CFM	ESP (IN)	BHP	RPM	FAN TYPE	WHEEL SIZE (IN)	DRIVE TYPE	HP	MOTOR RPM	V/PH/HZ	STARTER TYPE	ENCLOSURE				INLET dBA	INLET SONES		
GEF-1 & 2	2	DISTRICT 17 TRUCK REPAIR	ROOF	6,800	0.75	1.80	684	CENTRIFUGAL	30.5	BELT	3.00	1725	208/3/60	VFD	ODP	90	GREENHECK	GB-260-30	65	14.9	177	
GEF-3 & 4	2	DISTRICT 18 TRUCK REPAIR	ROOF	8,300	0.75	2.23	667	CENTRIFUGAL	30.5	BELT	3.00	1725	208/3/60	VFD	ODP	90	GREENHECK	GB-300-30	66	2.23	199	
GEF-5 TO 10	6	DISTRICT 17 TRUCK STORAGE	ROOF	11,000	1.00	3.69	617	CENTRIFUGAL	36	BELT	5	1725	208/3/60	VFD	ODP	88	GREENHECK	GB-330-50	70	19.5	224	
GEF-11 TO 18	8	DISTRICT 18 TRUCK STORAGE	ROOF	10,000	1.00	3.68	788	CENTRIFUGAL	30.5	BELT	5	1725	208/3/60	VFD	ODP	88	GREENHECK	GB-300-50	70	20	259	
UEF-1 TO 6	6	DISTRICT 17 TRUCK STORAGE	ROOF	16,000	0.75	4.10	479	CENTRIFUGAL	42.25	BELT	5	1725	208/3/60	VFD	ODP	88	GREENHECK	CUBE-420-50	66	15.9	403	
UEF-7 TO 14	8	DISTRICT 18 TRUCK STORAGE	ROOF	15,000	0.50	2.42	326	CENTRIFUGAL	48.25	BELT	5	1725	208/3/60	VFD	ODP	88	GREENHECK	CUBE-480-50	61	11.5	403	
TEF-1	1	DISTRICT 17 OFFICE	ROOF	960	1.00	0.35	1656	CENTRIFUGAL	14.625	DIRECT	3/4	2200	208/1/60	VARIGREEN	ODP	85	GREENHECK	G-143HP-VG	64	13.5	50	
TEF-2	1	DISTRICT 17 OFFICE	ROOF	750	0.50	0.12	1271	CENTRIFUGAL	11.125	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-103-VG	52	6.2	37	
TEF-3	1	DISTRICT 17 OFFICE	ROOF	250	0.50	0.06	1571	CENTRIFUGAL	10.875	DIRECT	1/10	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-080-VG	55	7.6	37	
TEF-4	1	DISTRICT 17 OFFICE	ROOF	1,050	1.00	0.40	1739	CENTRIFUGAL	14.625	DIRECT	3/4	2200	208/1/60	VARIGREEN	ODP	85	GREENHECK	G-143HP-VG	65	15.1	52	
TEF-5	1	DISTRICT 17 OFFICE	ROOF	150	0.50	0.05	1236	CENTRIFUGAL	11.188	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-097-VG	50	5.7	29	
TEF-6	1	DISTRICT 17 OFFICE	ROOF	550	1.00	0.22	1921	CENTRIFUGAL	11.125	DIRECT	1/4	2500	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-103HP-VG	61	11.8	50	
TEF-7	1	DISTRICT 17 OFFICE	ROOF	400	0.75	0.12	1570	CENTRIFUGAL	11.125	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-103HP-VG	55	8.1	50	
TEF-8	1	DISTRICT 18 OFFICE	ROOF	500	0.75	0.14	1535	CENTRIFUGAL	11.188	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-098-VG	57	8.9	50	
TEF-9	1	DISTRICT 18 OFFICE	ROOF	650	0.75	0.16	1460	CENTRIFUGAL	11.188	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-099-VG	58	9.2	50	
TEF-10	1	DISTRICT 18 OFFICE	ROOF	550	1.00	0.22	1921	CENTRIFUGAL	11.125	DIRECT	1/2	2500	208/1/60	VARIGREEN	ODP	85	GREENHECK	G-103HP-VG	61	11.8	50	
TEF-11	1	DISTRICT 18 OFFICE	ROOF	1,100	1.00	0.43	1787	CENTRIFUGAL	14.625	DIRECT	3/4	2200	208/1/60	VARIGREEN	ODP	85	GREENHECK	G-143HP-VG	66	16.2	50	
TEF-12	1	DISTRICT 18 OFFICE	ROOF	600	0.75	0.17	1666	CENTRIFUGAL	11.188	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-098-VG	60	10.4	50	
EF-17-1	1	DISTRICT 17 OFFICE	ROOF	480	0.75	0.13	1516	CENTRIFUGAL	11.188	DIRECT	1/4	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-098-VG	57	8.7	78	
EF-17-2	1	DISTRICT 17 OFFICE	ROOF	1,780	0.70	0.44	1278	CENTRIFUGAL	14.625	DIRECT	1	1725	208/1/60	VARIGREEN	TEFC	85	GREENHECK	G-143-VG	61	11	78	
EF-17-3	1	DISTRICT 17 OFFICE	ROOF	300	0.75	0.14	1669	CENTRIFUGAL	10.87	DIRECT	1/6	1725	115/1/60	VARIGREEN	ODP	85	GREENHECK	G-095-VG	61	11	78	
EF-18-1	1	DISTRICT 18 OFFICE	ROOF	2,080	1.20	0.83	1586	CENTRIFUGAL	14.625	DIRECT	1	1725	208/1/60	VARIGREEN	TEFC	85	GREENHECK	G-143-VG	67	15.2	67	
EF-18-2	1	DISTRICT 18 OFFICE	ROOF	1,300	1.00	0.36	1556	CENTRIFUGAL	13.062	DIRECT	1/2	1725	208/1/60	VARIGREEN	ODP	85	GREENHECK	G-123-VG	64	12.9	47	
EF-18-3	1	DISTRICT 18 OFFICE	ROOF	950	1.00	0.34	1647	CENTRIFUGAL	14.625	DIRECT	1/2	1725	208/1/60	VARIGREEN	ODP	85	GREENHECK	G-143HP-VG	63	13.4	47	
EF-18-4	1	DISTRICT 18 OFFICE	ROOF	2,000	0.75	0.56	1383	CENTRIFUGAL	14.625	DIRECT	1	1725	208/1/60	VARIGREEN	TEFC	85	GREENHECK	G-143-VG	63	12.7	47	

NOTES:

1. FANS SELECTED SPECIFICALLY BASED ON SOUND AND UPWARD MOBILITY OF 25% IN CLASS, FAN RPM, AND MOTOR HP.
2. ALL FANS SHALL BE UL/CUL-705 LISTED "POWER VENTILATORS."
3. ALL MOTORS 1 HP AND LARGER SHALL BE NEMA PREMIUM EFFICIENCY - MEETS NEMA TABLE 12-12.
4. ALL SINGLE PHASE MOTORS TO INCLUDE THERMAL OVERLOAD.
5. MOTOR VOLTAGE SHALL BE COORDINATED BY CONTRACTOR.
6. MOTORS SHALL BE PROVIDED WITH DISCONNECT SWITCHES AND APPROPRIATE ENCLOSURE BASED ON LOCATION AND APPLICATION.
7. ORIENTATION INCLUDING ARRANGEMENT, ROTATION AND/OR DISCHARGE SHALL BE COORDINATED BY CONTRACTOR.
8. ALL VFD RATED MOTORS SHALL BE PROVIDED WITH CLASS F INSULATION AND AN ORION SHAFT GROUNDING BRUSH WHICH INCLUDES A CONTINUOUS FORCE SPRING AND BRUSH MATERIAL CONSISTING OF A CARBON GRAPHITE AND INDUSTRIAL SILVER COMPOUND POSITIONED IN SUCH A MANNER THAT THE BRUSH IS ALWAYS IN CONTACT WITH THE SHAFT CONTINUOUSLY TO MAXIMIZE EFFICIENCY.
9. ALL ROOFTOP FANS SHALL BE PROVIDED WITH CLASS I LEAKAGE MOTORIZED DAMPERS & END SWITCH AS PER 2016 NYC ENERGY CONSERVATION CODE.

AIR TERMINAL UNIT SCHEDULE

DESIGNATION	TYPE	LOCATION	INLET SIZE (IN)	CFM		MINIMUM ΔSP (IN. WG.)	MANUFACTURER & MODEL NO.	REMARKS
				MIN. UNIT CAPACITY	MAXIMUM			
CAV-17-1	CAV	2ND FLOOR	10	-	800	0.1	TITUS DESV	
CAV-17-2	CAV	2ND FLOOR	16	-	1800	0.1	TITUS DESV	
CAV-17-3	CAV	2ND FLOOR	8	-	600	0.1	TITUS DESV	
CAV-18-1	CAV	2ND FLOOR	14	-	1000	0.1	TITUS DESV	
CAV-18-2	CAV	2ND FLOOR	16	-	2250	0.1	TITUS DESV	
CAV-18-3	CAV	2ND FLOOR	14	-	1650	0.1	TITUS DESV	

NOTES:

1. MINIMUM INLET DUCT SIZE INDICATED SHALL BE BROUGTH TO WITHIN THE LENGTH OF 3 DIAMETERS OF THE BOX'S INLET CONNECTION SIZE.
2. PROVIDE DDC CONTROLLER. DDC CONTROLLER SHALL BE FURNISHED BY BMS CONTRACTOR AND INSTALLED BY MANUFACTURER.
3. PROVIDE TRANSFORMER.

GAS FIRED UNIT HEATER SCHEDULE

DESIGNATION	SERVICE	LOCATION	TYPE	MOUNTING HEIGHT (FT.)	THROW (FT)	FAN DATA			MOTOR DATA		GAS DATA			AIR TEMP		OPERATING WEIGHT (LB.)	BASIS OF DESIGN MANUFACTURER	MODEL	REMARKS
						CFM	RPM	FAN TYPE	HP	V/PH/HZ	INPUT CAPACITY (MBH)	OUTPUT CAPACITY (MBH)	EFF(%)	EDB (°F)	LDB (°F)				
UH-1	DISTRICT 17 TRUCK STORAGE	STROAGE ROOM	GAS-FIRED	10	25	505	1500	PROPELLER	1/15	115/1/60	30	24	80	55	99	55	MODINE	HD-30	

NOTES: PROVIDE REMOTE THERMOSTAT.

SPLIT AIR CONDITIONING UNI - HEAT PUMP

UNIT NO.	SERVICE	LOCATION	SEER	INPUT W	DX COIL				ELECTRICAL		WEIGHT (LBS)	MANUFACTURER	MODEL	NOTE
					TOTAL COOLING / HEATING (BTU/HR)		EAT (°F)		MCA	V/PH/HZ				
							SUMMER	WINTER						
AC-1	DISTRICT 17 TRUCK WASH	DISTRICT 17 TRUCK WASH	20	104	35,500	37,000	85	70	-	208/1/60	50	LG	ARNU363SVA4	1, 2
AC-2	DISTRICT 17 TRUCK WASH	DISTRICT 17 TRUCK WASH	20	104	35,500	37,000	85	70	-	208/1/60	50	LG	ARNU363SVA4	1, 2

NOTES:

1. PROVIDE FILTER MERV 8.
2. PROVIDE LOW AMBIENT CONTROL. PROVIDE COMPLIANCE WITH ENERGY STAR REQUIREMENT.

AIR COOLED CONDENSING UNIT - HEAT PUMP

UNIT NO.	SERVING	LOCATION	COOLING CAP. BTU/HR	HEATING CAP. BTU/HR	OUTDOOR AIR (SUM/WIN ,°F)	ELECTRICAL				WEIGHT (LBS)	EER	IEER	COP	MANUFACTURER	MODEL	NOTE
						MCA	MOCP	FAN MOTOR FLA	V/PH/HZ							
ACCU-1	AC-1 AND AC-2	DISTRICT 17 TRUCK WASH	72,000	81,000	92 / 11	22.6	35	5	208/3/60	500	12.5	20.8	3.6	LG	ARUM072BTE5	1, 2, 3

NOTES:

1. PROVIDE LOW AMBIENT CONTROL TO 0° F. PROVIDE COMPLIANCE WITH ENERGY STAR REQUIREMENT.
2. REFRIGERANT LINES SIZED BY MANUFACTURER.
3. INSULATE BOTH REFRIGERANT LINES AND PROVIDE WEATHERPROOF JACKET.

CARBON MONOXIDE DETECTION CONTROLLER

DESIGNATION	SERVES	LOCATION	MAX INPUT POINTS	ELECTRICAL		MANUFACTURER & MODEL NO.	REMARKS
CO-17-1	GARAGE 17	1ST FLOOR MCC	99	17-27 VAC	24-36 VDC	MSA Z-GARD CX II	
CO-18-1	GARAGE 18	1ST FLOOR STORAGE	99	17-27 VAC	24-36 VDC	MSA Z-GARD CX II	

NOTES:

1. NEMA 4X ENCLOSURE
2. BACNET MS/TP

DIFFUSERS, REGISTERS, AND GRILLES SCHEDULE

DESIGNATION	LETTER	SERVING	TYPE	CFM RANGE	FRAME SIZE	NECK SIZE	MAX TOTAL PRESSURE DROP (IN. WG)	MAX N.C.	NOTES
CD	A	SUPPLY	SQUARE DIFFUSER	0 - 200	24 X 24	6"Ø			
CD	B	SUPPLY	SQUARE DIFFUSER	201 - 350	24 X 24	8"Ø			
CD	C	SUPPLY	SQUARE DIFFUSER	351 - 500	24 X 24	10"Ø			
CD	D	SUPPLY	SQUARE DIFFUSER	501 - 700	24 X 24	12"Ø			
CD	G	SUPPLY	SQUARE DIFFUSER	0 - 135	12 X 12	5"Ø			
CD	H	SUPPLY	SQUARE DIFFUSER	135 - 200	12 X 12	6"Ø			
RD	A	RETURN	SQUARE DIFFUSER	0 - 200	24 X 24	6"Ø			
RD	B	RETURN	SQUARE DIFFUSER	201 - 350	24 X 24	8"Ø			
RD	C	RETURN	SQUARE DIFFUSER	351 - 500	24 X 24	10"Ø			
RD	D	RETURN	SQUARE DIFFUSER	501 - 700	24 X 24	12"Ø			
RD	G	RETURN	SQUARE DIFFUSER	0 - 135	12 X 12	5"Ø			
RD	H	RETURN	SQUARE DIFFUSER	135 - 200	12 X 12	6"Ø			
TG	A	SUPPLY	SIDEWALL REGISTER	335	14 X 6	14 X 6			
TG	B	SUPPLY	SIDEWALL REGISTER	665	18 X 10	18 X 10			

NOTES:

1. SEE PLAN FOR CFM.
2. ALL DIFFUSERS SHALL BE PROVIDED WITH OPPOSED BLADE DAMPERS.
3. COORDINATE BORDER AND FINISH TYPE WITH ARCHITECT.
4. PROVIDE CORD OPERATED DAMPER WHERE DIFFUSERS ARE LOCATED IN INACCESSIBLE CEILING.
5. NECK SIZE FOR NON 4-WAY DIFFUSERS SHALL BE DETERMINED BY ADJUSTING TOTAL CFM TO EQUIVALENT 4-WAY. EXAMPLE: 150 CFM 2-WAY SHALL BE SIZED BASED ON 300 CFM 4-WAY. PROVIDE DEFLECTORS AS REQUIRED.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
MECHANICAL SCHEDULES

SEAL & SIGNATURE

STATE OF NEW YORK — KEITH FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	AT
CHECKED BY:	AT
DRAWING NUMBER:	M-702.00

Plotted: 9/27/2019 7:53:37 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\M-702.00_DDC33000.DWG - aengelman

SYMBOLS (AS APPLICABLE)

EQUIPMENT LABELS		CONTROL LABELS	
	SUPPLY FAN	CA XX	COMMON ALARM
	EXHAUST FAN	CO XX	CARBON MONOXIDE TRANSMITTER
	PUMP	FBK XX	FEEDBACK
M	2-POSITION DAMPER	FMS XX	AIR FLOW MEASURING STATION
		FSC XX	FAN SPEED CONTROL
M	MODULATING DAMPER	FT XX	FLOW TRANSMITTER
	2-WAY PNEUMATIC VALVE	HL XX	HIGH LEVEL ALARM
	3-WAY PNEUMATIC VALVE	HT XX	HUMIDITY TRANSMITTER
M	2-WAY MOTORIZED VALVE	ICD XX	ISOLATION CONTROL DAMPER
M	3-WAY MOTORIZED VALVE	LD XX	LEAK DETECTION
C / C	COOLING COIL	LL XX	LOW LEVEL ALARM
		MCD XX	MODULATING CONTROL DAMPER
P / C	PREHEAT COIL	MCV XX	MODULATION CONTROL VALVE
		PDT XX	PRESSURE DIFFERENTIAL TRANSMITTER
H / C	HEATING COIL	PSH XX	PRESSURE SWITCH - HIGH
		PSL XX	PRESSURE SWITCH - LOW
	MAGNETIC STARTER	PT XX	PRESSURE TRANSMITTER
		SD XX	SMOKE DETECTOR
VFD	VARIABLE FREQUENCY DRIVE	SS XX	START / STOP
DDCP	DIRECT DIGITAL CONTROL PANEL	SPT XX	STATIC PRESSURE TRANSMITTER
AFMS	AIR FLOW MEASURING STATION	ST XX	STATUS
FILTER	FILTER	TCD XX	TEMPERATURE CONTROL DAMPER
		TCV XX	TEMPERATURE CONTROL VALVE
		TT XX	TEMPERATURE TRANSMITTER

NOTE:
FOR POINT ABBREVIATIONS, REFER TO INDIVIDUAL SYSTEM'S POINT LIST.

NOT ALL SYMBOLS SHOWN ARE APPLICABLE. SOME SYMBOLS ARE SHOWN TO FACILITATE REVISIONS AND CHANGES IN THE SCOPE OF WORK.

GENERAL NOTES

1. THE DSNY 17/18 SANITATION GARAGES, BROOKLYN, NEW YORK, SHALL REQUIRE A NEW INSTALLATION OF A BUILDING MANAGEMENT SYSTEM (BMS) FOR MONITORING AND CONTROL OF MECHANICAL EQUIPMENT. SOFTWARE AND GRAPHICS WILL BE ADDED TO THE NEW BMS SYSTEM UNDER THIS CONTRACT.
2. ADDITIONAL SOFTWARE PROGRAMMING SHALL BE PROVIDED UNDER THIS CONTRACT TO IMPLEMENT ADDITIONAL ENERGY ROUTINES. WORK SHALL INCLUDE HVAC CONTROL, ALARM MONITORING, POINT TRENDING, POINT REPORTING AND MAINTENANCE MANAGEMENT FUNCTIONS. COORDINATE WITH ALL SITE LOW VOLTAGE SYSTEMS AS SPECIFIED.
3. THE BMS CONTRACTOR NETWORK FOR THE FACILITY WORK SHALL INCLUDE HVAC CONTROL, ENERGY MANAGEMENT, ALARM MONITORING, POINT TRENDING, POINT REPORTING AND MAINTENANCE MANAGEMENT FUNCTIONS. COORDINATE WITH ALL SITE LOW VOLTAGE SYSTEMS AS SPECIFIED.
4. BMS CONTRACTOR SHALL PROVIDE A STANDALONE ETHERNET NETWORK.
5. BMS CONTRACTOR SHALL PROVIDE ALL LOW VOLTAGE WIRING ASSOCIATED WITH FUEL OIL PUMPS, FUEL OIL DAY TANKS, FUEL OIL TANKS, ETC.
6. AFTER INSTALLING EQUIPMENT, THE BMS CONTRACTOR SHALL DEMONSTRATE THAT THE SYSTEM IS 100% OPERATIONAL.
7. PROVIDE CONTROL POWER TRANSFORMERS/POWER SUPPLIES FOR ALL NEW EQUIPMENT.
8. REFER TO MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS OF EQUIPMENT, DUCTWORK AND PIPING.
9. CONTROL WIRING IS TO BE ENCLOSED IN CONDUIT.
10. INTERFACE/INTEGRATE WITH THIRD-PARTY EQUIPMENT AS DEFINED AND SPECIFIED.
11. MAXIMUM ACCEPTABLE RESPONSE TIME FROM ANY ALARM OCCURRENCE (AT THE POINT OF ORIGIN) TO THE POINT OF ANNUNCIATION SHALL NOT EXCEED 5 SECONDS FOR NETWORK CONNECTED USER INTERFACES.
12. PROVIDE 120v, 15 AMP CIRCUIT TO EACH NEW BMS PANEL.
13. WHEN EQUIPMENT FAILURE COINCIDES WITH A POWER FAILURE, INDIVIDUAL EQUIPMENT FAILURE ALARMS SHALL NOT BE GENERATED.
14. THE BMS CONTRACTOR SHALL PROVIDE A COMPLETE SYSTEM CONSISTING OF DIRECT DIGITAL CONTROL PANELS (DDCPS), FIELD I/O DEVICES, POWER SUPPLIES AND SUPPORTIVE SOFTWARE, TO MEET THE WRITTEN SEQUENCES OF OPERATIONS, AS WRITTEN IN CONTRACT SPECIFICATIONS.
15. THE SYSTEM SHALL SUPPORT COMMUNICATIONS TO DDCP'S, AND PROVIDE OPERATOR INTERACTION, DATA CONSOLIDATION AND GLOBAL CONTROL FUNCTIONS VIA A LOCAL AREA NETWORK (LAN) OR WIDE AREA NETWORK (WAN) COMMUNICATION LINK BACKBONE.
16. PROVIDE ALL MISCELLANEOUS LOW VOLTAGE FIELD DEVICE MOUNTING AND INTERCONNECTING WIRING FOR ALL BUILDING MECHANICAL SYSTEMS INCLUDED IN THIS PROJECT.
17. LOW VOLTAGE CONTROLS WIRING IS NOT TO BE RUN IN ANY CONDUIT WITH 120V OR HIGHER WIRING.
18. PROVIDE AND INSTALL PROPER EARTH GROUND ON ALL BMS EQUIPMENT TO PREVENT THE BUILD-UP OF ELECTROMAGNETIC VOLTAGE POTENTIAL. ALL BMS EQUIPMENT SHALL BE EMI IMMUNE.
19. REFER TO SPECIFICATION 230900 "INSTRUMENTATION AND CONTROL FOR HVAC" FOR ADDITIONAL REQUIREMENTS FOR THIS PROJECT.
20. REFER TO MECHANICAL AND/OR ELECTRICAL PLANS FOR QUANTITIES AND LOCATION OF EQUIPMENT.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
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LOT: 1 BLOCK: 8138

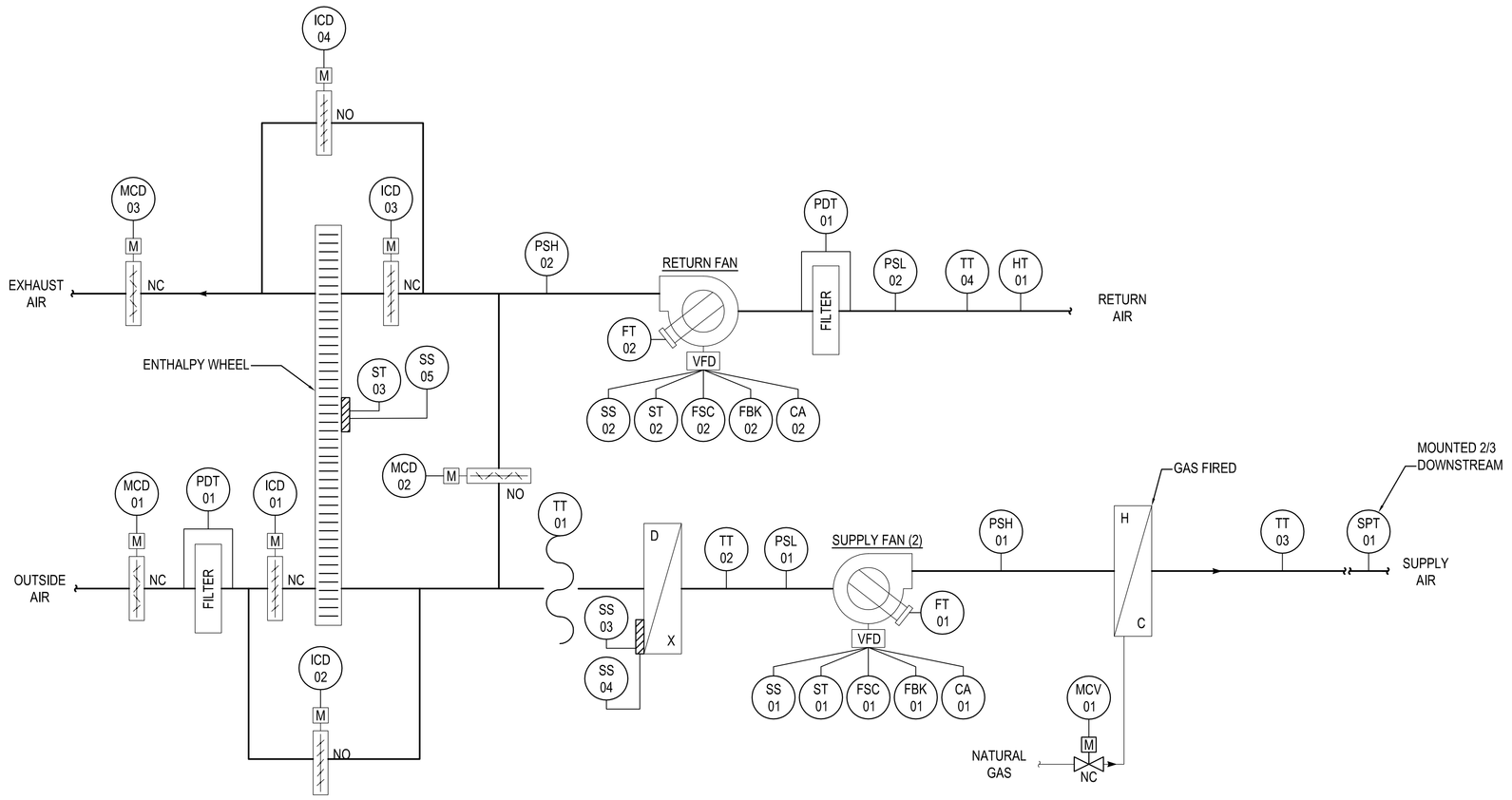
DRAWING TITLE:
BMS SYMBOLS, ABBREVIATIONS, AND NOTES

SEAL & SIGNATURE

STATE OF NEW YORK · ANTHONY TITTANEGRO · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: AT
CHECKED BY: AT
DRAWING NUMBER:
M-801.00

Plotted: 9/27/2019 7:53:29 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\M-801.00_DDC33000.DWG - ksimpson



ROOF TOP UNIT - POINTS LIST											
ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS					NOTES
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION	
TT-01	TEMPERATURE TRANSMITTER - MIXED AIR			X				X	1:00		
TT-02	TEMPERATURE TRANSMITTER - DX COILS			X				X	1:00		
TT-03	TEMPERATURE TRANSMITTER - HEATING COILS			X				X	1:00		
TT-04	TEMPERATURE TRANSMITTER - RETURN AIR			X				X	1:00		
FT-01	FLOW TRANSMITTER - SUPPLY FAN			X				X	1:00		
FT-02	FLOW TRANSMITTER - RETURN FAN			X				X	1:00		
HT-01	HUMIDITY TRANSMITTER - RETURN AIR			X							
PDT-01	PRESSURE DIFFERENTIAL TRANSMITTER - FILTER			X				X	1:00		
SPT-01	STATIC PRESSURE TRANSMITTER			X							
PDT-01	PRESSURE DIFFERENTIAL TRANSMITTER - FILTER			X				X	1:00		
MCD-01	MODULATING CONTROL DAMPER - OUTSIDE AIR				X						
MCD-02	TEMPERATURE CONTROL DAMPER - RETURN AIR				X						
MCD-03	TEMPERATURE CONTROL DAMPER - EXHAUST AIR				X						
MCV-01	ISOLATION CONTROL VALVE - GAS FIRED HEATING COIL				X						
PSL-01	PRESSURE SWITCH LOW - SF SUCTION	X						X	COV	ALARM	
PSL-02	PRESSURE SWITCH LOW - RF SUCTION	X						X	COV	ALARM	
PSH-01	PRESSURE SWITCH HIGH - SF DISCHARGE	X						X	COV	ALARM	
PSH-02	PRESSURE SWITCH HIGH - RF DISCHARGE	X						X	COV	ALARM	
ICD-01	ISOLATION CONTROL DAMPER - ENTHALPY WHEEL OA		X					X	1:00		
ICD-02	ISOLATION CONTROL DAMPER - ENTHALPY WHEEL BYPASS DAMPER OA		X					X	1:00		
ICD-03	ISOLATION CONTROL DAMPER - ENTHALPY WHEEL EA		X					X	1:00		
ICD-04	ISOLATION CONTROL DAMPER - ENTHALPY WHEEL BYPASS DAMPER EA		X					X	1:00		
SS-03	START/STOP - DX COILS		X								
SS-04	START/STOP - DX COILS		X								
SS-04	START/STOP - ENTHALPY WHEEL		X								
ST-03	STATUS - ENTHALPY WHEEL	X					X	X	COV	ALARM ON FAILURE	
	ECONOMIZER OVERRIDE						X	X	COV	ALARM ON FAILURE	
SS-01	START/STOP - SF VFD		X				X				BACNET INTEGRATION
ST-01	STATUS - SF VFD	X					X	X	COV	ALARM ON FAILURE	BACNET INTEGRATION
FSC-01	FAN SPEED CONTROL - SF VFD				X	X					BACNET INTEGRATION
FBK-01	FEEDBACK - SF VFD			X		X		X	1:00		BACNET INTEGRATION
CA-01	COMMON ALARM - SF VFD	X					X	X	COV	ALARM	BACNET INTEGRATION
SS-02	START/STOP - RF VFD		X				X				BACNET INTEGRATION
ST-02	STATUS - RF VFD	X					X	X	COV	ALARM ON FAILURE	BACNET INTEGRATION
FSC-02	FAN SPEED CONTROL - RF VFD				X	X					BACNET INTEGRATION
FBK-02	FEEDBACK - RF VFD			X		X		X	1:00		BACNET INTEGRATION
CA-02	COMMON ALARM - RF VFD	X					X	X	COV	ALARM	BACNET INTEGRATION

ROOF TOP UNIT (RTU) - SEQUENCE OF OPERATIONS:

A. GENERAL: REFER TO MEP DOCUMENTS FOR EQUIPMENT SCHEDULES, LOCATIONS AND ASSOCIATED FAN INTERLOCKING.

1. SYSTEM SHALL BE STARTED AND STOPPED FROM THE BMS SYSTEM.
2. SYSTEM OPERATES AS A VARIABLE AIR VOLUME UNIT
3. PRESSURE SWITCH MONITORING OF FILTER BANK.
4. OUTSIDE AIR DAMPER, MODULATING TYPE, NORMALLY CLOSED
5. RETURN AIR DAMPER, MODULATING TYPE, NORMALLY OPEN
6. EXHAUST AIR DAMPER, MODULATING TYPE, NORMALLY CLOSED
7. DIRECT EXPANSION COOLING COIL, NORMALLY OFF
8. GAS FIRED HEATING COIL, NORMALLY CLOSED
9. SUPPLY FAN VFD, NORMALLY OFF
10. EXHAUST FAN VFD, NORMALLY OFF
11. ENTHALPY WHEEL, NORMALLY OFF.
12. TIME-OF-DAY SCHEDULE: HVAC SYSTEMS SHALL OPERATE AUTOMATICALLY BY A TIME SIGNAL FROM THE BMS. OCCUPIED/UNOCCUPIED ADJUSTABLE TIME DURATIONS SHALL BE SET AT THE BMS WORKSTATION BUT BE RESIDENT IN THE LOCAL DDCP FOR OPERATION
13. FAS SHUTDOWN SIGNAL, DRY CONTACT

B. SYSTEM OFF: (UNOCCUPIED CYCLE)

1. WHEN THE SYSTEM IS OFF, ALL ASSOCIATED VALVES, DAMPERS, AND CONTROLLED DEVICES SHALL BE IN THEIR NORMAL POSITION AS STATED ABOVE.
2. UNOCCUPIED HEATING MODE: DURING THE UNOCCUPIED MODE OR PRIOR TO RTU START-UP IF THE SPACE TEMPERATURE DROPS BELOW 60 DEG F (ADJUSTABLE) THE UNOCCUPIED HEATING MODE SHALL BE ENABLED. THE SUPPLY FAN VFD SHALL START AND RAMP TO MAXIMUM SPEED WITH THE OUTSIDE AIR DAMPER CLOSED AND THE RETURN AIR DAMPER OPEN. THE GAS FIRED HEATING COIL SHALL MODULATE TO MAINTAIN SUPPLY AIR TEMPERATURE AT A SETPOINT OF 90 DEG F (ADJUSTABLE). WHEN THE SPACE TEMPERATURE RISES TO 65 DEG F (ADJUSTABLE) THE GAS FIRED HEATER SHALL SHUT DOWN AND THE SUPPLY FAN SHALL STOP. THE OUTSIDE AIR DAMPER SHALL CLOSE, AND THE RETURN AIR DAMPER SHALL OPEN.
3. UNOCCUPIED COOLING MODE: DURING THE UNOCCUPIED MODE OR PRIOR TO RTU START-UP IF THE SPACE TEMPERATURE RISES ABOVE 85 DEG F (ADJUSTABLE) THE UNOCCUPIED COOLING MODE SHALL BE ENABLED. THE SUPPLY FAN VFD SHALL START AND RAMP UP TO MAXIMUM SPEED WITH THE OUTSIDE AIR DAMPER CLOSED AND THE RETURN AIR DAMPER OPEN. THE UNIT SHALL MAINTAIN SUPPLY AIR TEMPERATURE AT A SETPOINT OF 55 DEG F (ADJUSTABLE). IF THE OUTSIDE AIR ENTHALPY IS NOT SUITABLE FOR FREE COOLING (ECONOMIZER) THE 1ST AND 2ND STAGE DX COOLING SHALL OPERATE. IF THE OUTSIDE AIR ENTHALPY IS SUITABLE FOR FREE COOLING (ECONOMIZER), THEN THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE (IN OPPOSITE DIRECTIONS) TO MAINTAIN THE SUPPLY AIR TEMPERATURE. ON AN ADDITIONAL CALL FOR COOLING WITH THE OUTSIDE AIR DAMPER OPEN 100% AND THE RETURN AIR DAMPER CLOSED, THE 1ST AND 2ND STAGE DX COOLING SHALL OPERATE. WHEN THE SPACE TEMPERATURE DROPS TO 80 DEG F (ADJUSTABLE) THE 1ST AND 2ND STAGE DX SHALL SHUTDOWN AND THE SUPPLY FAN SHALL STOP. THE OUTSIDE AIR DAMPER SHALL CLOSE, AND THE RETURN AIR DAMPER SHALL OPEN.

C. SYSTEM START-UP:

1. RTU SHALL BE STARTED-STOPPED AUTOMATICALLY BASED ON A TIME OF DAY SCHEDULE, OPTIMAL START PROGRAM, OR VIA A MANUAL COMMAND FROM THE BUILDING AUTOMATION SYSTEM (BAS). THE OPTIMAL START PROGRAM SHALL ENABLE RTU TO START BEFORE SCHEDULED OCCUPANCY, AS LATE AS POSSIBLE WHILE ENSURING THAT THE SPACE IS AT A SATISFACTORY TEMPERATURE WHEN OCCUPANCY STARTS. THE OPTIMAL START PROGRAM SHALL USE THE SUPPLY AIR TEMPERATURE SETPOINTS FROM THE UNOCCUPIED MODE.
2. THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL OPEN. THE SUPPLY AIR FAN SHALL START AND RAMP UP TO THE TEMPERATURE CONTROL SETTING AS DESCRIBED BELOW AFTER THE OUTSIDE AIR DAMPER HAS OPENED SUFFICIENTLY. THE EXHAUST AIR DAMPER SHALL OPEN TO THE 100% OPEN POSITION AND THE EXHAUST AIR FAN SHALL START AND RAMP UP TO ITS APPROPRIATE SPEED AS DESCRIBED BELOW.
3. ON START UP THE SYSTEM SHALL BE INDEXED TO THE OCCUPIED TEMPERATURE CONTROL MODE.

D. OCCUPIED TEMPERATURE AND ENTHALPY WHEEL CONTROL:

1. SUPPLY AIR TEMPERATURE RESET: THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET, FROM AN INITIAL SETPOINT OF 55 DEG F (ADJUSTABLE), UP OR DOWN TO MAINTAIN THE SPACE TEMPERATURE AT DESIGN SETPOINT (70 DEG F HEATING SETPOINT, 74 DEG F COOLING SETPOINT, ADJUSTABLE), TO NO MORE THAN 75 DEG F (ADJUSTABLE), NO LESS THAN 50 DEG F (ADJUSTABLE), AND AT A RATE NOT TO EXCEED 0.1 DEG F/MINUTE (ADJUSTABLE).
2. COOLING MODE: ON A CALL FOR COOLING, IF ECONOMIZER IS NOT SUITABLE, THE FIRST STAGE OF DX COOLING SHALL CYCLE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT (ADJUSTABLE) AND THE SUPPLY FAN VFD SHALL MODULATE TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE SETPOINT, ENSURING MINIMUM FLOW AS DETERMINED BY THE REQUIREMENTS OF THE DX SYSTEM. IF THE FIRST STAGE OF DX COOLING CANNOT MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT, THE 1ST AND 2ND DX COOLING STAGES SHALL CYCLE IN SEQUENCE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. THE GAS FIRED HEATING COIL SHALL BE OFF DURING THE COOLING MODE. THE REVERSE SEQUENCE SHALL OCCUR WHEN THE SPACE TEMPERATURE IS WITHIN THE COMFORT BAND. SPACE TEMPERATURE IN THE ZONE SHALL BE MAINTAINED AT THE COOLING (SUMMER) SETPOINT.
3. HEATING MODE: ON A CALL FOR HEATING THE SUPPLY FAN VFD SHALL MODULATE TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE SETPOINT, ENSURING MINIMUM FLOW AS DETERMINED BY THE REQUIREMENTS OF THE GAS FIRED HEATING SYSTEM, AND THE GAS FIRED HEATING COIL SHALL BE MODULATED TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. THE DX COOLING SHALL BE OFF DURING THE HEATING MODE. THE REVERSE SEQUENCE SHALL OCCUR WHEN THE SPACE TEMPERATURE IS WITHIN THE COMFORT BAND. SPACE TEMPERATURE IN THE ZONE SHALL BE MAINTAINED AT THE HEATING (WINTER) SETPOINT.
4. ENTHALPY WHEEL WINTER MODE: WINTER MODE SHALL BE ENABLED WHEN THE OUTSIDE AIR ENTHALPY IS FURTHER THAN THE ENTHALPY WHEEL WINTER ENABLE MODE SETPOINT (0.5 BTU/LB., ADJUSTABLE) AND LESS THAN THE ECONOMIZER MODE ENABLE SETPOINT (2.0 BTU/LB., ADJUSTABLE) BELOW RETURN AIR ENTHALPY, AND SHALL BE DISABLED WHEN THE OUTSIDE AIR ENTHALPY IS LESS THAN THE ENTHALPY WHEEL WINTER ENABLE MODE SETPOINT OR FURTHER THAN ECONOMIZER MODE ENABLE SETPOINT BELOW RETURN AIR ENTHALPY FOR AT LEAST 5 CONTINUOUS MINUTES (ADJUSTABLE). THE ENTHALPY WHEEL SHALL BE ENABLED AND THE WHEEL SPEED SHALL BE MODULATED TO MAINTAIN THE WHEEL LEAVING AIR TEMPERATURE AT SETPOINT (ADJUSTABLE). WHEEL LEAVING AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON A DIFFERENTIAL FROM THE OUTSIDE AIR TEMPERATURE (5 DEG F INITIAL, ADJUSTABLE) TO A MAXIMUM OF THE EFFECTIVE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPER SHALL BE INDEXED TO THE 100% OPEN POSITION.
5. ENTHALPY WHEEL SUMMER MODE: SUMMER MODE SHALL BE ENABLED WHEN THE OUTSIDE AIR ENTHALPY IS MORE THAN THE ENTHALPY WHEEL SUMMER MODE ENABLE SETPOINT (0.5 BTU/LB, ADJUSTABLE) ABOVE THE RETURN AIR ENTHALPY, AND SHALL BE DISABLED WHEN THE OUTSIDE AIR ENTHALPY IS LESS THAN THE ENTHALPY WHEEL SUMMER MODE ENABLE SETPOINT ABOVE THE RETURN AIR ENTHALPY FOR AT LEAST 5 CONTINUOUS MINUTES (ADJUSTABLE). THE ENTHALPY WHEEL SHALL BE ENABLED AND THE WHEEL SHALL ROTATE AT MAXIMUM SPEED. THE OUTSIDE AIR DAMPER SHALL BE INDEXED TO THE 100% OPEN POSITION.
6. ENTHALPY WHEEL PURGE MODE: FOR EVERY HOUR THE ENTHALPY WHEEL IS OFF, THE WHEEL SHALL START AND OPERATE FOR ONE MINUTE TO PURGE THE WHEEL.
7. HUMIDITY/FROST CONTROL: WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE OR EQUAL TO THE FROST THRESHOLD SETPOINT (37 DEG F, ADJUSTABLE) AND THE ENTHALPY WHEEL IS ENABLED, THE EXHAUST-SIDE BYPASS DAMPER SHALL MODULATE TO MAINTAIN SUPPLY AIR HUMIDITY AT SETPOINT (55%, ADJUSTABLE). IN ALL OTHER CONDITIONS, IF THE ENTHALPY WHEEL IS ENABLED, THE EXHAUST-SIDE BYPASS DAMPER SHALL REMAIN CLOSED. WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW THE FROST THRESHOLD SETPOINT AND THE ENTHALPY WHEEL IS ENABLED, THE ENTHALPY WHEEL SHALL OPERATE IN FROST CONTROL MODE. IN THIS MODE, THE ENTHALPY WHEEL SPEED SHALL BE LOCKED AT ITS LAST VALID VALUE AND THE SUPPLY-SIDE BYPASS DAMPER SHALL MODULATE TO MAINTAIN THE WHEEL LEAVING AIR TEMPERATURE AT SETPOINT. IF THE SYSTEM STARTS UP IN FROST CONTROL MODE, THE ENTHALPY WHEEL SPEED SHALL BE SET TO 60% (ADJUSTABLE). DURING THIS MODE, THE SETPOINT DIFFERENTIAL SHALL BE TEMPORARILY OVERRIDDEN TO 2 DEG F. IN ALL OTHER CONDITIONS, IF ENTHALPY WHEEL IS ENABLED, THE SUPPLY-SIDE BYPASS DAMPER SHALL REMAIN CLOSED. THE OUTSIDE AIR DAMPER SHALL BE INDEXED TO THE 100% OPEN POSITION.

E. ECONOMIZER CONTROL:

1. ECONOMIZER CONTROL MODE: (ENTHALPY WHEEL NOT OPERATIONAL, COOLING MODE ENABLED) IF THE OUTSIDE AIR ENTHALPY IS FURTHER THAN THE ECONOMIZER MODE ENABLES SETPOINT (2.0 BTU/LB., ADJUSTABLE) BELOW THE RETURN AIR ENTHALPY AND THE ENTHALPY WHEEL IS DISABLED, OR IF THE DIFFERENCE BETWEEN OUTSIDE AIR ENTHALPY AND RETURN AIR ENTHALPY IS BETWEEN THE ENTHALPY WHEEL SUMMER AND WINTER ENABLE SETPOINTS, THE ECONOMIZER MODE SHALL BE ENABLED. OUTSIDE AND RETURN AIR DAMPER SHALL MODULATE (OPPOSITE DIRECTIONS) TO MAINTAIN SUPPLY AIR TEMPERATURE AND THE SUPPLY FAN VFD SHALL MODULATE TO MAINTAIN THE SUPPLY AIR FLOW AT MINIMUM SETPOINT. IF THE OUTSIDE AIR DAMPER IS FULLY OPEN AND THE SYSTEM CANNOT MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT, THE SUPPLY FAN VFD SHALL BE MODULATED FROM THE MINIMUM FLOW SETPOINT TO THE MAXIMUM FLOW SETPOINT TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. ON A FURTHER CALL FOR COOLING, IF THE SUPPLY FAN VFD IS MAINTAINING THE FLOW AT THE MAXIMUM FLOW SETPOINT AND THE SYSTEM CANNOT MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT, THE SUPPLY FAN VFD SHALL CONTINUE TO MAINTAIN FLOW AT THE MAXIMUM FLOW SETPOINT AND THE 1ST STAGE OF DX COOLING SHALL CYCLE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. IF THE OUTSIDE AIR DAMPER AND THE 1ST STAGE OF DX COOLING CANNOT MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT WHILE THE SUPPLY FAN IS MAINTAINING FLOW AT THE MAXIMUM FLOW SETPOINT, THE 2ND STAGE OF DX COOLING SHALL BE ENABLED, AND THE 1ST AND 2ND DX COOLING STAGES SHALL CYCLE IN SEQUENCE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. WHEN THE OUTSIDE AIR ENTHALPY INCREASES TO LESS THAN THE ECONOMIZER MODE ENABLE SETPOINT BELOW THE RETURN AIR ENTHALPY, OR IF THE DIFFERENCE BETWEEN OUTSIDE AIR ENTHALPY AND RETURN AIR ENTHALPY EXCEEDS EITHER OF THE ENTHALPY WHEEL SUMMER AND WINTER ENABLE SETPOINTS, FOR AT LEAST 5 CONTINUOUS MINUTES (ADJUSTABLE), THE ECONOMIZER CONTROL MODE SHALL BE DISABLED, AND AHU SHALL BE INDEXED TO ENTHALPY WHEEL OPERATION AS DESCRIBED ABOVE.

F. DEHUMIDIFICATION MODE:

1. WHEN AT LEAST THE 1ST STAGE OF DX COOLING IS ENABLED, AND THE RETURN AIR RELATIVE HUMIDITY RISES ABOVE SETPOINT (65%, ADJUSTABLE), THE DEHUMIDIFICATION MODE SHALL BE ENABLED. IN THE DEHUMIDIFICATION MODE THE 1ST AND 2ND STAGE OF DX COOLING SHALL CYCLE IN SEQUENCE TO MAINTAIN SUPPLY AIR RELATIVE HUMIDITY AT SETPOINT (55%, ADJUSTABLE) AND THE GAS FIRED HEATING COIL SHALL MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. THE DEHUMIDIFICATION MODE SHALL BE DISABLED WHEN THE RETURN AIR RELATIVE HUMIDITY DROPS BACK TO DESIGN CONDITIONS AND RTU SHALL REVERT TO THE COOLING MODE AS DESCRIBED ABOVE.

G. SUPPLY AND EXHAUST AIRFLOW TRACKING CONTROL:

1. THE SUPPLY AIR FAN SHALL BE CONTROLLED AS DESCRIBED ABOVE. THE EXHAUST FAN VFD SHALL MODULATE TO MAINTAIN A FLOW DIFFERENTIAL BETWEEN SUPPLY AND EXHAUST (500 CFM, ADJUSTABLE).

H. SAFETIES

1. DUCT MOUNTED SMOKE DETECTOR (SD) SHALL BE FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR. DUCT DETECTOR TO BE INSTALLED BY MECHANICAL CONTRACT, WHENEVER SMOKE IS DETECTED IN THE COMMON SUPPLY OR RETURN DUCT, THE SUPPLY AND EXHAUST FANS SHALL STOP.
2. HIGH AND LOW PRESSURE SWITCHES (PSH, PSL) SHALL BE WIRED TO THE SUPPLY FAN AND RETURN FAN MOTOR STARTERS TO STOP THE FANS WHENEVER DUCT PRESSURE DROPS BELOW OR EXCEEDS THEIR SETTINGS (ADJUSTABLE). ALARMS SHALL ANNUNCIATE AT THE BMS CONTROL CONSOLE. MANUAL RESET SHALL BE PROVIDED FOR ALL HIGH AND LOW PRESSURE SWITCHES (PSH, PSL).
3. FAN LOCK-OUT: WHENEVER THE SYSTEM FAILS TO START BY THE BMS, THE BMS SHALL LOCK-OUT THE SYSTEM AND AN ALARM SHALL ANNUNCIATE AT THE BMS.
4. FLAME FAILURE: IF THE GAS FIRED HEATING FAILS, THE BMS SHALL LOCK-OUT THE SYSTEM AND AN ALARM SHALL ANNUNCIATE AT THE BMS

I. FILTER MONITORING:

1. THE FILTERS SHALL BE MONITORED BY A DIFFERENTIAL PRESSURE TRANSMITTER. ON INDICATION OF A "CHANGE FILTER" CONDITION A MAINTENANCE ALARM SHALL BE SENT TO THE BMS. THE BMS SHALL INDICATE ACTUAL DIFFERENTIAL PRESSURE AND ADJUSTABLE SETPOINT THAT IS DEFAULTED TO THE FILTER SCHEDULE SETTING.

J. SYSTEM RESTART:

1. AFTER A SYSTEM SHUTDOWN DUE TO A POWER OUTAGE, THE UNIT CONTROLS SHALL BE PLACED IN STAND-BY MODE BY THE BMS. UNIT SHALL REMAIN IN STAND-BY MODE WHEN NORMAL POWER IS RESTORED.
2. ALL ALARMS ASSOCIATED WITH THE UNIT SHALL BE SUPPRESSED DURING A LOSS OF POWER CONDITION.

K. ALARMS:

1. THE FOLLOWING TYPICAL ALARMS BUT NOT LIMITED TO BELOW SHALL BE ANNUNCIATED AT THE BMS SYSTEM:
   a. FREEZE ALARM VIA LOW TEMPERATURE DEVICE TSL.
   b. HIGH AND LOW STATIC PRESSURE ALARMS VIA PSH, PSL.
   c. DIRTY FILTER ALARM.
   d. ALL ANALOG, OFF NORMAL, HI/LOW LIMITS.
   e. SUPPLY FAN AND EXHAUST FAN FAILURE (COMMAND / STATUS MISMATCH, AFTER A 30 SECOND DELAY, ADJ.)
   f. FAN SHUTDOWN DUE TO ACTIVATION OF SMOKE DETECTORS (VIA FIRE ALARM SYSTEM).
   g. ENERGY WHEEL FAILURE (COMMAND / STATUS MISMATCH, AFTER A 30 SECOND DELAY, ADJ.)
   h. FLAME FAILURE

1 ROOF TOP UNIT (RTU) - CONTROL DETAIL
RTU-1 & RTU-2

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

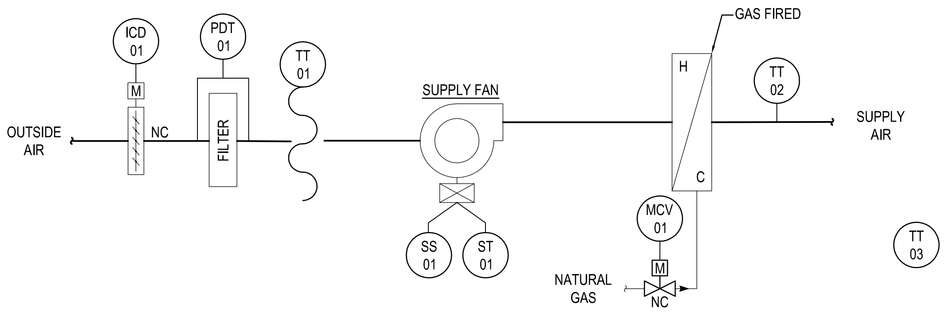
DRAWING TITLE:
BMS DETAILS

SEAL & SIGNATURE

STATE OF NEW YORK ANTHONY TITTONE 074116 LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: AT
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DRAWING NUMBER:
M-802.00

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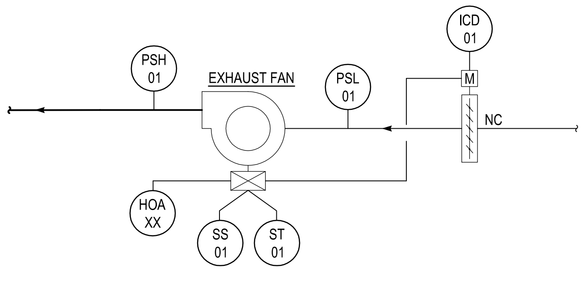


HEATING AND VENTILATING SYSTEM - POINTS LIST												
ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS						NOTES
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION		
TT-01	TEMPERATURE TRANSMITTER - OUTSIDE AIR			X				X	1:00			
TT-02	TEMPERATURE TRANSMITTER - SUPPLY AIR			X				X	1:00			
TT-03	TEMPERATURE TRANSMITTER - SPACE			X				X	1:00			
PDT-01	PRESSURE DIFFERENTIAL TRANSMITTER - FILTER			X				X	1:00			
MCV-01	ISOLATION CONTROL VALVE - GAS FIRED HEATING COIL				X							
ICD-01	ISOLATION CONTROL DAMPER - OUTSIDE AIR		X									
SS-01	START/STOP - SUPPLY FAN		X									
ST-01	STATUS - SUPPLY FAN	X										

1 HEATING AND VENTILATION - CONTROL DETAIL
H&V-1 & H&V-2

HEATING AND VENTILATION WITH REHEAT COIL - SEQUENCE OF OPERATIONS:

A. GENERAL: REFER TO MEP DOCUMENTS FOR EQUIPMENT SCHEDULES, LOCATIONS AND ASSOCIATED FAN INTERLOCKING.
   1. SYSTEM SHALL BE STARTED AND STOPPED FROM THE BMS SYSTEM.
   2. SYSTEM OPERATES AS A CONSTANT VOLUME UNIT
   3. OUTSIDE AIR DAMPER, TWO POSITION, NORMALLY CLOSED
   4. PRESSURE SWITCH MONITORING OF PRE FILTER BANK.
   5. GAS FIRED HEATING COIL, NORMALLY OPEN
   6. TIME-OF-DAY SCHEDULE: HVAC SYSTEMS SHALL OPERATE AUTOMATICALLY BY A TIME SIGNAL FROM THE BMS. OCCUPIED/UNOCCUPIED ADJUSTABLE TIME DURATIONS SHALL BE SET AT THE BMS WORKSTATION BUT BE RESIDENT IN THE LOCAL DDCP FOR OPERATION
   7. FAS SHUTDOWN SIGNAL, DRY CONTACT
B. SYSTEM OFF: (UNOCCUPIED CYCLE)
   1. WHEN THE SYSTEM IS OFF ALL ASSOCIATED VALVES, DAMPERS, AND CONTROLLED DEVICES SHALL BE IN THEIR NORMAL POSITION AS STATED ABOVE.
C. SYSTEM ON: (OCCUPIED CYCLE)
   1. WHEN SYSTEM IS COMMANDED ON VIA BMS, THE OUTSIDE AIR DAMPER SHALL REMAIN OPEN AND THE SUPPLY FAN SHALL START.
   2. TEMPERATURE CONTROL:
      a) THE GAS FIRED HEAT SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT.
      b) DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET AS REQUIRED, USING A LINEAR ALGORITHM, TO MAINTAIN A SPACE TEMPERATURE AT SETPOINT OF 59 DEG. F (ADJ.). TEMPERATURE LIMITS SHALL BE WITHIN 55 DEG. F (ADJ.) TO 74 DEG. F (ADJ.).
D. SAFETIES
   1. DUCT MOUNTED SMOKE DETECTOR (SD) SHALL BE FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR. DUCT DETECTOR TO BE INSTALLED BY MECHANICAL CONTRACTOR, WHENEVER SMOKE IS DETECTED IN THE COMMON SUPPLY DUCT, THE SUPPLY FAN SHALL STOP.
   2. SUPPLY FAN SHALL BE HARDWIRE INTERLOCK TO OUTSIDE AIR DAMPER 3. FAN LOCK-OUT: WHENEVER THE SYSTEM FAILS TO START BY THE BMS, THE BMS SHALL LOCK-OUT THE SYSTEM. AN ALARM SHALL ANNUNCIATE AT THE BMS CONTROL CONSOLE.
   3. FLAME FAILURE: IF THE GAS FIRED HEATING FAILS, THE BMS SHALL LOCK-OUT THE SYSTEM AND AN ALARM SHALL ANNUNCIATE AT THE BMS
F. FILTER MONITORING:
   1. THE FILTERS SHALL BE MONITORED BY DIFFERENTIAL PRESSURE TRANSMITTERS. ON INDICATION OF A "CHANGE FILTER" CONDITION A MAINTENANCE ALARM SHALL BE SENT TO THE BMS. THE BMS SHALL INDICATE ACTUAL DIFFERENTIAL PRESSURE AND FIELD ADJUSTABLE SETPOINT THAT IS DEFAULTED TO THE FILTER SCHEDULE SETTING.
G. SYSTEM RESTART:
   1. AFTER A SYSTEM SHUTDOWN DUE TO A POWER OUTAGE, THE UNIT CONTROLS SHALL BE PLACED IN STAND-BY MODE BY THE BMS. UNIT SHALL REMAIN IN STAND-BY MODE WHEN NORMAL POWER IS RESTORED.
   2. ALL ALARMS ASSOCIATED WITH THE UNIT SHALL BE SUPPRESSED DURING A LOSS OF POWER CONDITION.
H. ALARMS:
   1. TYPICAL ALARMS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING, SHALL BE ANNUNCIATED AT THE BMS SYSTEM:
      a) LOW TEMPERATURE ALARM VIA FREEZESTAT DEVICE TSL.
      b) HIGH AND LOW STATIC PRESSURE ALARMS VIA PSH, PSL.
      c) DIRTY FILTER ALARM.
      d) ALL ANALOG, OFF NORMAL, HI/LOW LIMITS.
      e) SUPPLY FAN FAILURE (COMMAND / STATUS MISMATCH, AFTER A 30 SECOND DELAY, ADJ.)
      f) FAN SHUTDOWN DUE TO ACTIVATION OF SMOKE DETECTORS (VIA FIRE ALARM SYSTEM).
      g) FLAME FAILURE

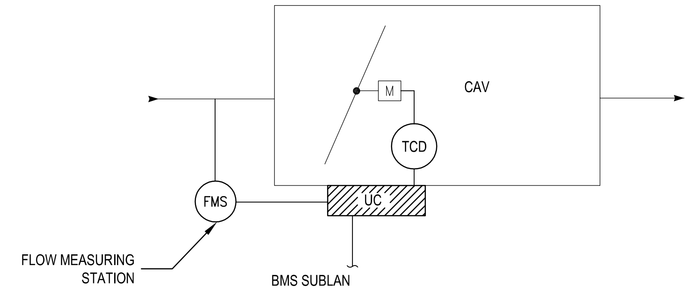


NOTES:
1. REFER TO MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS OF AREAS SERVED.
2. ALL CONTROL WIRING SHALL BE PROVIDED BY BMS CONTRACTOR

EXHAUST FANS SEQUENCE OF OPERATIONS:
A. EXHAUST FANS ARE INTERLOCKED WITH THEIR RESPECTIVE ISOLATION DAMPERS, SUCH THAT WHEN A FAN IS COMMANDED ON THE DAMPER SHALL OPEN FIRST AND WHEN OPEN STATUS IS PROVEN THE FAN SHALL TURN ON.
B. EXHAUST FANS SHALL BE COMMANDED ON/OFF BY LOCAL HARDWIRED HOA SWITCH.

EXHAUST FANS - POINTS LIST											
ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS					NOTES
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION	
PSL-01	PRESSURE SWITCH LOW - EXHAUST FAN SUCTION	X						X	COV	ALARM	
PSH-01	PRESSURE SWITCH HIGH - EXHAUST FAN DISCHARGE	X						X	COV	ALARM	
ICD-01	ISOLATION CONTROL DAMPER - OUTSIDE AIR		X					X	01:00		
SS-01	START/STOP - EXHUAST FAN		X								
HOA-XX	HAND / OFF / AUTO SWITCH										

2 EXHAUST FANS
TYPICAL



NOTES:
1. REFER TO MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS OF AREAS SERVED.
2. ALL CONTROL WIRING SHALL BE PROVIDED BY BMS CONTRACTOR.

CAV SEQUENCE OF OPERATIONS:
A. THE CAV DAMPER WILL MODULATE TO MAINTAIN DISCHARGE FLOW AT SETPOINT (ADJ.).

CAV BOX (COOLING ONLY) - POINTS LIST												
ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS						NOTES
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION		
	TEMPERATURE TRANSMITTER - SPACE			X				X	1:00			BACNET INTEGRATION
	AIR FLOW MEASURING STATION - SUPPLY			X				X	1:00			BACNET INTEGRATION
	TEMPERATURE CONTROL DAMPER - SUPPLY				X							BACNET INTEGRATION

3 CONSTANT AIR VOLUME BOX (CAV) - COOLING ONLY
TYPICAL

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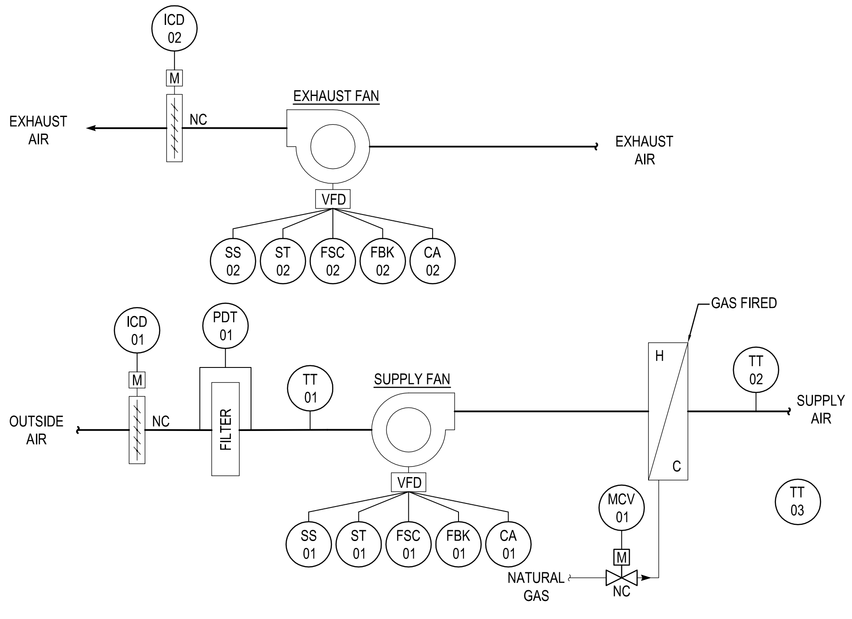
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STATE OF NEW YORK · SETH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

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DRAWN BY:	AT
CHECKED BY:	AT
DRAWING NUMBER:	M-803.00

Plotted: 9/27/2019 7:53:12 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\M-803.00_DDC33000.DWG - ksimpson



NOTE:

1. REFER TO MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS.
2. MINIMUM VFD INFORMATION AVAILABLE AT THE BMS:
   ENABLE / DISABLE
   RUN STATUS
   SPEED CONTROL
   SPEED FEEDBACK
   COMMON ALARM
3. BMS CONTRACTOR SHALL MONITOR LEVEL ALARMS AND LEAK DETECTION ALARM. WHENEVER HIGH/LOW LEVEL OR LEAK IS DETECTED, A SIGNAL SHALL BE SENT TO ANNUNCIATE AN ALARM AT THE OPERATOR'S WORKSTATION.

HEATING AND VENTILATING SYSTEM - POINTS LIST

ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS				
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION
TT-01	TEMPERATURE TRANSMITTER - HEATING COILS			X				X	1:00	
TT-02	TEMPERATURE TRANSMITTER - SUPPLY AIR			X				X	1:00	
TT-03	TEMPERATURE TRANSMITTER - SPACE			X				X	1:00	
PDT-01	PRESSURE DIFFERENTIAL TRANSMITTER - FILTER			X				X	1:00	
MCV-01	ISOLATION CONTROL VALVE - GAS FIRED HEATING COIL				X					
ICD-01	ISOLATION CONTROL DAMPER - OUTSIDE AIR		X							
ICD-02	ISOLATION CONTROL DAMPER - EXHAUST AIR		X							
SS-01	START/STOP - SUPPLY FAN		X				X			
ST-01	STATUS - SUPPLY FAN	X					X	X	COV	ALARM
FSC-01	FAN SPEED CONTROL - SUPPLY FAN				X	X				
FBK-01	FEEDBACK - SUPPLY FAN			X		X		X	1:00	
CA-01	COMMON ALARM - SUPPLY FAN	X					X	X	COV	ALARM
SS-02	START/STOP - EXHAUST FAN		X				X			
ST-02	STATUS - EXHAUST FAN	X					X	X	COV	ALARM
FSC-02	FAN SPEED CONTROL - EXHAUST FAN				X	X				
FBK-02	FEEDBACK - EXHAUST FAN			X		X		X	1:00	
CA-02	COMMON ALARM - EXHAUST FAN	X					X	X	COV	ALARM

MAKE-UP AIR UNIT WITH PREHEAT COIL -
SEQUENCE OF OPERATIONS:

A. GENERAL: REFER TO MEP DOCUMENTS FOR EQUIPMENT SCHEDULES, LOCATIONS AND ASSOCIATED FAN INTERLOCKING.
   1. SYSTEM SHALL BE STARTED AND STOPPED FROM THE BMS SYSTEM.
   2. SYSTEM OPERATES AS A VARIABLE AIR VOLUME UNIT
   3. OUTSIDE AIR DAMPER, TWO POSITION, NORMALLY CLOSED
   4. EXHAUST AIR DAMPER, TWO POSITION, NORMALLY CLOSED
   5. PRESSURE SWITCH MONITORING OF PRE FILTER BANK.
   6. GAS FIRED HEATING COIL, NORMALLY OPEN
   7. DIRECT EXPANSION COOLING COIL, NORMALLY OFF
   8. SUPPLY FAN VFD, NORMALLY OFF.
   9. EXHAUST FAN VFD, NORMALLY OFF.
   10. TIME-OF-DAY SCHEDULE: HVAC SYSTEMS SHALL OPERATE AUTOMATICALLY BY A TIME SIGNAL FROM THE BMS. OCCUPIED/UNOCCUPIED ADJUSTABLE TIME DURATIONS SHALL BE SET AT THE BMS WORKSTATION BUT BE RESIDENT IN THE LOCAL DDCP FOR OPERATION.

B. SYSTEM OFF: (UNOCCUPIED CYCLE)
   1. WHEN THE SYSTEM IS OFF ALL ASSOCIATED VALVES, DAMPERS, AND CONTROLLED DEVICES SHALL BE IN THEIR NORMAL POSITION AS STATED ABOVE.

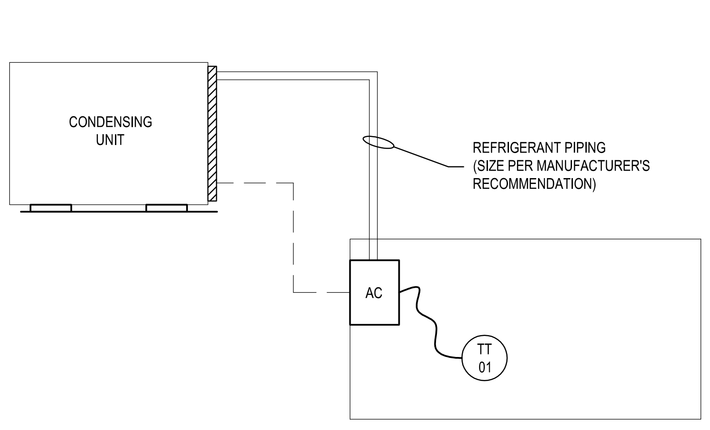
C. SYSTEM ON: (OCCUPIED CYCLE)
   1. WHEN SYSTEM IS COMMANDED ON VIA BMS, THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL REMAIN OPEN AND THE SUPPLY AND EXHAUST FANS SHALL START.

D. TEMPERATURE CONTROL:
   1. GAS FIRED HEAT SHALL BE MODULATED AS NECESSARY TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT DISCHARGE AIR TEMPERATURE SETPOINT.
   2. DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET AS REQUIRED, USING A LINEAR ALGORITHM, TO MAINTAIN A SPACE TEMPERATURE AT SETPOINT OF 59°F (ADJ.). TEMPERATURE LIMITS SHALL BE WITHIN 55°F (ADJ.) TO 74°F (ADJ.).

E. CO CONTROL VENTILATION:
   1. WHEN IN THE OCCUPIED MODE, THE FLOW MEASURING SENSOR SHALL RESET THE SUPPLY FAN SPEED BETWEEN THE MINIMUM AIRFLOW SETPOINT (0.75CFM/SQ.FT.) AND THE MAXIMUM AIRFLOW SETPOINT (6 AIR CHANGES PER HOUR) IN ORDER TO MAINTAIN THE HIGHEST MEASURED CO CONCENTRATION AT 10PPM.

F. FAN CONTROL
   1. WHEN IN THE OCCUPIED MODE, THE EXHAUST FAN SHALL MODULATE TO MAINTAIN A 3% (ADJ) SPEED DIFFERENTIAL BETWEEN SUPPLY FAN SPEED AND EXHAUST FAN SPEED

1 MAKE-UP AIR UNITS - CONTROL DETAIL
TYPICAL



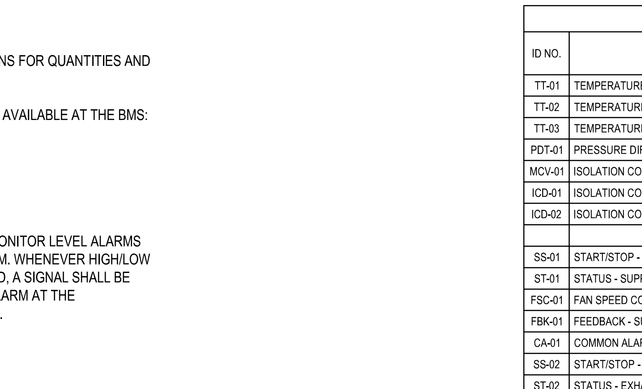
NOTES:

1. REFER TO MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS OF AREAS SERVED.
2. ALL CONTROL WIRING SHALL BE PROVIDED BY BMS CONTRACTOR

SPLIT AC - POINTS LIST

ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS			
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL
TT-01	TEMPERATURE TRANSMITTER - AC			X				X	1:00

2 SPLIT AC
TYPICAL



NOTES:

1. REFER TO MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS OF AREAS SERVED.
2. ALL CONTROL WIRING SHALL BE PROVIDED BY BMS CONTRACTOR

PURGE FANS - POINTS LIST

ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS					NOTES
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION	
CO-XX	CARBON MONOXIDE TRANSMITTER			X							
ICD-01	ISOLATION CONTROL DAMPER - OUTSIDE AIR		X					X	1:00		
SS-01	START/STOP - PURGE FAN		X								
ST-01	STATUS - PURGE FAN	X									

PURGE FANS SEQUENCE OF OPERATIONS:

A. WHEN CO SYSTEM DETECTS AN ELEVATED LEVEL OF CARBON MONOXIDE (25 PPM, ADJUSTABLE), PURGE FANS SHALL BE ACTIVATED.

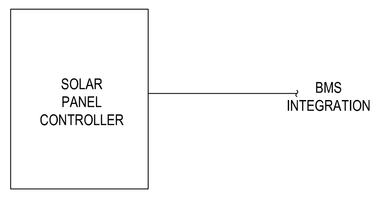
B. WHEN CO SYSTEM DETECTS A SUBSEQUENT LOWERED LEVEL OF CARBON MONOXIDE (20 PPM, ADJUSTABLE), PURGE FANS SHALL BE DEACTIVATED.

C. PURGE FANS ARE INTERLOCKED WITH THEIR RESPECTIVE ISOLATION DAMPERS, SUCH THAT WHEN A FAN IS COMMANDED ON THE DAMPER SHALL OPEN FIRST AND WHEN OPEN STATUS IS PROVEN THE FAN SHALL TURN ON.

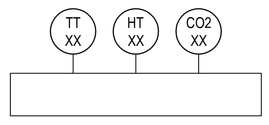
3 PURGE FANS - UEF
TYPICAL

NOTES:

1. REFER TO ELECTRICAL AND MECHANICAL PLANS FOR QUANTITIES AND LOCATIONS OF AREAS SERVED.
2. ALL CONTROL WIRING SHALL BE PROVIDED BY BMS CONTRACTOR



4 SOLAR PANEL - CONTROL DETAIL
TYPICAL



NOTE:

1. OUTSIDE WEATHER STATION MUST BE MOUNTED OUT OF DIRECT SUNLIGHT

OUTSIDE WEATHER STATION - POINTS LIST

ID NO.	CONTROL POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS				
		DI	DO	AI	AO	AV	DV	TREND	INTERVAL	DESCRIPTION
TT-XX	TEMPERATURE TRANSMITTER			X				X	1:00	
HT-XX	HUMIDITY TRANSMITTER			X				X	1:00	
CO2-XX	CO2 SENSOR			X				X	1:00	

5 OUTSIDE WEATHER STATION
TYPICAL

SYSKA HENNESSY GROUP
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120 West John Street Hicksville, NY 11801
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www.hiranigroup.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
BMS DETAILS

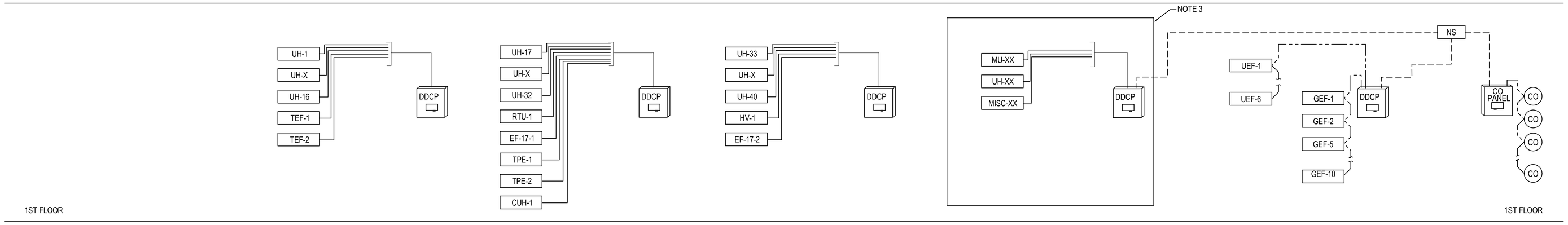
SEAL & SIGNATURE

STATE OF NEW YORK — KEITH TITTEL — LICENSED PROFESSIONAL ENGINEER — 074116

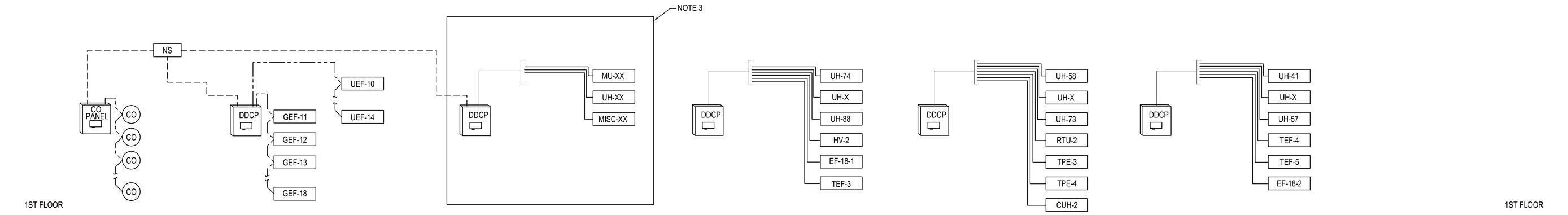
DATE:	09/27/2019
PROJECT NO:	DDC33000
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DISTRICT 17 GARAGE



DISTRICT 18 GARAGE



LEGEND

TAG-XX	MECHANICAL / ELECTRICAL EQUIPMENT
DDCP	DIRECT DIGITAL CONTROL PANEL
NS	NETWORK SWTICH
- - - - - - - - - -	ETHERNET CAT6
———	COPPER WIRE - MINIMUM 2 #18 AWG TWISTED / SHIELDED

ABBREVIATIONS:

CUH	CABINET UNIT HEATER
CO	CARBON MONOXIDE TRANSMITTER
DOAS	DEDICATED OUTDOOR AIR SYSTEM UNIT
EF	EXHAUST FAN
GEF	GENERAL EXHAUST FAN
HV	HEATING AND VENTILATION UNIT
MU	MAKE-UP UNIT
RTU	ROOFTOP UNIT
TEF	TOILET EXHAUST FAN
TPE	TRANSFER FAN
UEF	UPFLOW EXHAUST FAN
UH	UNIT HEATER

1 BMS ARCHITECTURE

NOTES:
1. FOR QUANTITIES AND LOCATIONS, REFERENCE MECHANICAL PLANS.
2. BMS CONTRACTOR TO COORDINATE DATA OUTLET FOR IT NETWORK CONNECTIVITY.
3. TYPICAL FOR ALL MAKE-UP AIR UNITS AND UNIT HEATERS. REFERENCE MECHANICAL PLANS FOR ALL QUANTITIES AND LOCATIONS.

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STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

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ABBREVIATIONS

-A-	
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AIC	AMPERE INTERRUPTING CAPACITY
AMP	AMPERE
ANN	ANNUNCIATOR
APPD	APPROVED
APPX	APPENDIX
ARCH	ARCHITECT
ATCH	ATTACHMENT
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AV	AUDIO VISUAL
AVG	AVERAGE
AWG	AMERICAN WIRE GAUGE
-B-	
BAS	BUILDING AUTOMATION SYSTEM
BAT	BATTERY
BFF	BELOW FINISH FLOOR
BKGD	BACKGROUND
BLDG	BUILDING
BLW	BELOW
BOS	BOTTOM OF STEEL
BOT	BOTTOM
BRKR	BREAKER
BSMT	BASEMENT
BSTR	BOOSTER
BTWN	BETWEEN
-C-	
CAB	CABINET
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CD	CONSTRUCTION DOCUMENT
CERT	CERTIFY
CH	CHILLER
CHK	CHECK
CKT	CIRCUIT
CL	CENTER LINE / CLOSE
CLG	CEILING
CONC	CONCRETE
CONN	CONNECT
COOR	COORDINATE
CORR	CORRIDOR
CP	CONTROL PANEL
CR	CONTROL RELAY
CS	CONTROL SWITCH
CTRL	CONTROL
CTV	CABLE TELEVISION
-D-	
(D)	EXISTING TO BE DEMOLISHED
DC	DIRECT CURRENT
DDC	DIRECT DIGITAL CONTROL
DEF	DEFINITION
DEG	DEGREE
DEG F	DEGREES FAHRENHEIT
DEMO	DEMOLITION
DESCR	DESCRIPTION
DET	DETAIL
DGTL	DIGITAL
DIAG	DIAGRAM
DIM	DIMENSION
DIR	DIRECTION
DISC	DISCONNECT
DISCH	DISCHARGE
DISTR PNL	DISTRIBUTION PANEL
DIV	DIVISION
DMR	DIMMER
DS	DISCONNECT SWITCH
DWG	DRAWING
-E-	
(E)	EXISTING TO REMAIN
(ER)	EXSTING TO BE RELOCATED
EA	EACH
EH	ELECTRIC HEATER
EL	ELEVATION
ELEC	ELECTRIC
EMER	EMERGENCY
ENVIR	ENVIRONMENT
EPO	EMERGENCY POWER OFF
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
EX	EXAMPLE
EXCL	EXCLUDE
EXH FN	EXHAUST FAN
EXIST	EXISTING
EXT	EXTERNAL

-F-	
F	FAHRENHEIT
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FC	FOOTCANDLE
FCA	FAULT CURRENT AVAILABLE
FDR	FEEDER
FLEX	FLEXIBLE
FLR	FLOOR
FLUOR	FLUORESCENT
FR	FIRE RATING
FREQ	FREQUENCY
FT	FOOT / FEET
FU	FUSE
FU SW	FUSED SWITCH
FUT	FUTURE
-G-	
G	GROUND
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
-H-	
HP	HORSEPOWER
HZ	HERTZ
-J-	
JB	JUNCTION BOX
-L-	
LTG	LIGHTING
LV	LOW VOLTAGE
-M-	
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MIN	MINIMUM
MV	MEDIUM VOLTAGE
-N-	
NC	NORMALLY CLOSED
NEUT	NEUTRAL
NO	NORMALLY OPEN, NUMBER
NTS	NOT TO SCALE
-P-	
P	POLE
PB	PULL BOX
PH	PHASE
PNL	PANEL
PWR	POWER
-R-	
(R)	REMOVE
REC	RECESSED
RECPT	RECEPTACLE
REQD	REQUIRED
RM	ROOM
-S-	
SCHED	SCHEDULE
SD	SMOKE DETECTOR
SECT	SECTION
SPEC	SPECIFICATION
SPKR	SPEAKER
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYS	SYSTEM
-T-	
TELCOM	TELECOMMUNICATIONS
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPRESSOR
TYP	TYPICAL
-U-	
UC	UNDERCOUNTER
UGND	UNDERGROUND
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTIL	UTILITY
-V-	
V	VOLT
VA	VOLT AMPERE
VFD	VARIABLE FREQUENCY DRIVE
VOLT	VOLTAGE
-W-	
W	WATT OR WIRE
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
-X-	
XFER	TRANSFER
XFMR	TRANSFORMER

SYMBOLS LEGEND

ANNOTATION

1 E-201 TITLE SCALE: NTS	TITLE MARK DETAIL OR PLAN NO. - 1 FOUND IN E-201
1 E-501	DETAIL REFERENCE DETAIL NO. - 1 FOUND IN E-501
1 E-501	SECTION MARK SECTION NO. - 1 FOUND IN E-501
1	SHEET KEYNOTE OR CODED NOTE
1	REVISION CLOUD (DELTA 1)
2 E-201	DETAIL BOUNDARY B DETAIL NO. - 2
LP4:12	PANEL:CIRCUIT

POWER OUTLETS

	WALL		
			DUPLEX
	J		JUNCTION BOX

WIRING

	3/4" CONDUIT WITH 2#12 WIRES, UON. GROUND WIRE NOT SHOWN.
//	3/4" CONDUIT WITH 3#12 WIRES, UON. GROUND WIRE NOT SHOWN.
///	3/4" CONDUIT WITH 4#12 WIRES, UON. GROUND WIRE NOT SHOWN.
1LA-1,3,5 ///	CONDUIT HOMERUN TO PANEL BOARD 1LA WITH CIRCUIT 1,3,5
	CAPPED CONDUIT
	CONDUIT RUN UNDERGROUND OR UNDER THE FLOOR SLAB
	CONDUIT TURNING DOWN
	CONDUIT TURNING UP
	CONDUIT BREAK

LIGHTING

FLR	WALL	CLG	
			RECESSED DOWNLIGHT
			1X4 SURFACE MOUNTED LIGHT
			2X4 SURFACE MOUNTED LIGHT
			4FT WALL MOUNTED LIGHT
			1X4 EMERGENCY LIGHT
			2X4 EMERGENCY LIGHT
			2X4 RECESSED LIGHT
			EXIT SIGN 1 FACE
			EXIT SIGN 1 FACE LEFT ARROW
			EMERGENCY BATTERY PACK
			EMERGENCY BATTERY PACK W/ EXIT SIGN

SWITCHES/CONTROLS

FLR	WALL	CLG	
	$T		LIGHT SWITCH - TIME OPERATED
	$		LIGHT SWITCH - SINGLE POLE
	$3		LIGHT SWITCH - THREE WAY
	$K		LIGHT SWITCH - KEY OPERATED
	$P		LIGHT SWITCH - WITH PILOT LIGHT
	$TO		SWITCH - WITH THERMAL OVERLOAD
FLR	WALL		
	D		DIMMER
	OCS	OS	OCCUPANCY SENSOR
	PC		PHOTOCELL
	OR		OVERRIDE SWITCH

POWER

	DISTRIBUTION BOARD
	RECESSED PANEL
	SURFACE MOUNTED PANEL
T	TRANSFORMER
	DISCONNECT SWITCH
$M	SWITCH - MOTOR RATED
FCO	FUSED DISCONNECT SWITCH (FCO DENOTES FUSE CUT OUT)
	MAGNETIC MOTOR STARTER
	STARTER - DISCONNECT SWITCH
M	MOTOR

R	RELAY
VFD	VARIABLE FREQUENCY DRIVE
PB	PULL BOX

SINGLE LINE DIAGRAM

	CIRCUIT BREAKER SWITCH
	FUSE - INLINE
	FUSE SWITCH
CB	CIRCUIT BREAKER - ENCLOSED
K	KIRK KEY INTERLOCK
	SWITCHGEAR BUSWAY
GFR	GROUND FAULT RELAY
A	AMMETER
M	DIGITAL METER UON
	TRANSFORMER - DELTA WYE-GROUNDED
	BATTERY
XXXXX XXXXX XXXXX XXXXX	PANEL

GROUNDING SYSTEM

	GROUND CABLE CONNECTION
	GROUND ROD - MIN. 3/4"Ø x 10' LONG
	EQUIPMENT CONNECTION

PHOTO VOLTAIC SYSTEM

	PHOTO VOLTAIC PANEL

LIGHTNING PROTECTION SYSTEM

	AIR TERMINAL
	CABLE CONNECTION
	DOWN CONDUCTOR WITH GROUND ROD

GENERAL NOTES

1. UNLESS REQUESTED OTHERWISE, THE AMPACITY OF 600 VOLTS OR LESS CONDUCTORS SHALL BE BASED ON THE TERMINALS NOT TO EXCEED 60°C(140°F) FOR CONDUCTOR SIZE 12 THROUGH 1 AWG OR 75°C(167°F) FOR CONDUCTOR SIZE OVER 1AWG.
2. NO PIPING, DUCTS OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE LOCATED WITHIN THE DEDICATED SPACE ABOVE THE ELECTRICAL EQUIPMENT.
3. FUSES SHALL BE PROVIDED WITH REJECTION TYPE FUSE HOLDERS.
4. GREEN INSULATED COPPER GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL BRANCH CIRCUITS AND FEEDERS.
5. ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE WEATHERPROOF.
6. PROJECT SPECIFICATIONS ARE AN INTEGRAL PART OF THESE DRAWINGS.
7. A SINGLE RECEPTACLE INSTALLED ON AN INDIVIDUAL BRANCH CIRCUIT SHALL HAVE AN AMPERE RATING OF NOT LESS THAN THAT OF THE BRANCH CIRCUIT. INDICATE THE RECEPTACLES RATING.
8. MINIMUM SIZE OF CONDUIT SHALL BE 3/4". MINIMUM SIZE OF NEUTRAL CONDUCTOR SHALL BE #12 AWG, UON MINIMUM SIZE OF CONDUCTOR SHALL BE #12 AWG, UON MINIMUM CONDUCTOR SIZE AT 120 VOLTS AND OVER 100FT CIRCUIT LENGTH SHALL BE #10 AWG, UON MINIMUM CONDUCTOR SIZE AT 277 VOLTS AND OVER 200FT. CIRCUIT LENGTH SHALL BE #10AWG UON.

SHEET INDEX

NUMBER	TITLE	SCALE
E-001.00	ELECTRICAL SYMBOLS ABBREVIATIONS ANS NOTES	NONE
DE-101.00	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17	3/32"=1'-0"
DE-102.00	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17	3/32"=1'-0"
DE-103.00	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18	3/32"=1'-0"
DE-104.00	ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18	3/32"=1'-0"
DE-105.00	ELECTRICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 17	3/32"=1'-0"
DE-106.00	ELECTRICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 18	3/32"=1'-0"
DE-107.00	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 17	3/32"=1'-0"
DE-108.00	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 17	3/32"=1'-0"
DE-109.00	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18	3/32"=1'-0"
DE-110.00	ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18	3/32"=1'-0"
E-101.00	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 17	3/32"=1'-0"
E-102.00	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 17	3/32"=1'-0"
E-103.00	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 18	3/32"=1'-0"
E-104.00	ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 18	3/32"=1'-0"
E-105.00	ELECTRICAL 2ND FLOOR PART PLAN-DISTRICT 17	3/32"=1'-0"
E-106.00	ELECTRICAL 2ND FLOOR PART PLAN-DISTRICT 18	3/32"=1'-0"
E-107.00	ELECTRICAL ROOF PART PLAN-DISTRICT 17	3/32"=1'-0"
E-108.00	ELECTRICAL ROOF PART PLAN-DISTRICT 17	3/32"=1'-0"
E-109.00	ELECTRICAL ROOF PART PLAN-DISTRICT 18	3/32"=1'-0"
E-110.00	ELECTRICAL ROOF PART PLAN-DISTRICT 18	3/32"=1'-0"
E-201.00	ELECTRICAL GROUND FLOOR LIGHTING PART PLAN-DISTRICT 17	3/32"=1'-0"
E-202.00	ELECTRICAL GROUND FLOOR LIGHTING PART PLAN-DISTRICT 18	3/32"=1'-0"
E-203.00	ELECTRICAL 2ND FLOOR LIGHTING PART PLAN-DISTRICT 17	3/32"=1'-0"
E-204.00	ELECTRICAL 2ND FLOOR LIGHTING PART PLAN-DISTRICT 18	3/32"=1'-0"
E-401.00	ELECTRICAL EQUIPMENT ELEVATIONS	NONE
E-402.00	ELECTRICAL EQUIPMENT ELEVATONS	NONE
E-403.00	ELECTRICAL EQUIPMENT ELEVATIONS	NONE
E-404.00	ELECTRICAL EQUIPMENT ELEVATIONS	NONE
E-501.00	ELECTRICAL DETAILS	NONE
E-502.00	ELECTRICAL DETAILS	NONE
E-503.00	ELECTRICAL DETAILS	NONE
E-504.00	ELECTRICAL DETAILS	NONE
E-505.00	ELECTRICAL DETAILS	NONE
E-506.00	ELECTRICAL DETAILS	NONE
E-507.00	ELECTRICAL DETAILS	NONE
E-601.00	ELECTRICAL ONE LINE DIAGRAM - DEMOLITION	NONE
E-602.00	ELECTRICAL ONE LINE DIAGRAM - INSTALLATION	NONE
E-603.00	ELECTRICAL ONE LINE DIAGRAM AND PANEL SCHEDULE - NEW SERVICE ROOM	NONE

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

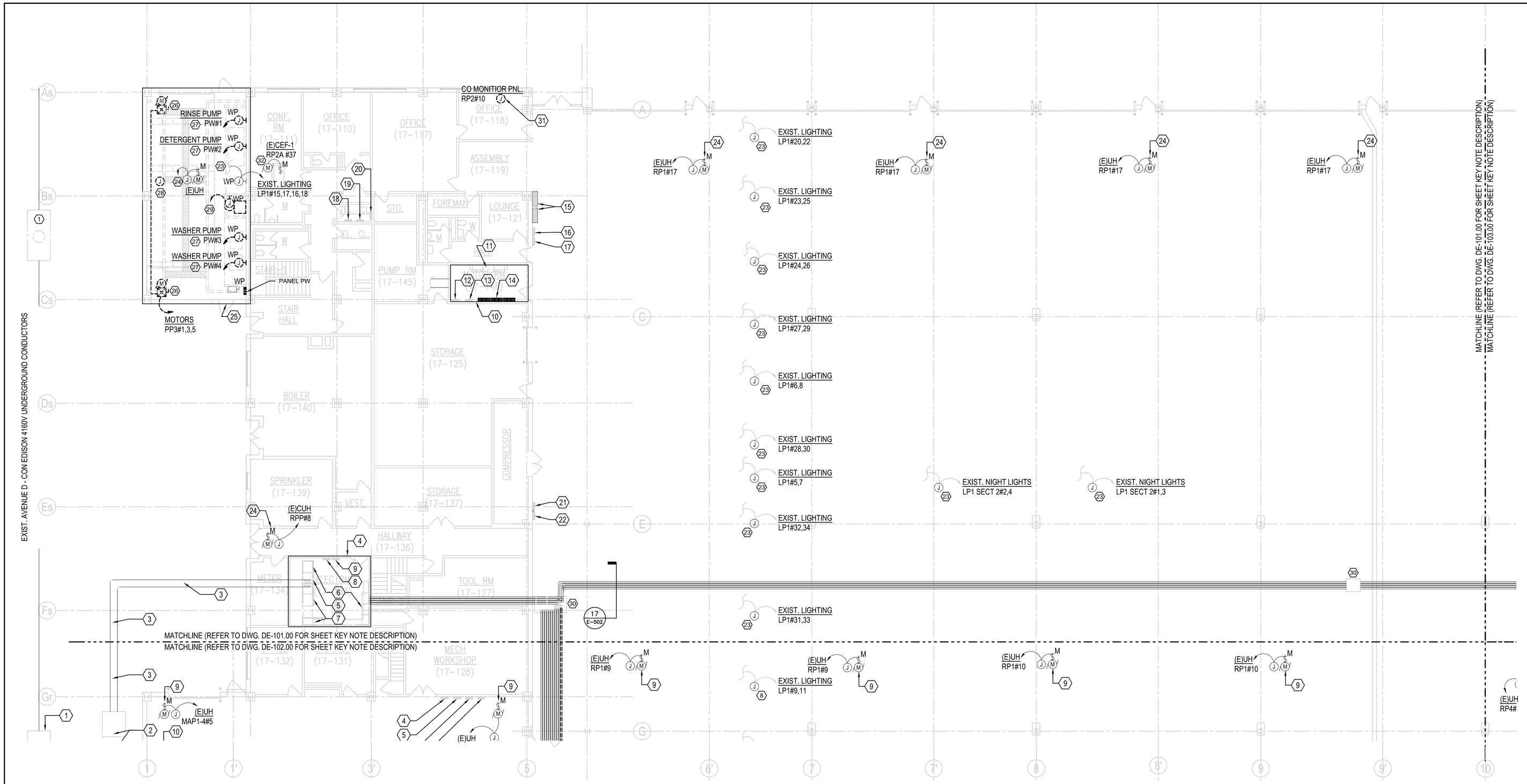
DRAWING TITLE:
ELECTRICAL SYMBOLS ABBREVIATIONS ANS NOTES

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTLEBAUM · 074116 · LICENSED PROFESSIONAL ENGINEER

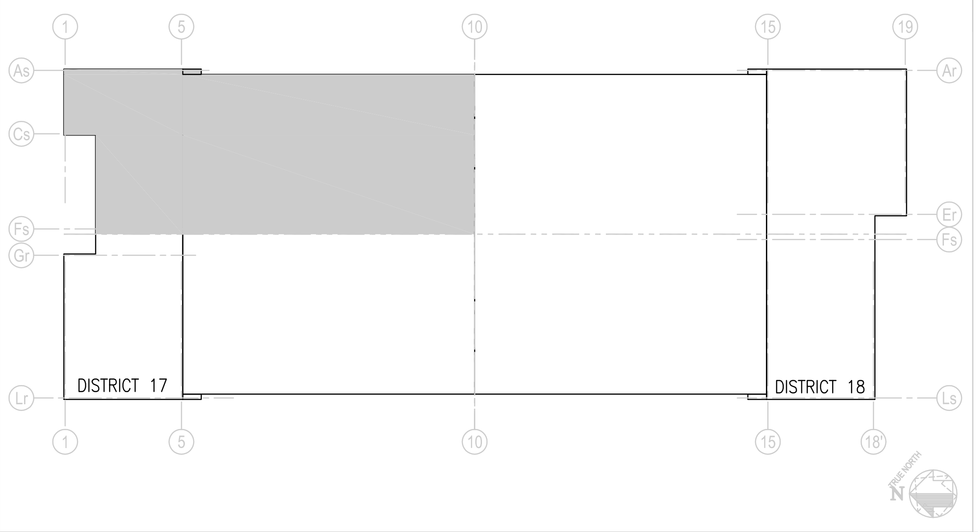
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	E-001.00

Plotted: 9/27/2019 8:18:19 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\E-001.00_DDC33000.DWG - khasan



1 1ST FLOOR ELECTRICAL DEMOLITION PART PLAN - DISTRICT 17
3/32" = 1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN ———

EXISTING TO BE REMOVED - - - - - -

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES. CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS. CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT, THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER. ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED, CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE REMOVAL OF THE MECHANICAL EQUIPMENT WITH THE FIRE ALARM CONTRACTOR.

DEMOLITION POWER PLAN NOTES:

1. ALL EXISTING POWER BRANCH CIRCUITS SERVING THE FACILITY No. 17 MECHANICAL UNITS ARE CONNECTED TO EXISTING 120/208Y DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
2. EXISTING CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL NOTE SEVERAL EXISTING BRANCH CIRCUITS ARE RUN IN PARALLEL WITH IN JUNCTION BOXES, PULL BOXES & IN SOME CASES IN THE SAME RACEWAY.
3. CONTRACTOR TO SURVEY EXISTING CONDITIONS, IDENTIFY BRANCH CIRCUITING & COORDINATE REMOVAL OF POWER OF EQUIPMENT WITH OTHER TRADES. ONLY AFFECTED CIRCUITS ARE TO BE DEMO. UNDER NO CONDITION CAN THE CONTRACTOR ASSUME THE DEMOLITION OF ENTIRE RACEWAYS WHICH COULD POTENTIALLY AFFECT THE POWER & OPERATION OF OTHER EXISTING SYSTEMS ON THE SAME JUNCTION BOXES OR PULL BOXES.
4. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR EXISTING EQUIPMENT WHICH IS AFFECTED BY THE MECHANICAL DEMOLITION & WHICH IS REQUIRED BE MAINTAIN OPERATIONS. REFER TO NOTES 2 & 3, ALL NEW TEMPORARY INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, BUILDING STANDARDS & CONTRACT DOCUMENTS.
5. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
6. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
7. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING CON EDISON MANHOLES ALONG AVENUE D.
2. EXISTING CON EDISON MEDIUM VOLTAGE SERVICE TO CON EDISON TRANSFORMER VAULT LOCATED ON THE SIDE WALK.
3. EXISTING 4000A, 120/208VOLT, 3Ø, 4WIRE UNDERGROUND DUCT BANK TO DSNY GARAGE, SERVICE CONDUCTORS STUB-UP IN THE MAIN ELECTRICAL ROOM IN DSNY FACILITY 17. REFER TO ONE LINE DIAGRAM FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES - CONTINUED

4. EXISTING MAIN ELECTRICAL SERVICE ROOM LOCATED AT DSNY GARAGE 17. REFER TO ONE LINE DIAGRAM E-601 & ELECTRICAL ELEVATION DRAWING E-401 FOR ADDITIONAL INFORMATION.
5. EXISTING 4000A, 208/120V, 3Ø, 4 WIRE SERVICE SWITCH BOARD LINE UP. THE EXISTING INCOMING SERVICE CONDUCTORS STUB UP & CONNECT TO BUS, REFER TO E-502 & E-601 FOR ADDITIONAL INFORMATION.
6. EXISTING 2000AF/4000AS, 208/120V, 3Ø, 4 WIRE SERVICE SWITCH BOARD SECTION. EXISTING ELECTRICAL CONNECTION FOR GARAGE #18, SERVICE SWITCH CONNECTS TO EXISTING DPB SWITCH BOARD SECTION, 2000A MAIN LUG ONLY, 208/120V, 3Ø, 4 WIRE, EXISTING ELECTRICAL DISTRIBUTION DEDICATED TO GARAGE #18, REFER TO E-502 & E-601 FOR ADDITIONAL INFORMATION.
7. EXISTING 2000AF/4000AS, 208/120V, 3Ø, 4 WIRE SERVICE SWITCH BOARD SECTION. EXISTING ELECTRICAL CONNECTION FOR GARAGE #17, SERVICE SWITCH CONNECTS TO EXISTING DPA SWITCH BOARD SECTION, 2000A MAIN LUG ONLY, 208/120V, 3Ø, 4 WIRE, EXISTING ELECTRICAL DISTRIBUTION DEDICATED TO GARAGE #17, REFER TO E-502 & E-601 FOR ADDITIONAL INFORMATION.
8. EXISTING PANEL 'SL' 208/120V, 3Ø, 4 WIRE, 100A M.L.O., PANEL SERVES EXISTING LIGHTING.
9. EXISTING PANEL 'EP' 208/120V, 3Ø, 4 WIRE, 100A M.L.O., PANEL SERVES EXISTING LIGHTING CONTRACTOR & SPRINKLER COMPRESSOR.
10. EXISTING MOTOR CONTROL CENTER ROOM FOR FACILITY No.17. REFER TO E-402 & E-601 FOR ADDITIONAL INFORMATION.
11. EXISTING MOTOR CONTROL CENTER MMC-B 208/120V, 3Ø, 3 WIRE, 600A M.L.O.
12. EXISTING PP1 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, 200A M.L.O, SERVES MECHANICAL UNITS.
13. EXISTING PP1A-S1 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, 400A MCB SERVES PUMPS UNITS
14. EXISTING WALL MOUNTED STARTERS FOR FANS TO BE REMOVED.
15. EXISTING PP3 DISTRIBUTION PANELS 208/120V, 3Ø, 4 WIRE 200A M.L.O. SERVES ROLL UP DOORS.
16. EXISTING BRANCH CIRCUIT PANEL RPG1 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES FUEL DISPENSING SYSTEM.
17. EXISTING BRANCH CIRCUIT PANEL RP1 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES UNIT HEATERS & GENERAL BRANCH CIRCUIT RECEPTACLES.
18. EXISTING BRANCH CIRCUIT PANEL RP2 208/120V, 3Ø, 4 WIRE 100A M.L.O. SERVES UNIT HEATERS, MONITOR & GENERAL BRANCH CIRCUIT RECEPTACLES.
19. EXISTING BRANCH CIRCUIT PANEL RPP 208/120V, 3Ø, 4 WIRE 60A MCB. SERVES EQUIPMENT & GENERAL BRANCH CIRCUIT RECEPTACLES.
20. EXISTING LIGHTING PANEL LP3 208/120V, 3Ø, 4 WIRE 100A M.L.O. SERVES LIGHTING.
21. EXISTING LIGHTING PANEL LP1 208/120V, 3Ø, 4 WIRE 225A M.L.O. SERVES LIGHTING.
22. EXISTING LIGHTING PANEL LPNL2 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES LIGHTING.
23. EXISTING FACILITY POWER FOR LIGHTING TO REMAIN.
24. EXISTING UNIT HEATER, POWER CIRCUIT & CONDUIT TO REMAIN.
25. EXISTING TRUCK WASH SPACE TO BE RE-PURPOSED. CONTRACTOR SHALL REMOVE EXISTING, COORDINATE THE REMOVAL, STORAGE OF ALL EXISTING FILING CABINETS WITH DDC & CITY OF NEW YORK BEFORE STARTING WORK. CONTRACTOR TO WALK THE SPACE WITH DDC & CITY OF NEW YORK TO IDENTIFY ANY EQUIPMENT WHICH NEEDS TO BE DISCONNECTED & TURNED OVER TO THE CITY OF NEW YORK. REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
26. EXISTING ROLL UP DOOR MOTORS, POWER & ASSOCIATED CONTROLS SHALL BE REMOVED ALL THE WAY TO THE SOURCE PANEL. COORDINATE WITH OTHER TRADES & ARCHITECTURAL DRAWINGS.
27. CONTRACTOR SHALL DEMOLISH EXISTING EQUIPMENT BRANCH CIRCUIT ALL THE WAY TO THE SOURCE PANEL.
28. CONTRACTOR SHALL DEMOLISH POWER CIRCUITS PW#5, PW#6 & PW#7 TO JUNCTION BOXES.
29. CONTRACTOR SHALL DEMOLISH POWER TO TRUCK WASH AREA WATER HEATER, COORDINATE WITH PLUMBING DRAWING FOR ADDITIONAL INFORMATION.
30. EXISTING PULL BOXES. CONTRACTOR TO COORDINATE ACCESS TO PULL BOX FEEDERS WITH DDC & DSNY. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
31. EXISTING AIR SAMPLING MONITORING PANEL TO BE REMOVED
32. EXISTING MECHANICAL EQUIPMENT TO REMAIN

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DOB BSCAN STICKER

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REVISIONS:

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

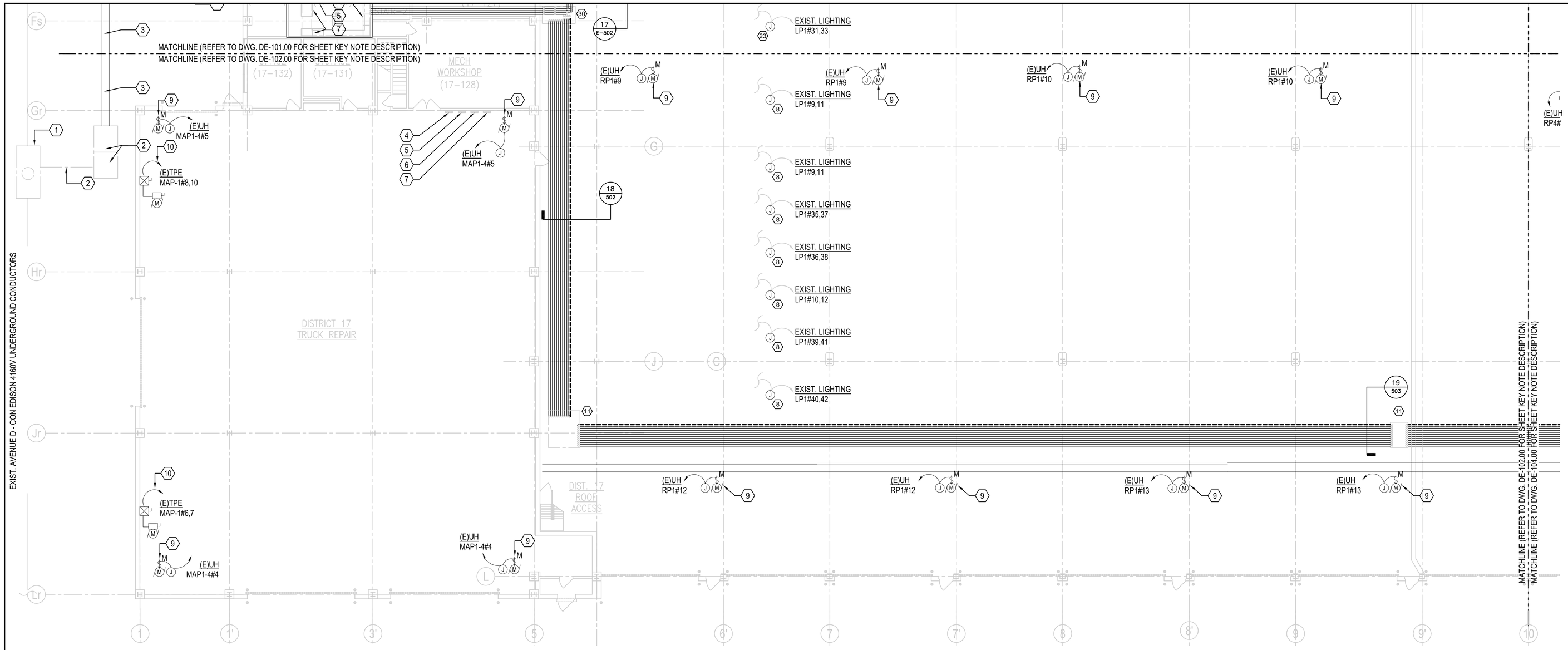
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DRAWING TITLE:
ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · SETH TITTERTON · 074116 · PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	DE-101.00

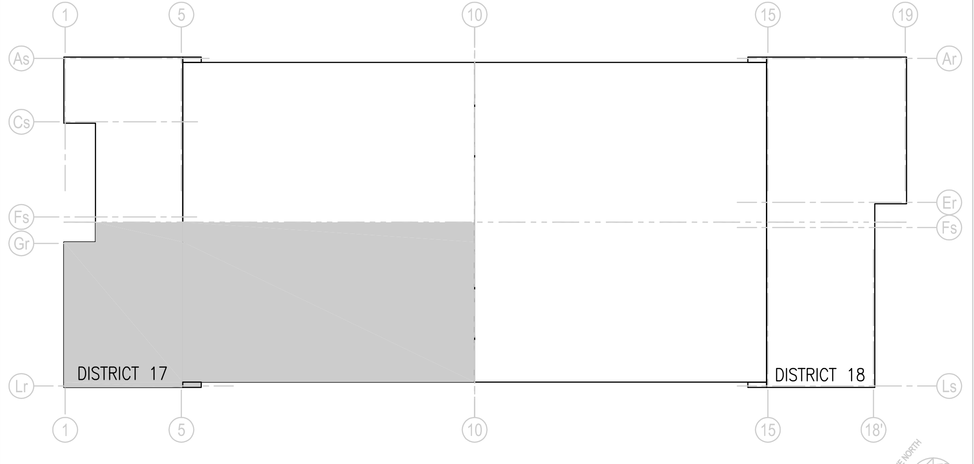
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1 1ST FLOOR ELECTRICAL DEMOLITION PART PLAN-DISTRICT 17
3/32"=1'-0"

0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REMOVED

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1. EXISTING CON EDISON MANHOLES ALONG AVENUE D.
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SHEET KEYNOTES - CONTINUED

4. EXISTING PANEL 'LP2' 208/120V, 3Ø, 4 WIRE, 100A M.L.O, PANEL SERVES EXISTING LIGHTING.
5. EXISTING PANEL 'LPN.1' 208/120V, 3Ø, 4 WIRE, 100A M.L.O, PANEL SERVES EXISTING LIGHTING.
6. EXISTING PANEL 'MAP1' 208/120V, 3Ø, 4 WIRE, 400A MAIN FUSE, PANEL SERVES EXISTING TRUCK SHOP EQUIPMENT & TPE FANS.
7. EXISTING PANEL 'MRP1' 208/120V, 3Ø, 4 WIRE, 60A M.L.O, PANEL SERVES EXISTING TRUCK SHOP EQUIPMENT & UNIT HEATERS.
8. EXISTING FACILITY POWER FOR LIGHTING TO REMAIN.
9. EXISTING UNIT HEATER, POWER CIRCUIT & CONDUIT TO REMAIN.
10. EXISTING TPE FANS AND ASSOCIATED CONTROLS TO REMAIN.
11. EXISTING PULL BOXES, CONTRACTOR TO COORDINATE ACCESS TO PULL BOX FEEDERS WITH DDC & DSNY. REFER TO ELECTRICAL DRAWINGS E-502.00 AND E-503.00 FOR ADDITIONAL INFORMATION

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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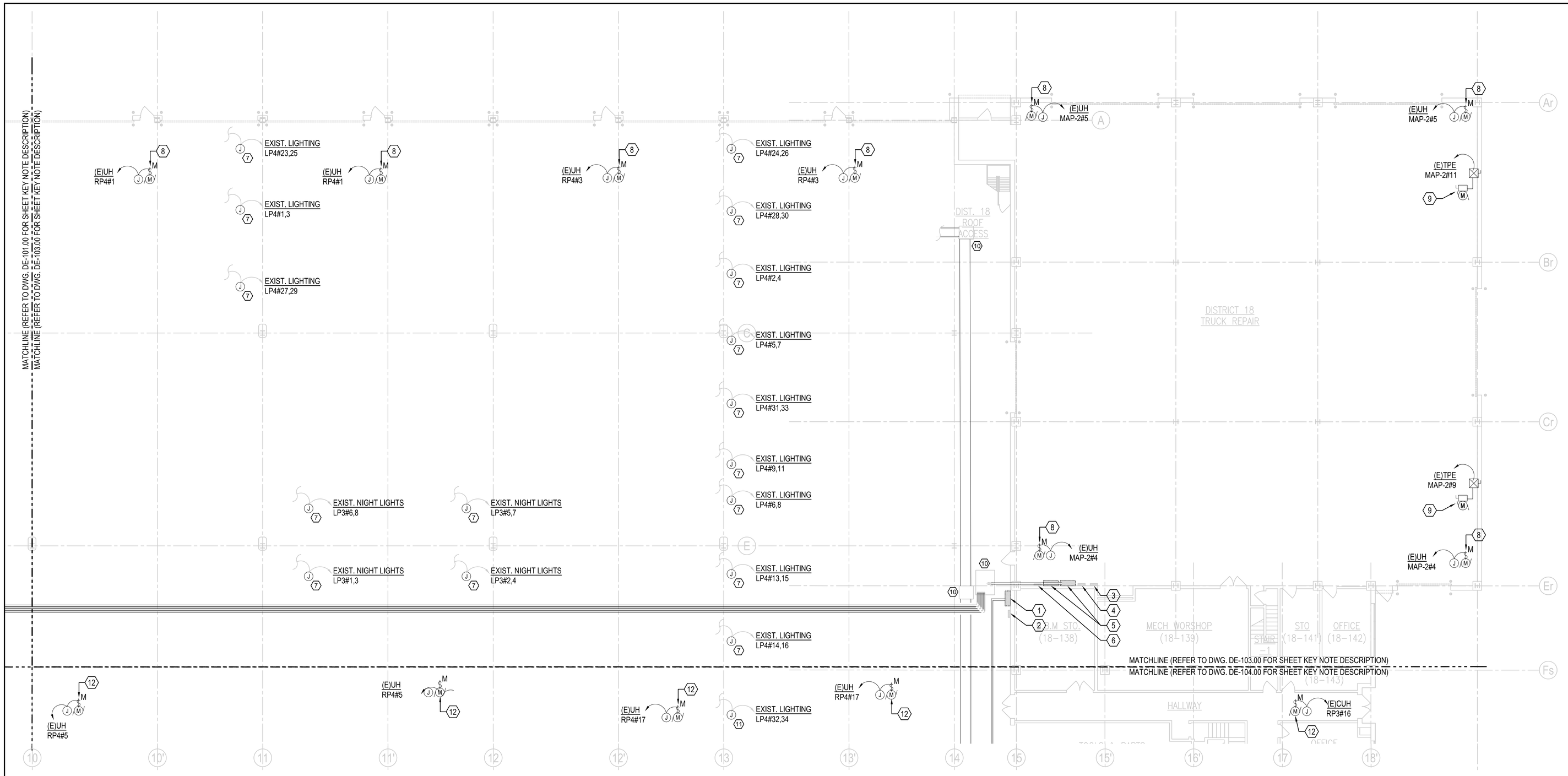
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DRAWING TITLE:
ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

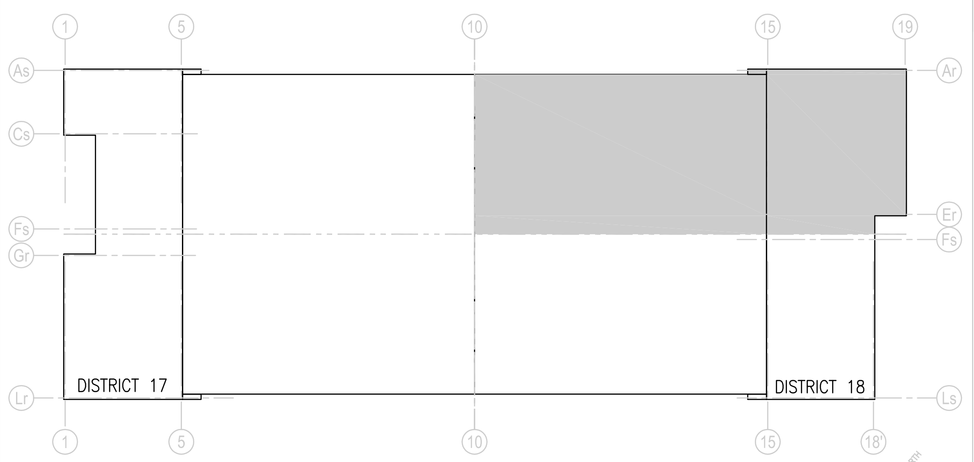
DATE: 09/27/2019
PROJECT NO: DDC33000
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CHECKED BY: HG
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DE-102.00

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1 1ST FLOOR ELECTRICAL DEMOLITION PART PLAN-DISTRICT 18
3/32"=1'-0"
0 10'-8" 21'-4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN ————

EXISTING TO BE REMOVED - - - - - - - -

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4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS, CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT, THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER, ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED. CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE REMOVAL OF THE MECHANICAL EQUIPMENT WITH THE FIRE ALARM CONTRACTOR.

DEMOLITION POWER PLAN NOTES:

1. ALL EXISTING POWER BRANCH CIRCUITS SERVING THE FACILITY No. 18 MECHANICAL UNITS ARE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
2. EXISTING CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL NOTE SEVERAL EXISTING BRANCH CIRCUITS ARE RUN IN PARALLEL WITH IN JUNCTION BOXES, PULL BOXES & IN SOME CASES IN THE SAME RACEWAY.
3. CONTRACTOR TO SURVEY EXISTING CONDITIONS, IDENTIFY BRANCH CIRCUITING & COORDINATE REMOVAL OF POWER OF EQUIPMENT WITH OTHER TRADES. ONLY AFFECTED CIRCUITS ARE TO BE DEMO, UNDER NO CONDITION CAN THE CONTRACTOR ASSUME THE DEMOLITION OF ENTIRE RACEWAYS WHICH COULD POTENTIALLY AFFECT THE POWER & OPERATION OF OTHER EXISTING SYSTEMS ON THE SAME JUNCTION BOXES OR PULL BOXES.
4. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR EXISTING EQUIPMENT WHICH IS AFFECTED BY THE MECHANICAL DEMOLITION & WHICH IS REQUIRED BE MAINTAIN OPERATIONS, REFER TO NOTES 2 & 3. ALL NEW TEMPORARY INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, BUILDING STANDARDS & CONTRACT DOCUMENTS.
5. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
6. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
7. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING PANEL 'LP4' 208/120V, 3Ø, 4 WIRE, 225A M.L.O, PANEL SERVES EXISTING LIGHTING.
2. EXISTING PANEL 'LPNL3' 208/120V, 3Ø, 4 WIRE, 100A M.L.O, PANEL SERVES EXISTING LIGHTING.
3. EXISTING PANEL 'LP5A' 208/120V, 3Ø, 4 WIRE, 225A M.L.O, PANEL SERVES EXISTING LIGHTING

SHEET KEYNOTES - CONTINUED

4. EXISTING PANEL 'RP' 208/120V, 3Ø, 4 WIRE, 100A M.L.O, PANEL SERVES EXISTING UNIT HEATERS, GENERAL BRANCH CIRCUIT RECEPTACLES & SMOKE VENT.
5. EXISTING TWO SECTION PANEL 'MAP2' 208/120V, 3Ø, 4 WIRE, 400A MAIN FUSE, PANEL SERVES EXISTING TRUCK SHOP EQUIPMENT & TPE FANS.
6. EXISTING PANEL 'MRP2' 208/120V, 3Ø, 4 WIRE, 60A M.L.O, PANEL SERVES EXISTING TRUCK SHOP EQUIPMENT & UNIT HEATERS.
7. EXISTING FACILITY POWER FOR LIGHTING TO REMAIN.
8. EXISTING UNIT HEATER POWER CIRCUIT & CONDUIT TO REMAIN.
9. EXISTING TPE FANS AND ASSOCIATED CONTROLS TO REMAIN.
10. EXISTING PULL BOXES, CONTRACTOR TO COORDINATE ACCESS TO PULL BOX FEEDERS WITH DDC & DSNY, REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

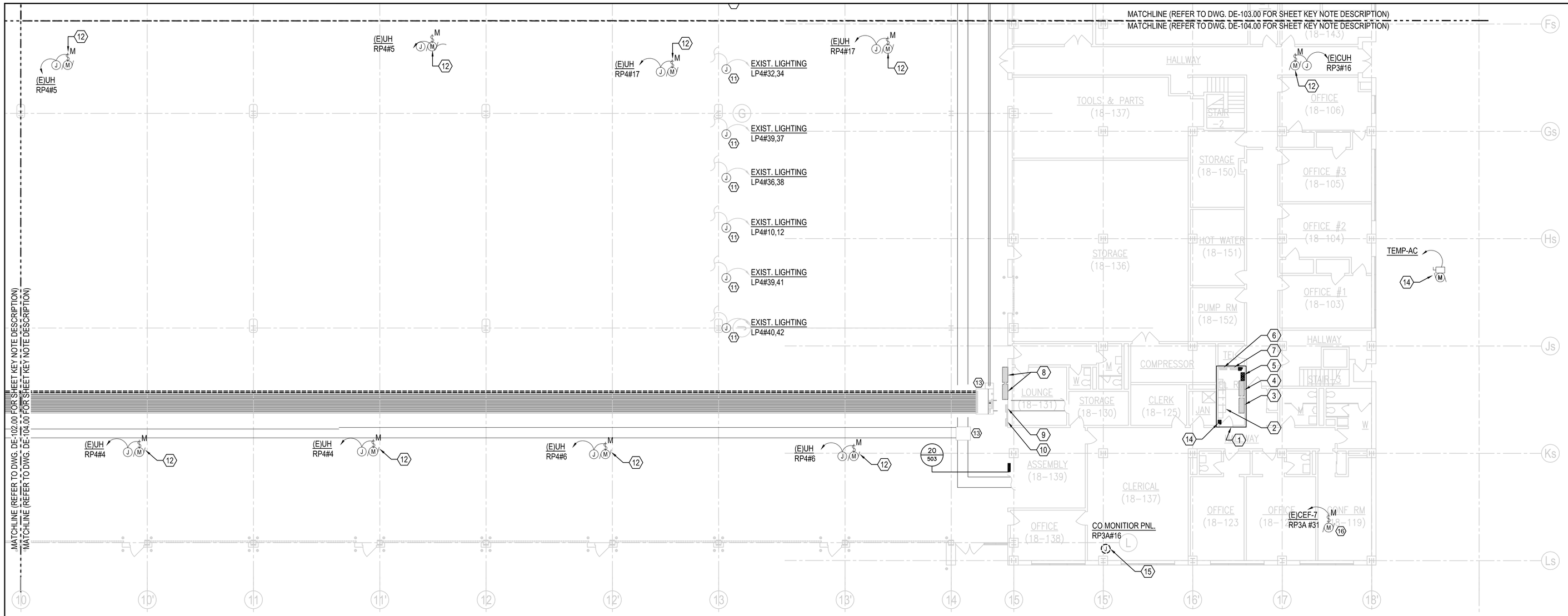
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DRAWING TITLE:
ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH TITTEL — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	DE-103.00

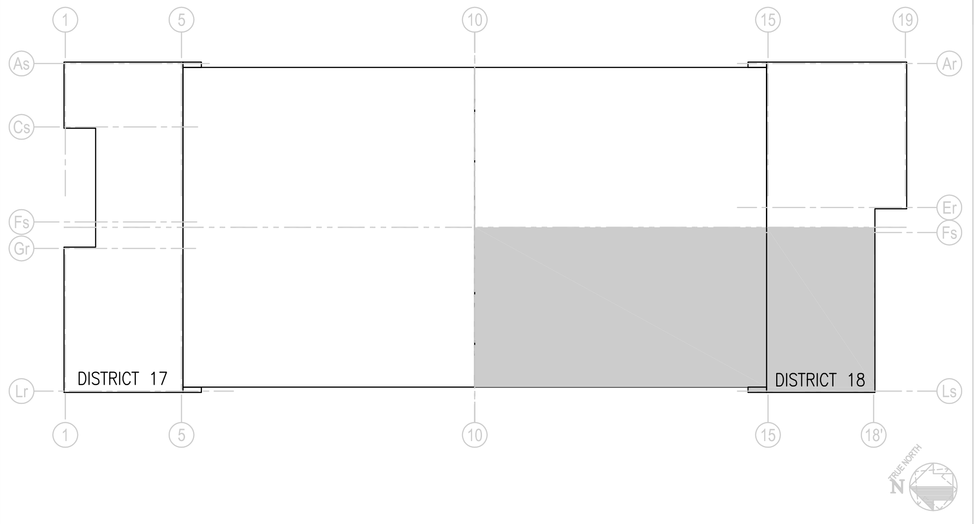
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1 1ST FLOOR ELECTRICAL DEMOLITION PART PLAN-DISTRICT 18
3/32"=1'-0"

0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REMOVED

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
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DEMOLITION POWER PLAN NOTES:

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7. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING MOTOR CONTROL CENTER ROOM FOR FACILITY No.18. REFER TO E-502 & E-601 FOR ADDITIONAL INFORMATION.
2. EXISTING MOTOR CONTROL CENTER MMC-A 208/120V, 3Ø, 3 WIRE, 600A M.L.O.
3. EXISTING PP2 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, 600A MAIN FUSE. SERVES MECHANICAL UNITS.
4. EXISTING PP2-S1 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, 600A BUS SERVES MECHANICAL UNITS & PUMPS.
5. EXISTING WALL MOUNTED STARTERS FOR FAN'S TO BE REMOVED..
6. EXISTING BRANCH CIRCUIT PANEL RP3 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES UNIT HEATERS, DAMPERS & GENERAL BRANCH CIRCUIT RECEPTACLES.
7. EXISTING LIGHTING PANEL LP6 208/120V, 3Ø, 4 WIRE 225A M.L.O. SERVES LIGHTING
8. EXISTING PP4 TWO SECTION DISTRIBUTION PANELS 208/120V, 3Ø, 4 WIRE 400A MAIN. SERVES ROLL UP DOORS.
9. EXISTING BRANCH CIRCUIT PANEL RPG2 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES FUEL DISPENSING SYSTEM.
10. EXISTING BRANCH CIRCUIT PANEL RP4 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES UNIT HEATERS & GENERAL BRANCH CIRCUIT RECEPTACLES.
11. EXISTING FACILITY POWER FOR LIGHTING TO REMAIN.
12. EXISTING UNIT HEATER POWER CIRCUIT & CONDUIT TO REMAIN.
13. EXISTING PULL BOXES. CONTRACTOR TO COORDINATE ACCESS TO PULL BOX FEEDERS WITH DDC & DSNY. REFER TO DETAIL#20 ON ELECTRICAL DRAWING E-502 FOR ADDITIONAL INFORMATION.
14. EXISTING TEMP. A/C UNIT POWER CIRCUIT & CONDUIT TO BE REMOVED IN ITS ENTIRETY
15. EXISTING AIR SAMPLING MONITORING PANEL TO BE REMOVED
16. EXISTING MECHANICAL EQUIPMENT TO REMAIN

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL GROUND FLOOR DEMOLITION PART PLAN-DISTRICT 18

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

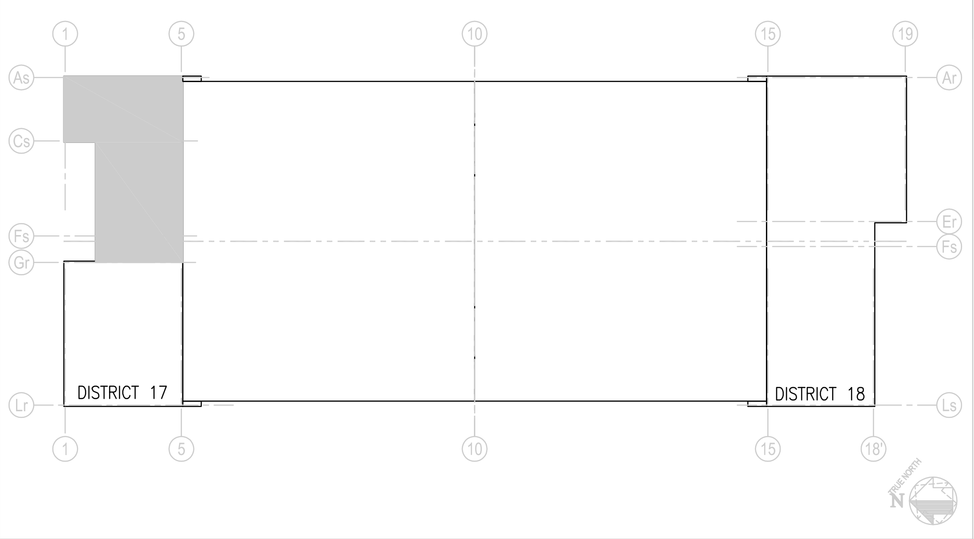
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	DE-104.00

Plotted: 9/27/2019 6:24:20 AM P:\NY\OM\EP_EIN\PP\DDC33000\DRAWINGS\SHEETS\DE-104.00_DDC33000.DWG - ksimpson



1 2ND FLOOR ELECTRICAL DEMOLITION PART PLAN-DISTRICT 17
3/32"=1'-0"
0 10'-8" 21'-4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN ———

EXISTING TO BE REMOVED - - - - -

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
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DEMOLITION POWER PLAN NOTES:

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SHEET KEYNOTES

1. EXISTING PANEL 'LP2A' 208/120V, 3Ø, 4 WIRE, 100A M.L.O. PANEL SERVES EXISTING LIGHTING.
2. EXISTING TWO SECTION PANEL 'RP2A SECT. A SECT B.' 208/120V, 3Ø, 4 WIRE, 150A MCB. PANEL SERVES EXISTING RECEPTACLES AND HVAC EQUIPMENT.
3. EXISTING TEL/DAT PULL BOX.

SHEET KEYNOTES - CONTINUED

4. EXISTING MECHANICAL EQUIPMENT TO REMAIN.
5. EXISTING CABINET UNIT HEATER TO BE REMOVED. CONTRACTOR TO DEMOLISH EXISTING EQUIPMENT BRANCH CIRCUIT ALL THE WAY TO THE SOURCE PANEL.

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NYC DDC Department of Design and Construction

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CAPITAL PROJECT NUMBER:
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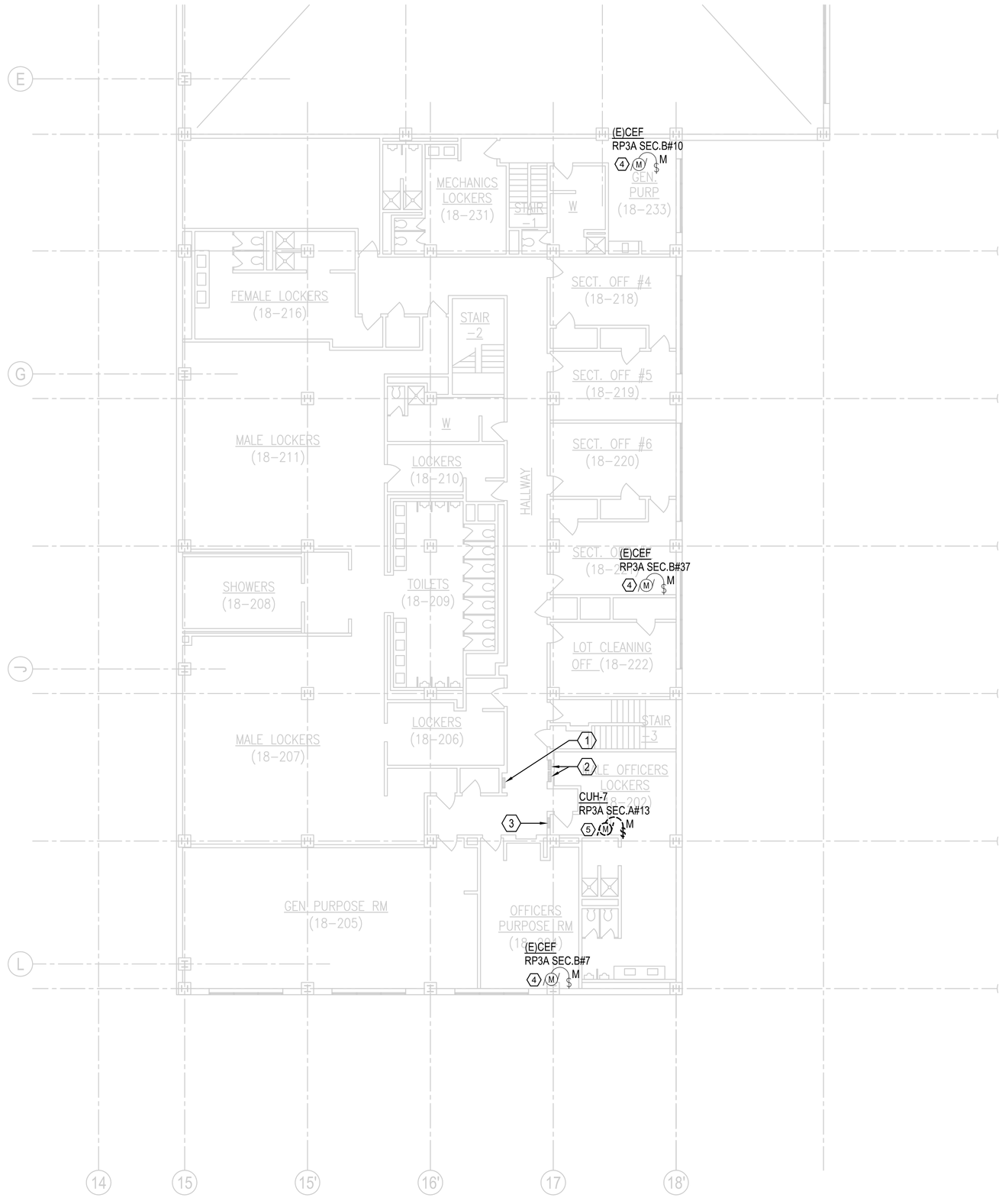
LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 024116 · LICENSED PROFESSIONAL ENGINEER

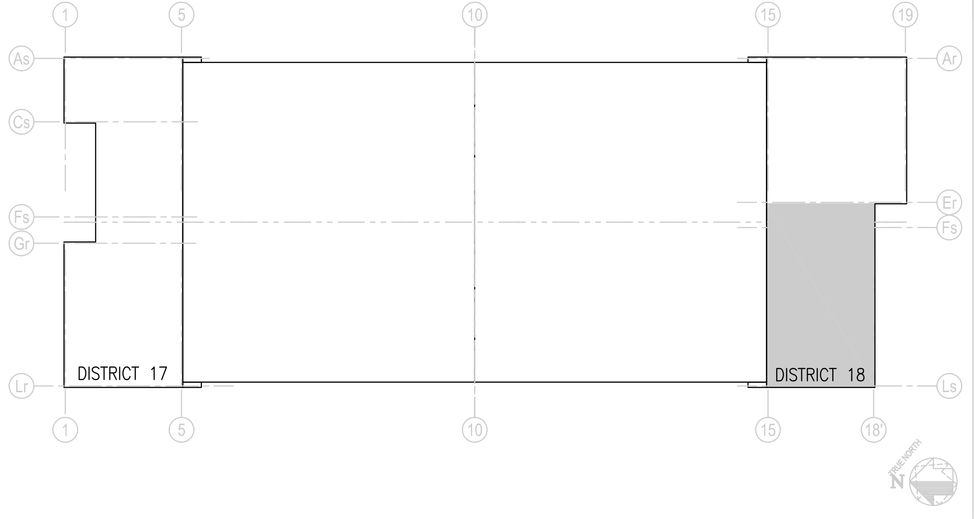
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PROJECT NO: DDC33000
DRAWN BY: HG
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DRAWING NUMBER:
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Plotted: 9/27/2019 8:24:07 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\DE-105.00_DDC33000.DWG - ksimpson



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3/32"=1'-0" 0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN ———

EXISTING TO BE REMOVED - - - - - -

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DEMOLITION POWER PLAN NOTES:

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2. EXISTING CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL NOTE SEVERAL EXISTING BRANCH CIRCUITS ARE RUN IN PARALLEL WITH IN JUNCTION BOXES, PULL BOXES & IN SOME CASES IN THE SAME RACEWAY.
3. CONTRACTOR TO SURVEY EXISTING CONDITIONS, IDENTIFY BRANCH CIRCUITING & COORDINATE REMOVAL OF POWER OF EQUIPMENT WITH OTHER TRADES, ONLY AFFECTED CIRCUITS ARE TO BE DEMO, UNDER NO CONDITION CAN THE CONTRACTOR ASSUME THE DEMOLITION OF ENTIRE RACEWAYS WHICH COULD POTENTIALLY AFFECT THE POWER & OPERATION OF OTHER EXISTING SYSTEMS ON THE SAME JUNCTION BOXES OR PULL BOXES.
4. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR EXISTING EQUIPMENT WHICH IS AFFECTED BY THE MECHANICAL DEMOLITION & WHICH IS REQUIRED BE MAINTAIN OPERATIONS, REFER TO NOTES 2 & 3. ALL NEW TEMPORARY INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, BUILDING STANDARDS & CONTRACT DOCUMENTS.
5. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
6. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC., INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
7. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING PANEL 'LP5A' 208/120V, 3Ø, 4 WIRE, 100A M.L.O, PANEL SERVES EXISTING LIGHTING.
2. EXISTING TWO SECTION PANEL 'RP3 SECT.A & SECT.B' 208/120V, 3Ø, 4 WIRE, 225A MCB. PANEL SERVES EXISTING RECEPTACLES AND HVAC EQUIPMENT.
3. EXISTING TEL/DAT PULL BOX.

SHEET KEYNOTES - CONTINUED

4. EXISTING MECHANICAL EQUIPMENT, CONDUIT AND WIRING TO REMAIN.
5. EXISTING CABINET UNIT HEATER TO BE REMOVED. CONTRACTOR TO DEMOLISH EXISTING EQUIPMENT BRANCH CIRCUIT ALL THE WAY TO THE SOURCE PANEL

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

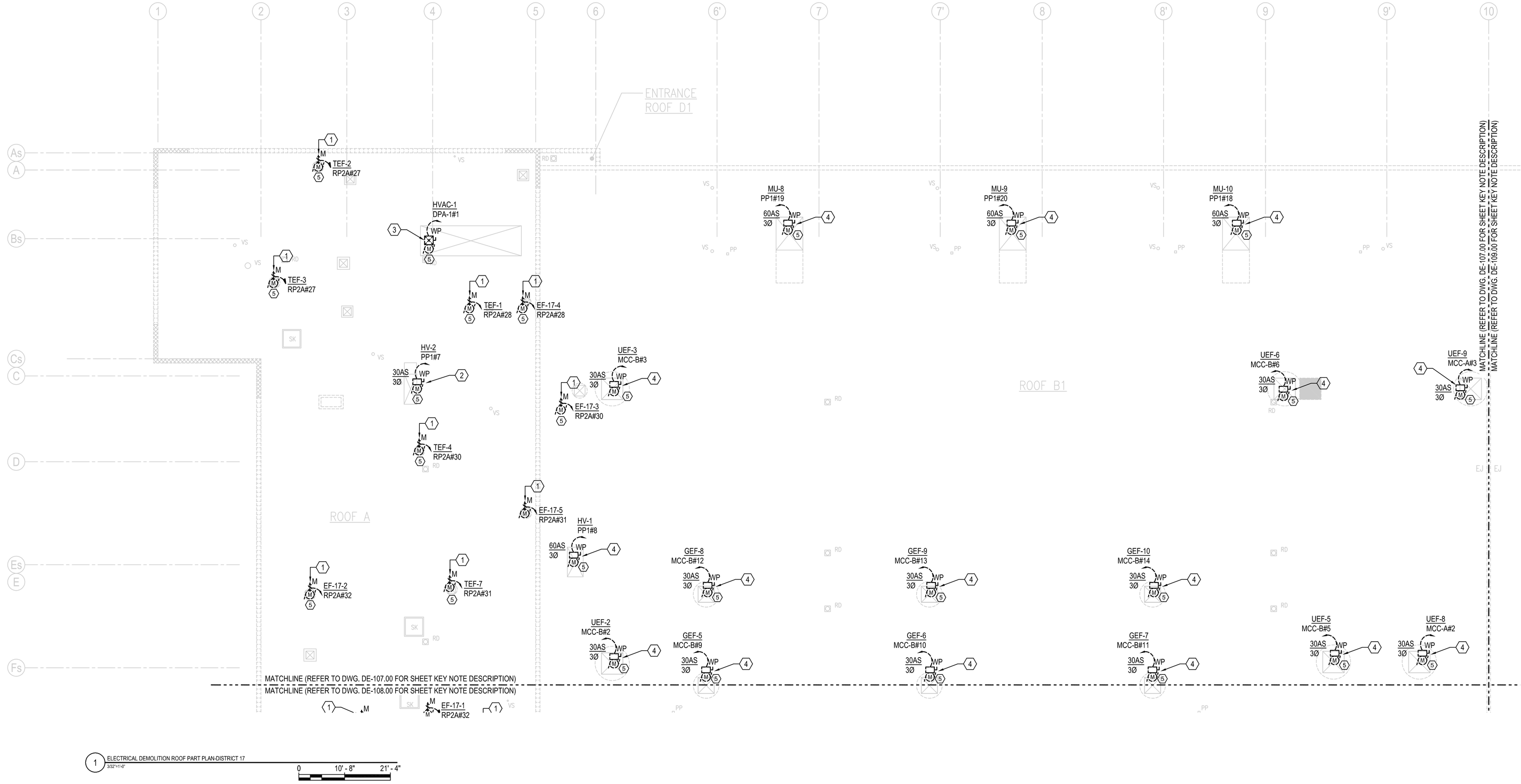
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ELECTRICAL 2ND FLOOR DEMOLITION PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

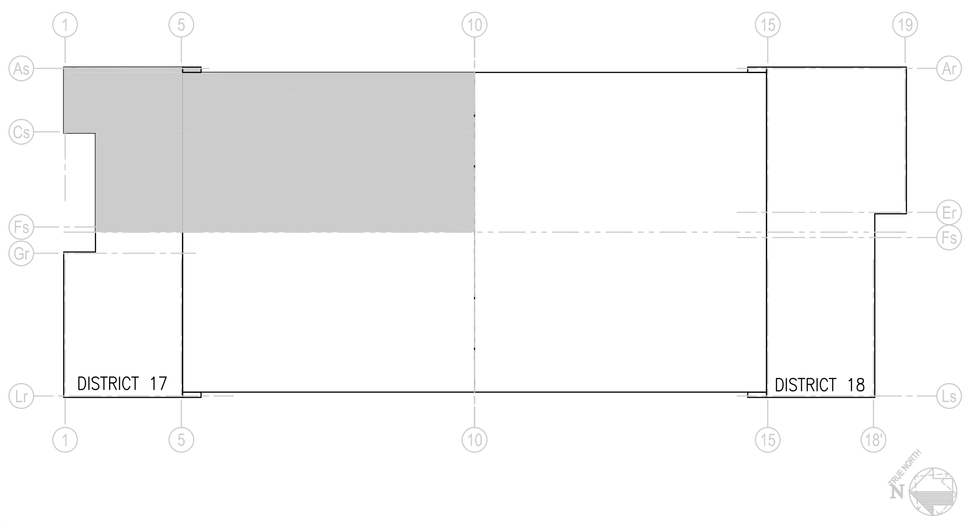
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PROJECT NO: DDC33000
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CHECKED BY: HG
DRAWING NUMBER:
DE-106.00

Plotted: 9/27/2019 8:23:58 AM P:\NYCOMEP_E\NPP\DDC33000\DRAWINGS\SHEETS\DE-106.00_DDC33000.DWG - kslmpson



1 ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN ————

EXISTING TO BE REMOVED - - - - - - - -

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES, CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS, CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT, THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER, ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED, CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
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DEMOLITION POWER PLAN NOTES:

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SHEET KEYNOTES

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5. CONTRACTOR SHALL REMOVE ALL EXISTING CONDUIT ROOF STUB-UPS.

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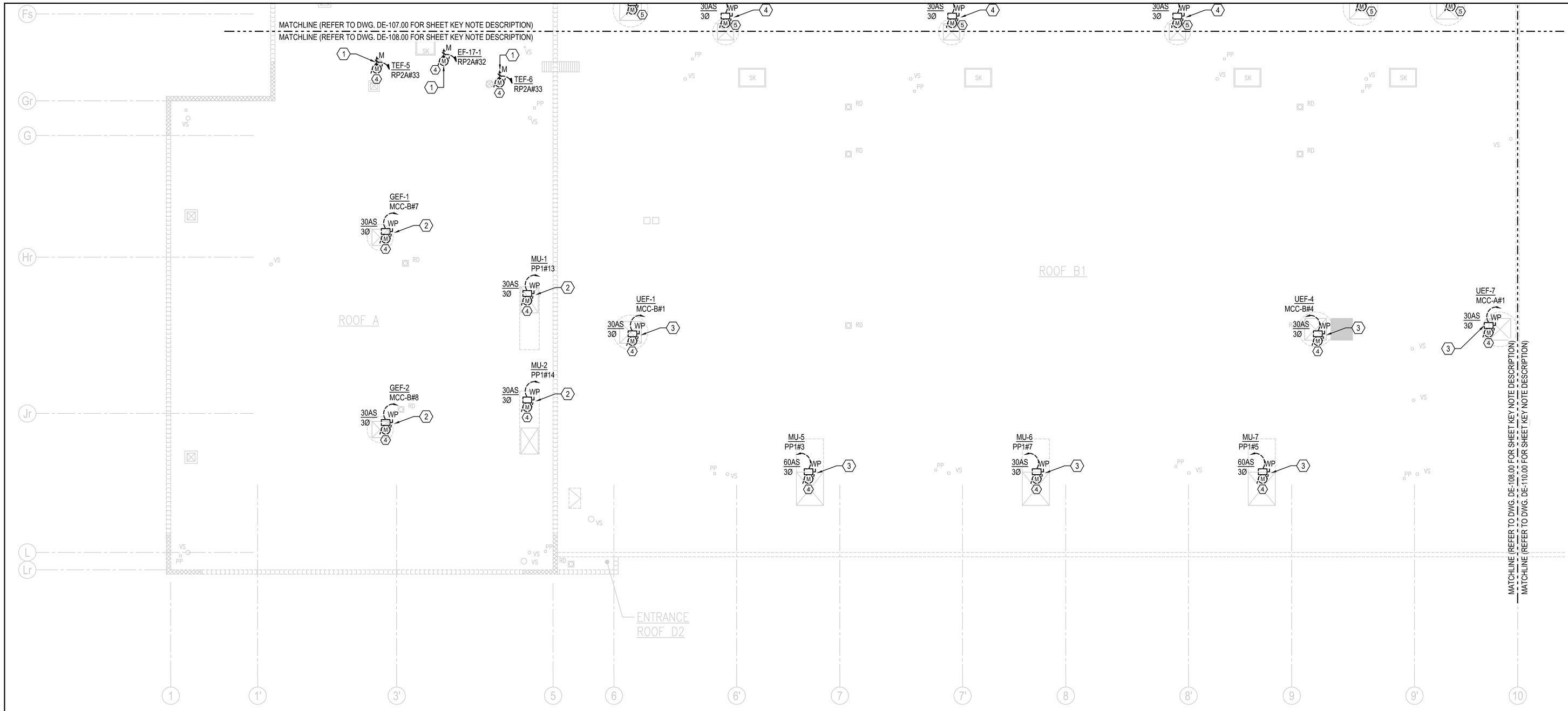
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DRAWING TITLE:
ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEVIN FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

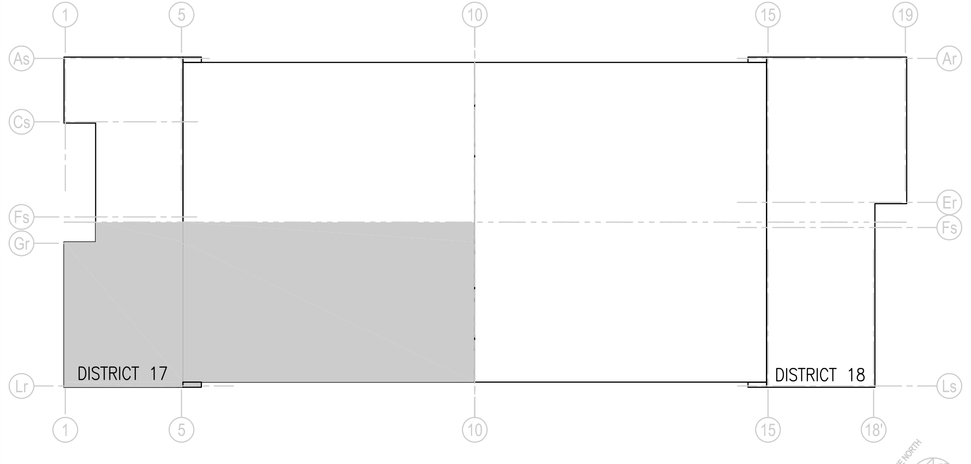
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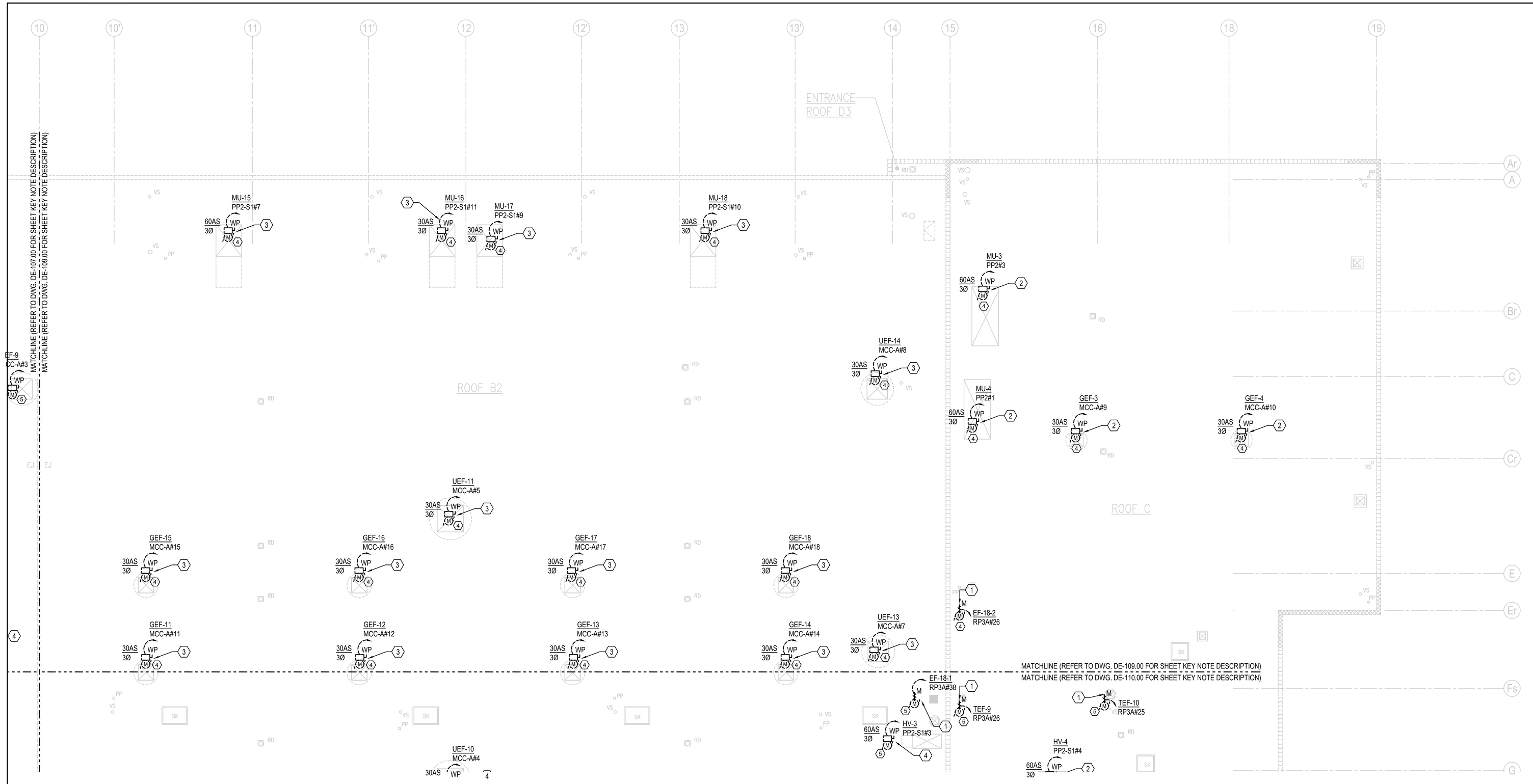
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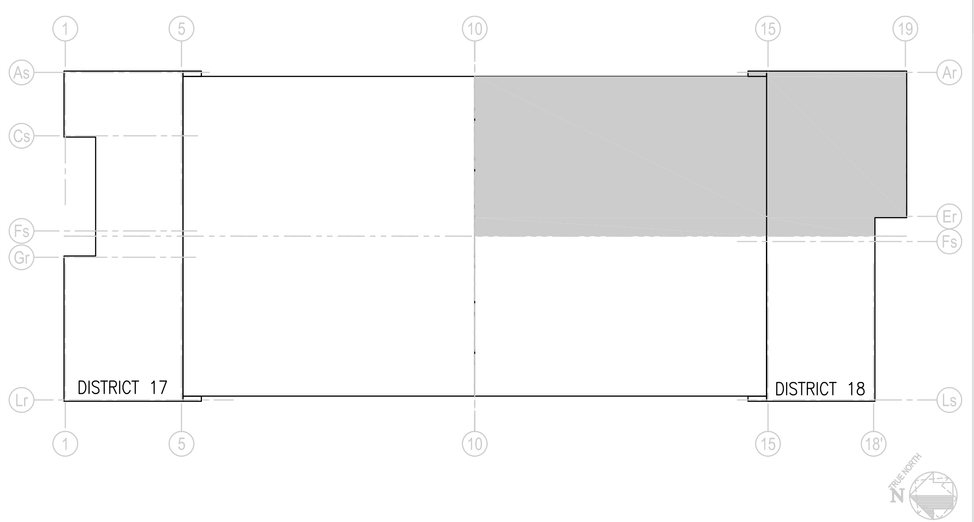
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KEY PLAN



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SHEET KEYNOTES

1. EXISTING MECHANICAL EQUIPMENT DISCONNECT, POWER CIRCUIT & CONDUIT TO BE REMOVED IN ITS ENTIRETY, EXISTING POWER FEED IS RAN TO PANEL LOCATED ON THE 2ND FLOOR. CONTRACTOR TO COORDINATE THE REMOVAL OF ALL CONTROLS, DISCONNECTS & WITH MECHANICAL CONTRACTOR. COORDINATE ACCESS TO CEILING IN THIS AREA WITH DDC & DSNY PROJECT MANAGER.
2. EXISTING MECHANICAL EQUIPMENT DISCONNECT, POWER CIRCUIT & CONDUIT TO BE REMOVED IN ITS ENTIRETY. EXISTING POWER FEED IS RAN TO PANEL LOCATED ON THE 1ST FLOOR. CONTRACTOR TO COORDINATE THE REMOVAL OF ALL CONTROLS, DISCONNECTS & WITH MECHANICAL CONTRACTOR. COORDINATE ACCESS TO CEILING IN THIS AREA WITH DDC & DSNY PROJECT MANAGER.
3. EXISTING MECHANICAL EQUIPMENT DISCONNECT, POWER CIRCUIT & CONDUIT TO BE REMOVED IN ITS ENTIRETY. EXISTING POWER FEED IS RAN IN CONDUIT SUPORTED FROM THE STRUCTURAL TRUSS SYSTEM TO PANEL LOCATED ON THE 1ST FLOOR. CONTRACTOR TO COORDINATE THE REMOVAL OF ALL CONTROLS, DISCONNECTS & WITH MECHANICAL CONTRACTOR. COORDINATE ACCESS TO THE GARAGE AREA WITH DDC & DSNY PROJECT MANAGER.
4. CONTRACTOR SHALL REMOVE ALL EXISTING CONDUIT ROOF STUB-UPS.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

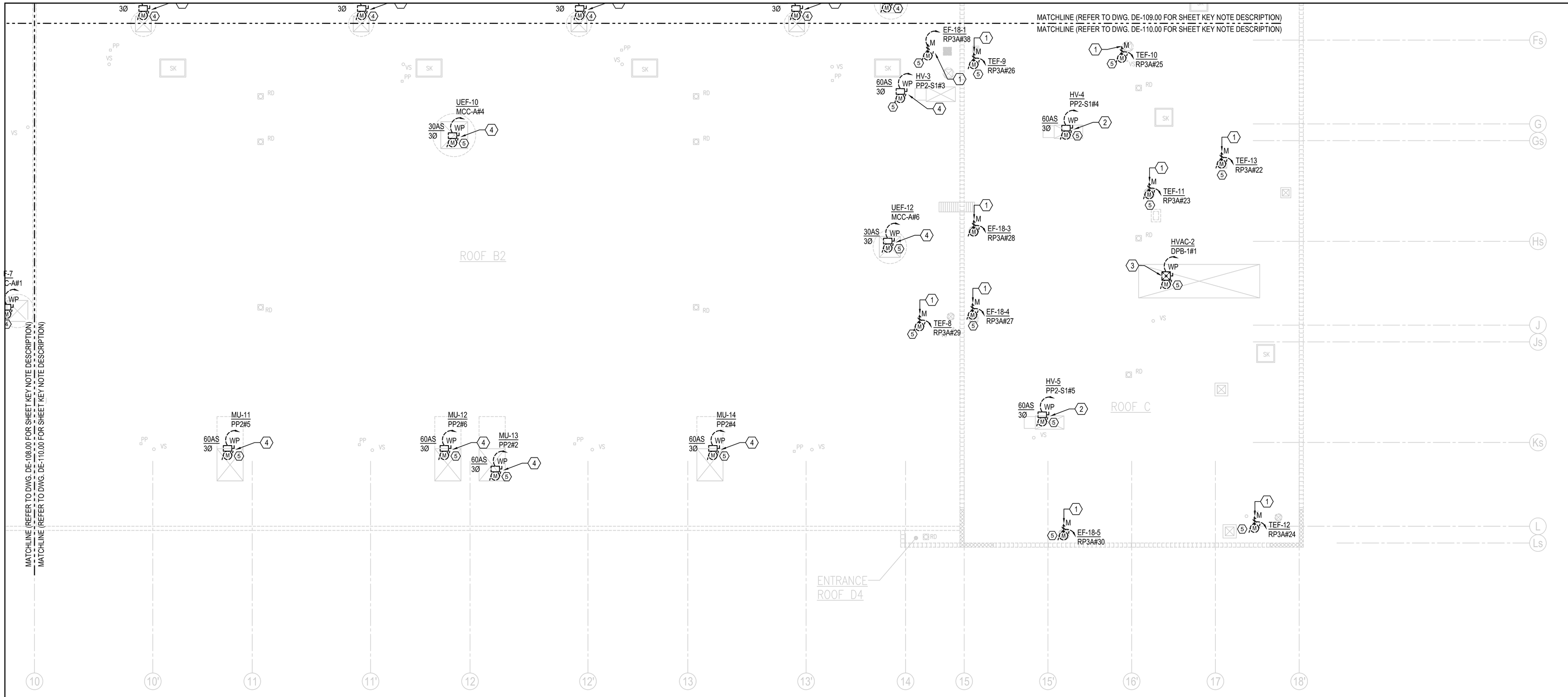
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DRAWING TITLE:
ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH FITZGERALD — 074116 — LICENSED PROFESSIONAL ENGINEER

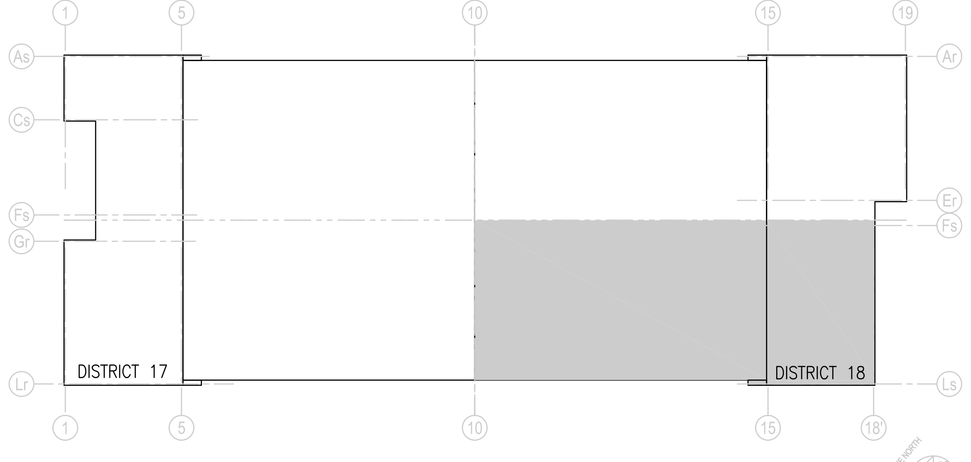
DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: HG
CHECKED BY: HG
DRAWING NUMBER:
DE-109.00

Plotted: 9/27/2019 8:23:20 AM P:\NYC\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\DE-109.00_DDC33000.DWG - khasan



1 ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN
EXISTING TO BE REMOVED

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES, CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS, CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT. THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER. ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED, CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE REMOVAL OF THE MECHANICAL EQUIPMENT WITH THE FIRE ALARM CONTRACTOR.

DEMOLITION POWER PLAN NOTES:

1. ALL EXISTING POWER BRANCH CIRCUITS SERVING THE FACILITY No. 18 MECHANICAL UNITS ARE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
2. EXISTING CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL NOTE SEVERAL EXISTING BRANCH CIRCUITS ARE RUN IN PARALLEL WITH IN JUNCTION BOXES, PULL BOXES & IN SOME CASES IN THE SAME RACEWAY.
3. CONTRACTOR TO SURVEY EXISTING CONDITIONS, IDENTIFY BRANCH CIRCUITING & COORDINATE REMOVAL OF POWER OF EQUIPMENT WITH OTHER TRADES. ONLY AFFECTED CIRCUITS ARE TO BE DEMO, UNDER NO CONDITION CAN THE CONTRACTOR ASSUME THE DEMOLITION OF ENTIRE RACEWAYS WHICH COULD POTENTIALLY AFFECT THE POWER & OPERATION OF OTHER EXISTING SYSTEMS ON THE SAME JUNCTION BOXES OR PULL BOXES.
4. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR EXISTING EQUIPMENT WHICH IS AFFECTED BY THE MECHANICAL DEMOLITION & WHICH IS REQUIRED BE MAINTAIN OPERATIONS. REFER TO NOTES 2 & 3, ALL NEW TEMPORARY INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, BUILDING STANDARDS & CONTRACT DOCUMENTS.
5. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK RUNNING IN THE CEILING OF THE SECOND FL.
6. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
7. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

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2. EXISTING MECHANICAL EQUIPMENT DISCONNECT, POWER CIRCUIT & CONDUIT TO BE REMOVED IN ITS ENTIRETY. EXISTING POWER FEED IS RAN TO PANEL LOCATED ON THE 1ST FLOOR. CONTRACTOR TO COORDINATE THE REMOVAL OF ALL CONTROLS, DISCONNECTS & WITH MECHANICAL CONTRACTOR. COORDINATE ACCESS TO CEILING IN THIS AREA WITH DDC & DSNY PROJECT MANAGER.
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4. EXISTING MECHANICAL EQUIPMENT DISCONNECT, POWER CIRCUIT & CONDUIT TO BE REMOVED IN ITS ENTIRETY. EXISTING POWER FEED IS RAN IN CONDUIT SUPORTED FROM THE STRUCTURAL TRUSS SYSTEM TO PANEL LOCATED ON THE 1ST FLOOR. CONTRACTOR TO COORDINATE THE REMOVAL OF ALL CONTROLS, DISCONNECTS & WITH MECHANICAL CONTRACTOR. COORDINATE ACCESS TO THE GARAGE AREA WITH DDC & DSNY PROJECT MANAGER.
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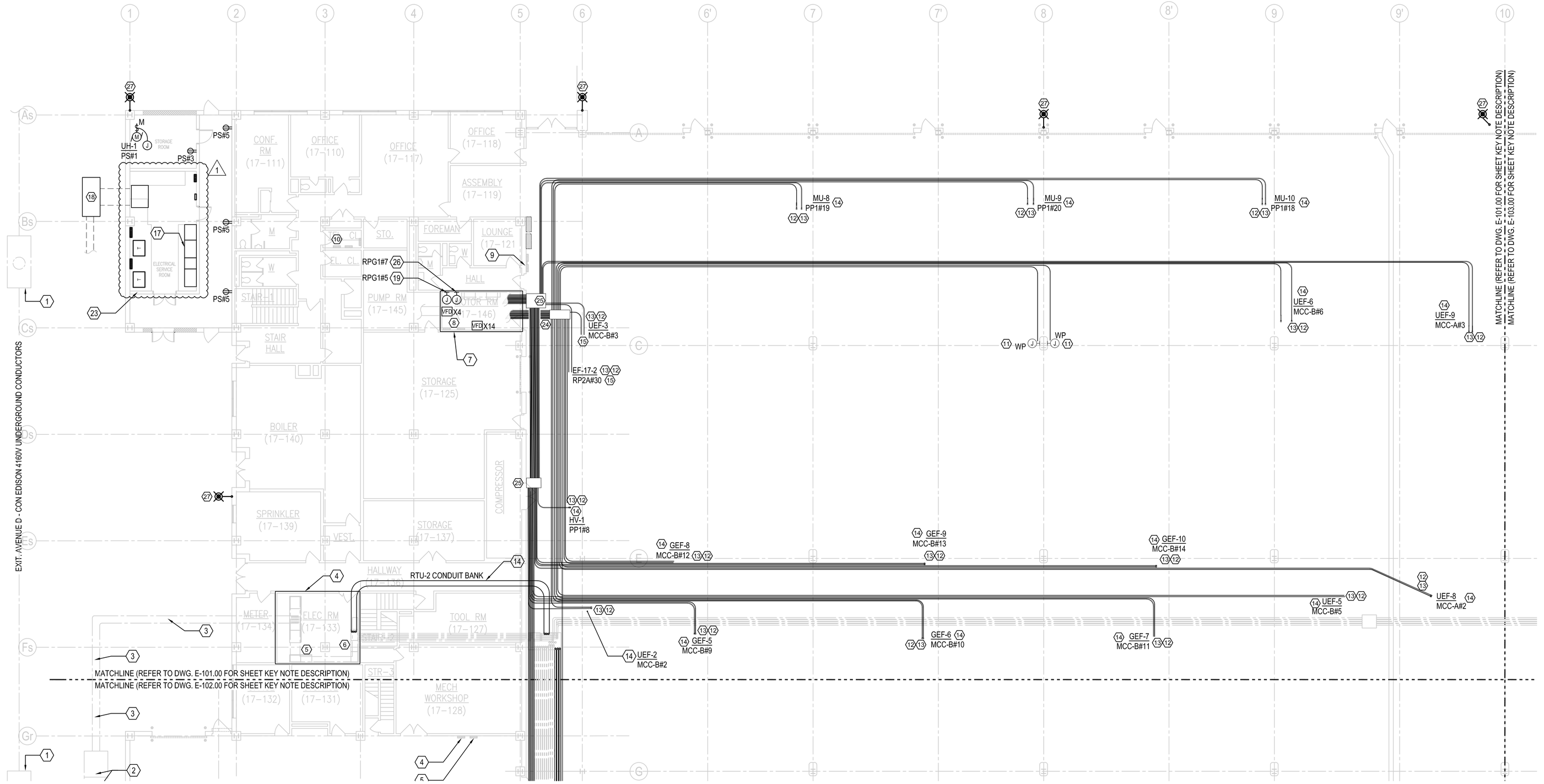
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DRAWING TITLE:
ELECTRICAL DEMOLITION ROOF PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

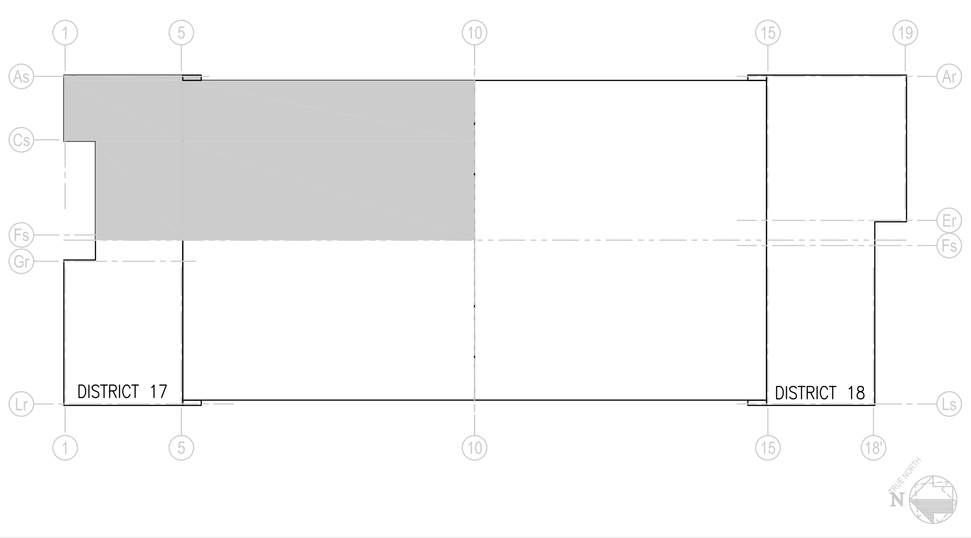
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	DE-110.00

Plotted: 9/27/2019 8:23:07 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\DE-110.00_DDC33000.DWG - khasan



1 1ST FL ELECTRICAL PART PLAN-DISTRICT 17
3/32"=1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND
EXISTING TO REMAIN
NEW

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS. CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
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9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER. ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED. CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE CONNECTION OF ALL HVAC EQUIPMENT WITH THE MECHANICAL & FIRE ALARM CONTRACTOR.

POWER PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SERVING THE FACILITY NO. 17 MECHANICAL UNITS ARE TO BE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
2. NEW CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL PROVIDE DEDICATED RACEWAY & WIRING FOR ALL NEW BRANCH CIRCUITS. CONTRACTOR TO PROVIDE & INSTALL LABELS & IDENTIFY SOURCE OF POWER AS PER SPECIFICATION.
3. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR NEW BRANCH CIRCUIT FOR THE NEW MECHANICAL EQUIPMENT. ALL NEW INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, DSNY GARAGE BUILDING GUIDELINES, STANDARDS & CONTRACT DOCUMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
5. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
6. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINUMUM SIZE 3/4". ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
7. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY. REFER TO DRAWING FOR LOCATIONS.
8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING CON EDISON MANHOLES ALONG AVENUE D.
2. EXISTING CON EDISON MEDIUM VOLTAGE SERVICE TO CON EDISON TRANSFORMER VAULT LOCATED ON THE SIDE WALK.
3. EXISTING 4000A, 120/208VOLT, 3Ø, 4WIRE UNDERGROUND DUCT BANK TO DSNY GARAGE. SERVICE CONDUCTORS STUB-UP IN THE MAIN ELECTRICAL ROOM IN DSNY FACILITY 17. REFER TO ONE LINE DIAGRAM FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES - CONTINUED

4. EXISTING MAIN ELECTRICAL SERVICE ROOM LOCATED AT DSNY GARAGE 17. REFER TO ONE LINE DIAGRAM E-602 & ELECTRICAL EQUIPMENT ELEVATION DRAWING E-401 FOR ADDITIONAL INFORMATION.
5. EXISTING 2000AF/4000AS, 208/120V, 3Ø, 4 WIRE SERVICE SWITCH BOARD SECTION. EXISTING ELECTRICAL CONNECTION FOR GARAGE #18. SERVICE SWITCH CONNECTS TO EXISTING DPB SWITCH BOARD SECTION, 2000A MAIN LUG ONLY, 208/120V, 3Ø, 4 WIRE. EXISTING ELECTRICAL DISTRIBUTION DEDICATED TO GARAGE #18. REFER TO E-602 FOR ADDITIONAL INFORMATION.
6. EXISTING 2000AF/4000AS, 208/120V, 3Ø, 4 WIRE SERVICE SWITCH BOARD SECTION. EXISTING ELECTRICAL CONNECTION FOR GARAGE #17. SERVICE SWITCH CONNECTS TO EXISTING DPA SWITCH BOARD SECTION, 2000A MAIN LUG ONLY, 208/120V, 3Ø, 4 WIRE. EXISTING ELECTRICAL DISTRIBUTION DEDICATED TO GARAGE #17. REFER TO E-602 FOR ADDITIONAL INFORMATION.
7. EXISTING MOTOR CONTROL CENTER ROOM FOR FACILITY No.17. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS. REFER TO E-602 FOR ADDITIONAL INFORMATION.
8. EXISTING PP1 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, 200A M.L.O. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS. REFER TO E-402 AND E-602 FOR ADDITIONAL INFORMATION.
9. EXISTING BRANCH CIRCUIT PANEL RP1 208/120V, 3Ø, 4 WIRE 60A M.L.O. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS.
10. EXISTING BRANCH CIRCUIT PANEL RP2 208/120V, 3Ø, 4 WIRE 100A M.L.O. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS.
11. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS AND A TWO GANG JUNCTION BOX TO EACH CARBON MONOXIDE SENSOR.
12. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS.
13. CONTRACTOR TO COORDINATE CONDUIT STUB UP TO ROOF WITH MECHANICAL AND ROOFING CONTRACTOR.
14. REFER TO E-602 FOR ADDITIONAL INFORMATION.
15. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 1Ø CIRCUIT BREAKER WITH 2#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO EXHAUST FAN.
16. NOT USED.
17. CONTRACTOR TO PROVIDE AND INSTALL A NEW 4000A/4000AF, 208/120VOLT, 3Ø, 4W MAIN SERVICE SWITCHBOARD FOR DISTRIBUTED INTERCONNECTION WITH THE UTILITY GRID. CONTRACTOR SHALL COORDINATE WITH CON EDISON DISTRIBUTED GENERATION DIVISION.
18. NEW CON EDISON UNDER GROUND VAULT WITH TRANSFORMER AND NETWORK PROTECTOR (REFER TO CIVIL DRAWINGS FOR DETAILS).
19. CONTRACTOR TO PROVIDE 120V, 1Ø, 20A CIRCUIT WITH 2#12AWG +1#12AWG GRD. IN 3/4" TO LOW VOLTAGE TRANSFORMER SUPPLIED BY THE MECHANICAL CONTRACTOR. CONNECT VIA A TWO GANG JUNCTION BOX FOR CARBON MONOXIDE SENSOR CONTROLLER.
20. NOT USED.
21. NOT USED.
22. NOT USED.
23. REFER TO DETAIL No. 30 ON DRAWING E-504 FOR ENLARGE PLAN OF THE NEW ELECTRICAL ROOM FOR ADDITIONAL INFORMATION.
24. CONTRACTOR TO PROVIDE PULL BOX FOR DATA/CONTROLS CONDUITS. REFER TO M-800 SERIES DRAWINGS & E-502 DETAIL No. 16 FOR ADDITIONAL INFORMATION.
25. CONTRACTOR TO PROVIDE PULL BOX FOR ELECTRICAL CONDUITS. REFER TO E-501 DETAILS 2 AND 3 FOR ADDITIONAL INFORMATION.
26. CONTRACTOR TO PROVIDE 120V, 1Ø, 20A CIRCUIT WITH 2#12AWG +1#12AWG GRD. IN 3/4" TO BMS CONTROL PANEL SUPPLIED BY THE MECHANICAL CONTRACTOR. CONNECT VIA A TWO GANG JUNCTION BOX.
27. CONTRACTOR TO PROVIDE LIGHTNING PROTECTION DOWN CONDUCTOR WITH TEST WELL AND GROUND ROD. REFER TO DWG. E-506 FOR ADDITIONAL INFORMATION.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
-	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
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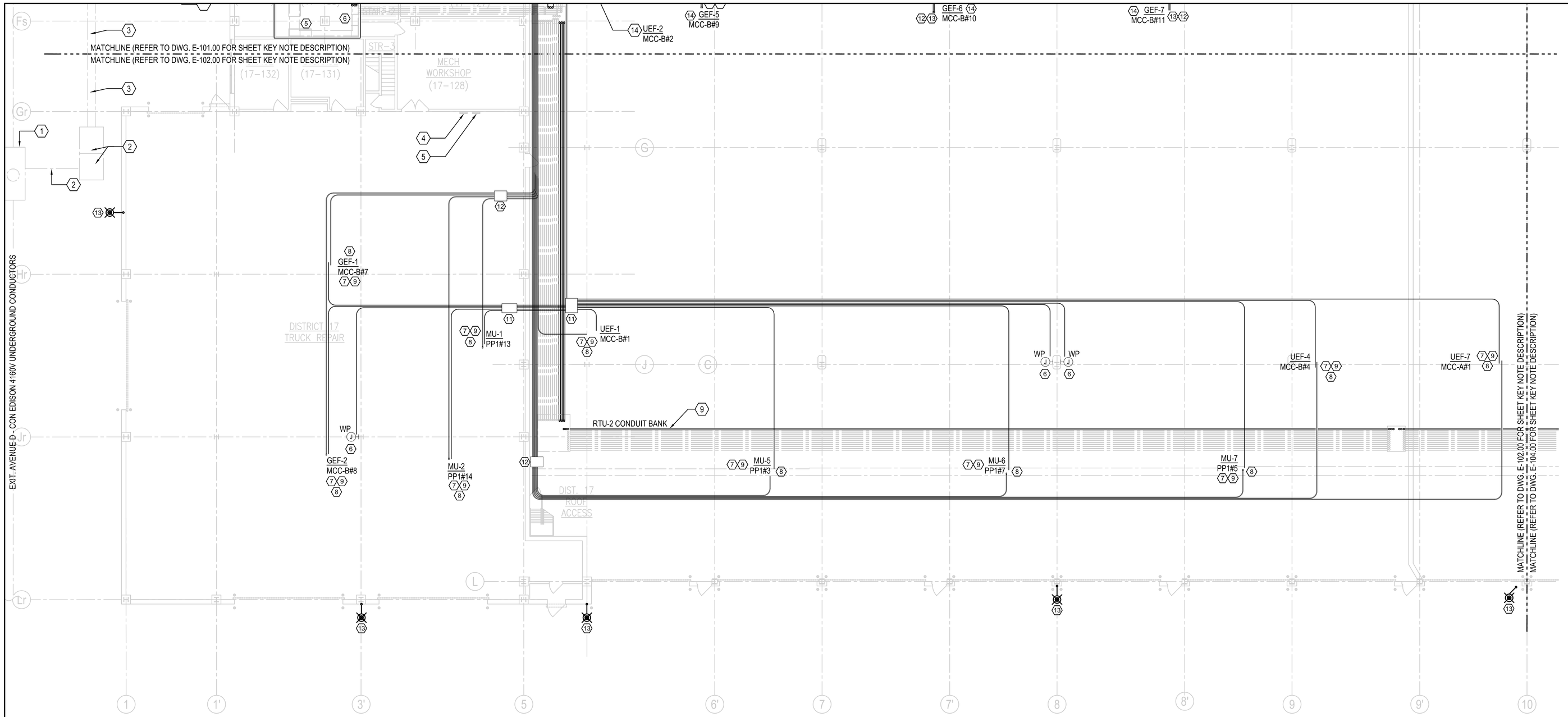
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DRAWING TITLE:
ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 17

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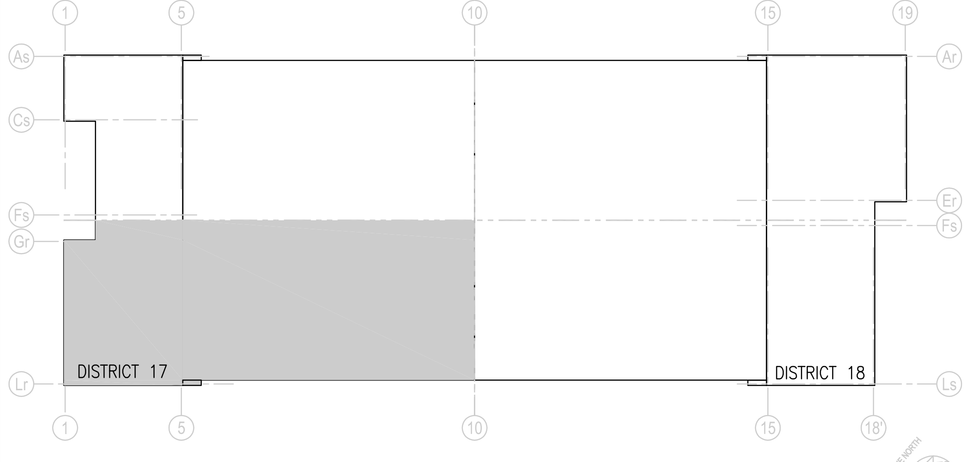
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PROJECT NO: DDC33000
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DRAWING NUMBER:
E-101.00

Plotted: 8/30/2021 2:05:05 PM P:\NY\O\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\E-101.00_DDC33000.DWG - aengelman



1 1ST FL ELECTRICAL PART PLAN-DISTRICT 17
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KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

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11. CONTRACTOR SHALL COORDINATE THE CONNECTION OF ALL HVAC EQUIPMENT WITH THE MECHANICAL & FIRE ALARM CONTRACTOR.

POWER PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SERVING THE FACILITY NO. 17 MECHANICAL UNITS ARE TO BE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
2. NEW CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL PROVIDE DEDICATED RACEWAY & WIRING FOR ALL NEW BRANCH CIRCUITS. CONTRACTOR TO PROVIDE & INSTALL LABELS & IDENTIFY SOURCE OF POWER AS PER SPECIFICATION.
3. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR NEW BRANCH CIRCUIT FOR THE NEW MECHANICAL EQUIPMENT. ALL NEW INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, DSNY GARAGE BUILDING GUIDELINES, STANDARDS & CONTRACT DOCUMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
5. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
6. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINIMUM SIZE 3/4". ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
7. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY. REFER TO DRAWING FOR LOCATIONS.
8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING CON EDISON MANHOLES ALONG AVENUE D.
2. EXISTING CON EDISON MEDIUM VOLTAGE SERVICE TO CON EDISON TRANSFORMER VAULT LOCATED ON THE SIDE WALK.
3. EXISTING 4000A, 120/208VOLT, 3Ø, 4WIRE UNDERGROUND DUCT BANK TO DSNY GARAGE. SERVICE CONDUCTORS STUB-UP IN THE MAIN ELECTRICAL ROOM IN DSNY FACILITY 17. REFER TO ONE LINE DIAGRAM FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES - CONTINUED

4. EXISTING PANEL 'MAP1' 208/120V, 3Ø, 4 WIRE, 400A MAIN FUSE.
5. EXISTING PANEL 'MRP1' 208/120V, 3Ø, 4 WIRE, 60A M.L.O.
6. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS AND A TWO GANG JUNCTION BOX TO EACH CARBON MONOXIDE SENSOR.
7. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS.
8. CONTRACTOR TO COORDINATE CONDUIT STUB UP TO ROOF WITH MECHANICAL AND ROOFING CONTRACTOR.
9. REFER TO E-602 FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 3Ø CIRCUIT BREAKER WITH 3#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO EXHAUST FAN.
11. CONTRACTOR TO PROVIDE PULL BOX FOR DATA/CONTROLS CONDUITS. REFER TO M-800 SERIES DRAWINGS & E-502 DETAIL NO. 16 FOR ADDITIONAL INFORMATION.
12. CONTRACTOR TO PROVIDE PULL BOX FOR ELECTRICAL CONDUITS. REFER TO E-501 DETAILS 2 AND 3 FOR ADDITIONAL INFORMATION.
13. CONTRACTOR TO PROVIDE LIGHTNING PROTECTION DOWN CONDUCTOR WITH TEST WELL AND GROUND ROD. REFER TO DWG. E-506 FOR ADDITIONAL INFORMATION

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

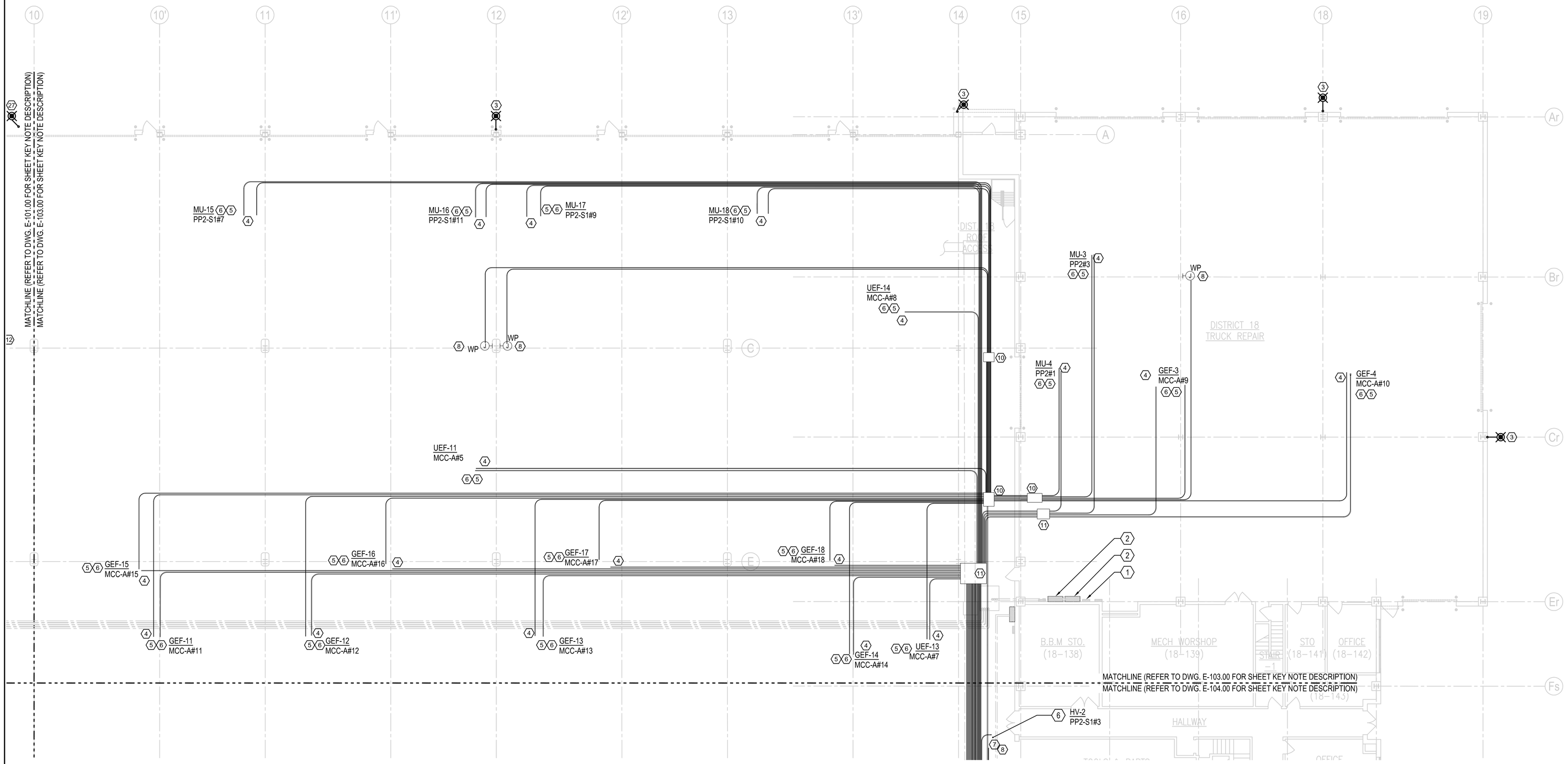
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DRAWING TITLE:
ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

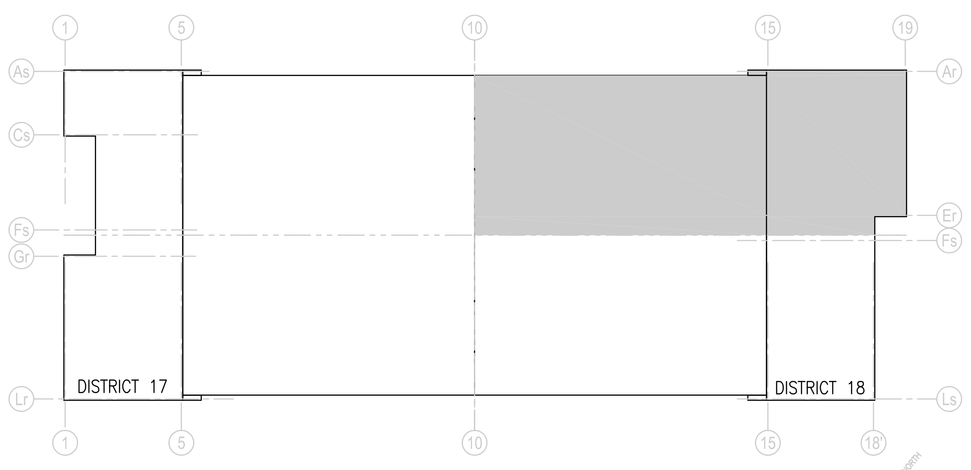
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PROJECT NO:	DDC33000
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1 1ST FL ELECTRICAL PART PLAN-DISTRICT 18
3/32"=1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

NEW

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES. CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS, CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT. THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER, ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED. CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE CONNECTION OF ALL HVAC EQUIPMENT WITH THE MECHANICAL & FIRE ALARM CONTRACTOR.

POWER PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SERVING THE FACILITY NO. 17 MECHANICAL UNITS ARE TO BE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY, CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
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4. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
5. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
6. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINIMUM SIZE 3/4", ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
7. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY, REFER TO DRAWING FOR LOCATIONS.
8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES - CONTINUED

1. EXISTING PANEL 'RP' 208/120V, 3Ø, 4 WIRE, 100A M.L.O. PANEL SERVES EXISTING UNIT HEATERS, GENERAL BRANCH CIRCUIT RECEPTACLES & SMOKE VENT.
2. EXISTING TWO SECTION PANEL 'MAP2' 208/120V, 3Ø, 4 WIRE, 400A MAIN FUSE, CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO TPE MECHANICAL UNITS.
3. CONTRACTOR TO PROVIDE LIGHTNING PROTECTION DOWN CONDUCTOR WITH TEST WELL AND GROUND ROD. REFER TO DWG. E-506 FOR ADDITIONAL INFORMATION.
4. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS.
5. CONTRACTOR TO COORDINATE CONDUIT STUB UP TO ROOF WITH MECHANICAL AND ROOFING CONTRACTOR.
6. REFER TO E-602 FOR ADDITIONAL INFORMATION.
7. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 3Ø CIRCUIT BREAKER WITH 3#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO EXHAUST FAN.
8. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS AND A TWO GANG JUNCTION BOX TO EACH CARBON MONOXIDE SENSOR.
9. NOT USED.
10. CONTRACTOR TO PROVIDE PULL BOX FOR DATA/CONTROLS CONDUITS, REFER TO M-800 SERIES DRAWINGS & E-502 DETAIL NO. 16 FOR ADDITIONAL INFORMATION.
11. CONTRACTOR TO PROVIDE PULL BOX FOR ELECTRICAL CONDUITS. REFER TO E-501 DETAILS 2 AND 3 FOR ADDITIONAL INFORMATION

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LOT: 1 BLOCK: 8138

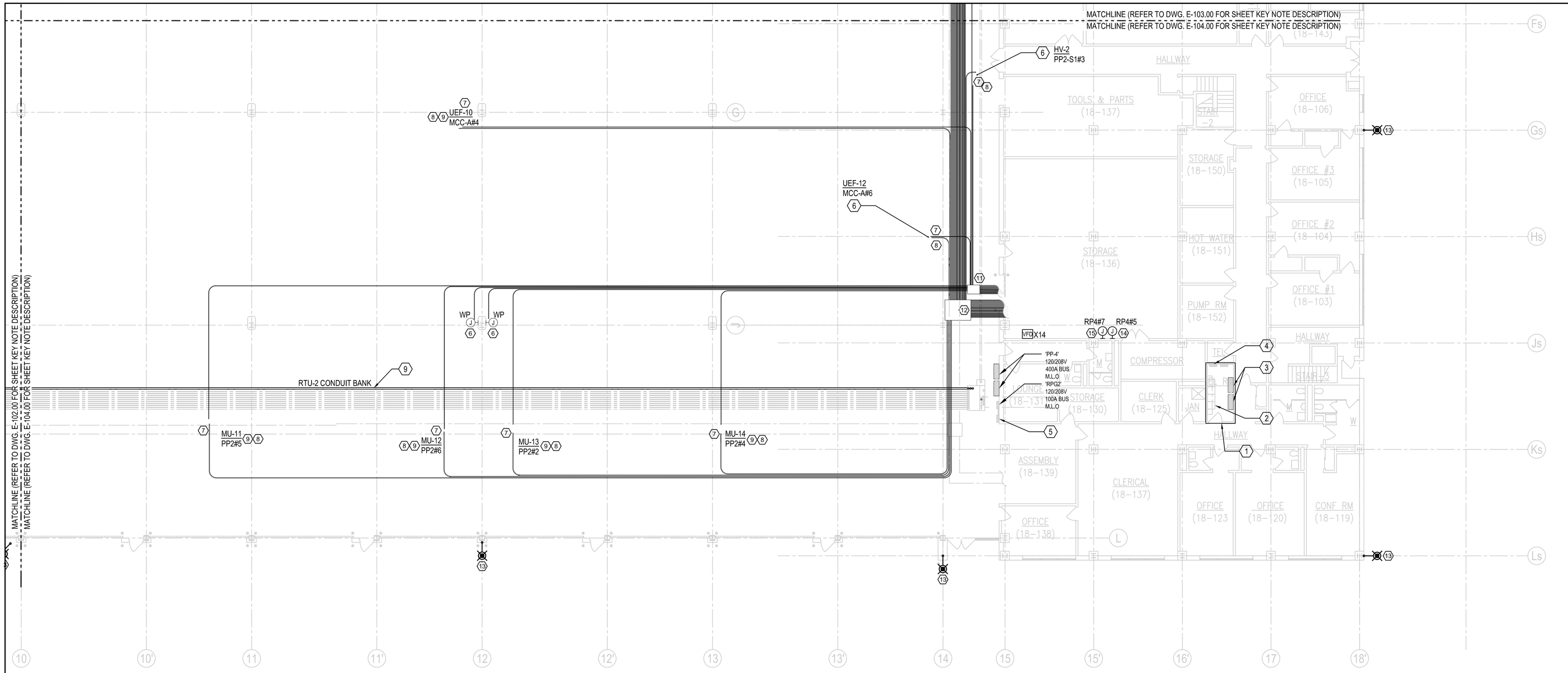
DRAWING TITLE:
ELECTRICAL GROUND FLOOR PART PLAN-DISTRICT 18

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTMANN · 074116 · LICENSED PROFESSIONAL ENGINEER

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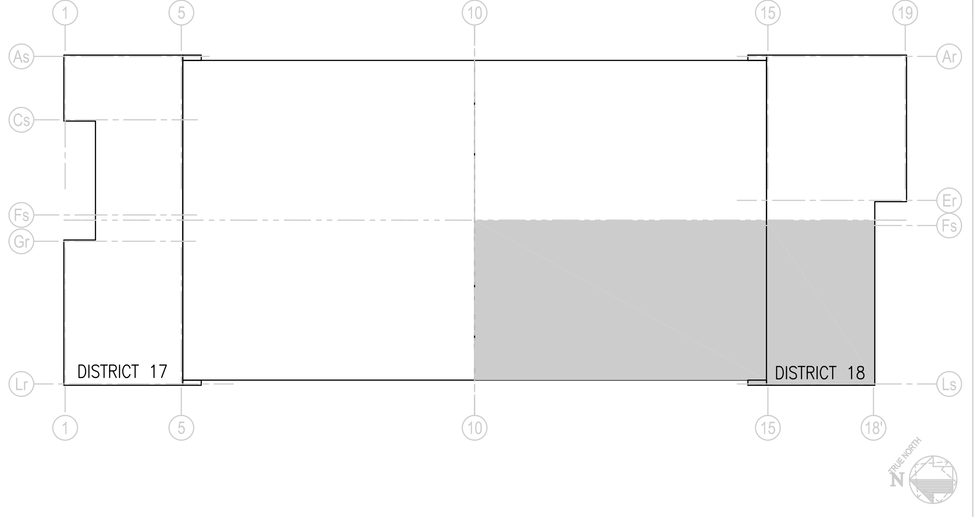
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1 1ST FL ELECTRICAL PART PLAN-DISTRICT 18
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0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

NEW

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
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5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
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8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT, THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER. ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED. CONTRACTOR SHALL NOTE 'GEP' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED. CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE CONNECTION OF ALL HVAC EQUIPMENT WITH THE MECHANICAL & FIRE ALARM CONTRACTOR.

POWER PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SERVING THE FACILITY NO. 17 MECHANICAL UNITS ARE TO BE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
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5. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
6. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINUMUM SIZE 3/4", ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
7. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY. REFER TO DRAWING FOR LOCATIONS.
8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING MOTOR CONTROL CENTER ROOM FOR FACILITY NO.18. REFER E-602 FOR ADDITIONAL INFORMATION.
2. EXISTING MOTOR CONTROL CENTER MMC-A 208/120V, 3Ø, 3 WIRE, 600A M.L.O. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS. REFER TO E-602 FOR ADDITIONAL INFORMATION

SHEET KEYNOTES

3. EXISTING PP2 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, 600A MAIN FUSE. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS. REFER TO E-602 FOR ADDITIONAL INFORMATION.
4. EXISTING BRANCH CIRCUIT PANEL RP3 208/120V, 3Ø, 4 WIRE 60A M.L.O. SERVES UNIT HEATERS, DAMPERS & GENERAL BRANCH CIRCUIT RECEPTACLES.
5. EXISTING BRANCH CIRCUIT PANEL RP4 208/120V, 3Ø, 4 WIRE 60A M.L.O. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO MECHANICAL UNITS. REFER TO E-602 FOR ADDITIONAL INFORMATION.
6. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS AND A TWO GANG JUNCTION BOX TO EACH CARBON MONOXIDE SENSOR.
7. CONTRACTOR TO PROVIDE AND INSTALL 1" RGS CONDUIT WITH PULL WIRE FOR CONTROLS.
8. CONTRACTOR TO COORDINATE CONDUIT STUB UP TO ROOF WITH MECHANICAL AND ROOFING CONTRACTOR.
9. REFER TO E-602 FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 1Ø CIRCUIT BREAKER WITH 2#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO EXHAUST FAN.
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13. CONTRACTOR TO PROVIDE LIGHTNING PROTECTION DOWN CONDUCTOR WITH TEST WELL AND GROUND ROD. REFER TO DWG. E-506 FOR ADDITIONAL INFORMATION.
14. CONTRACTOR TO PROVIDE 120V, 1Ø, 20A CIRCUIT WITH 2#12AWG +1#12AWG GRD. IN 3/4" TO BMS CONTROL PANEL SUPPLIED BY THE MECHANICAL CONTRACTOR. CONNECT VIA A TWO GANG JUNCTION BOX.
15. CONTRACTOR TO PROVIDE 120V, 1Ø, 20A CIRCUIT WITH 2#12AWG +1#12AWG GRD. IN 3/4" TO LOW VOLTAGE TRANSFORMER SUPPLIED BY THE MECHANICAL CONTRACTOR. CONNECT VIA A TWO GANG JUNCTION BOX FOR CARBON MONOXIDE SENSOR CONTROLLER.

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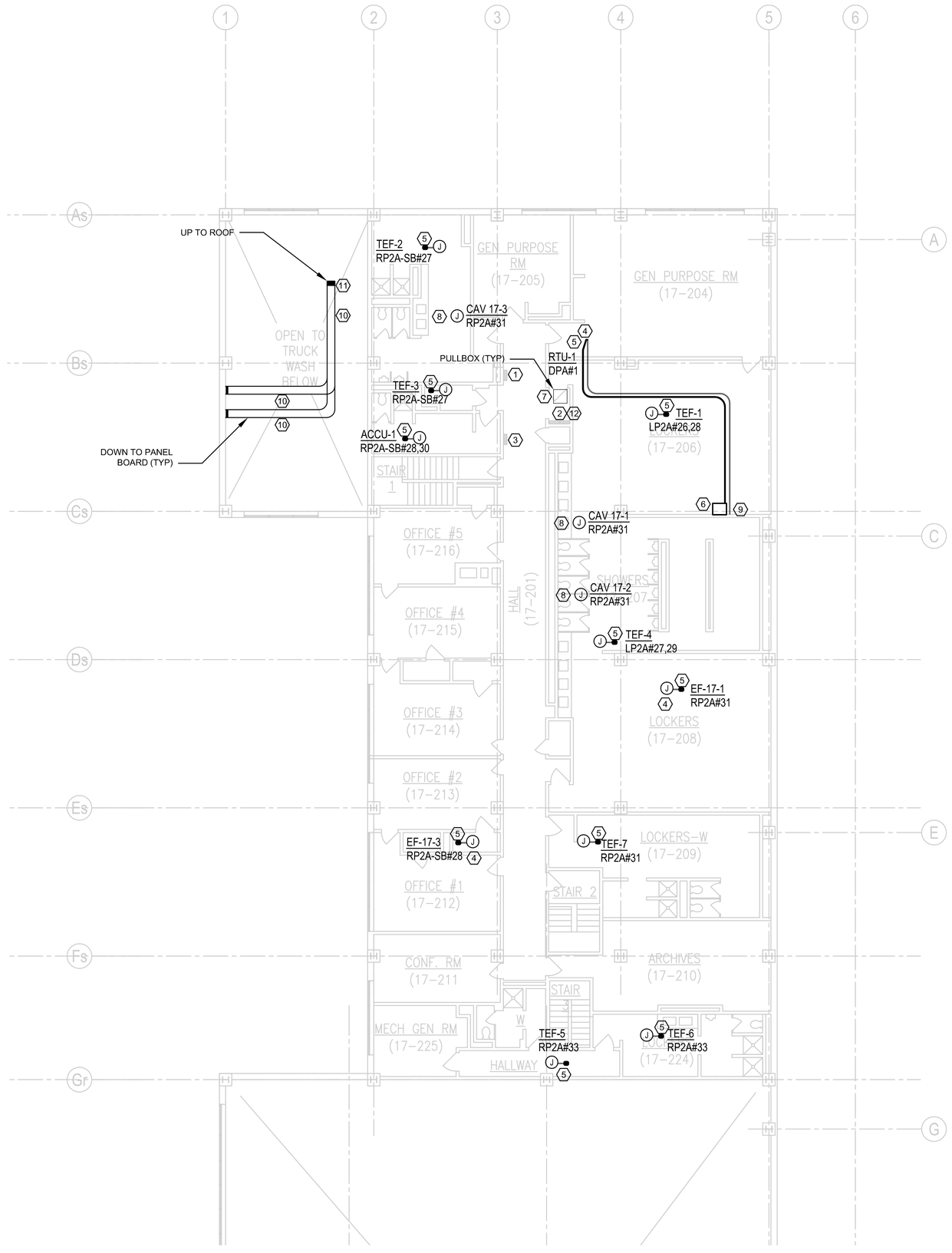
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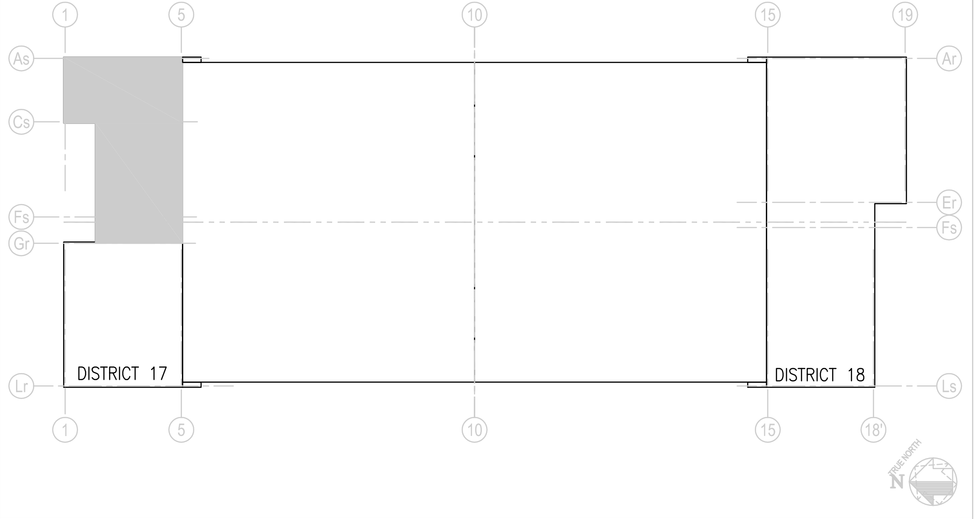
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1 2ND FL ELECTRICAL PART PLAN-DISTRICT 17
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KEY PLAN



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2. NEW CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL PROVIDE DEDICATED RACEWAY & WIRING FOR ALL NEW BRANCH CIRCUITS. CONTRACTOR TO PROVIDE & INSTALL LABELS & IDENTIFY SOURCE OF POWER AS PER SPECIFICATION.
3. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR NEW BRANCH CIRCUIT FOR THE NEW MECHANICAL EQUIPMENT. ALL NEW INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, DSNY GARAGE BUILDING GUIDELINES, STANDARDS & CONTRACT DOCUMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
5. CONTRACTOR SHALL NOTE THAT EXISTING CONDITIONS REQUIRE WORKING AT HEIGHTS IN ORDER TO ACCESS PULL BOXES, RACEWAY SYSTEM, ETC. INSTALL BELOW THE EXISTING CORRUGATED STEEL DECK. CONTRACTOR IS REQUIRE TO COORDINATE HIS WORK WITH DDC & DSNY TO ENSURE THE MOVEMENT OF LARGE EQUIPMENT IS NOT INTERRUPTED.
6. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINUMUM SIZE 3/4", ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
7. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY. REFER TO DRAWING FOR LOCATIONS.
8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. EXISTING PANEL 'LP2A' 208/120V, 3Ø, 4 WIRE, 100A M.L.O. PANEL SERVES EXISTING LIGHTING.
2. EXISTING TWO SECTION PANEL 'RP2A SECT. A SECT B,' 208/120V, 3Ø, 4 WIRE, 150A MCB, PANEL SERVES EXISTING RECEPTACLES AND HVAC EQUIPMENT.
3. EXISTING TEL/DAT PULL BOX.

SHEET KEYNOTES - CONTINUED

4. CONTRACTOR TO PROVIDE AND INSTALL 3/4" RGS CONDUIT WITH PULL WIRE FOR CONTROLS.
5. CONTRACTOR TO COORDINATE CONDUIT STUB UP TO ROOF WITH MECHANICAL AND ROOFING CONTRACTOR.
6. CONTRACTOR TO PROVIDE PULL BOX FOR DATA/CONTROLS CONDUITS, REFER TO M-800 SERIES DRAWINGS FOR ADDITIONAL INFORMATION.
7. CONTRACTOR TO PROVIDE PULL BOX FOR ELECTRICAL CONDUITS, REFER TO E-501 DETAILS 2 AND 3 FOR ADDITIONAL INFORMATION.
8. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 1Ø CIRCUIT BREAKER WITH 2#10AWG + 1#10AWG GRD IN 3/4" EMT FOR CAV, COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
9. CONTRACTOR TO PROVIDE CORE DRILL AND FIRE PROOF SEAL FOR CONDUITS TO MCC ROOM ON GROUND FLOOR, COORDINATE IN FIELD.
10. CONTRACTOR TO PROVIDE SUPPORTS FOR PHOTOVOLTAIC CONDUIT BANKS RUNNING TIGHT TO UNDERSIDE OF STRUCTURAL DECK TO PV PANEL BOARDS LOCATED IN NEW ELECTRICAL ROOM.
11. CONTRACTOR TO PROVIDE NEMA 3R PULL BOX WITHIN ROOM FOR PV CONDUIT. TRANSITION FROM RGS TO EMT CONDUIT. PROVIDE LABELING IDENTIFYING P.V. PULL BOX.
12. CONTRACTOR TO PROVIDE TIME CLOCK WITH 12 POLES ASCO MODEL 918 OR APPROVED EQUAL. TIME CLOCK TO CONTROL ALL "TEF" FANS.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

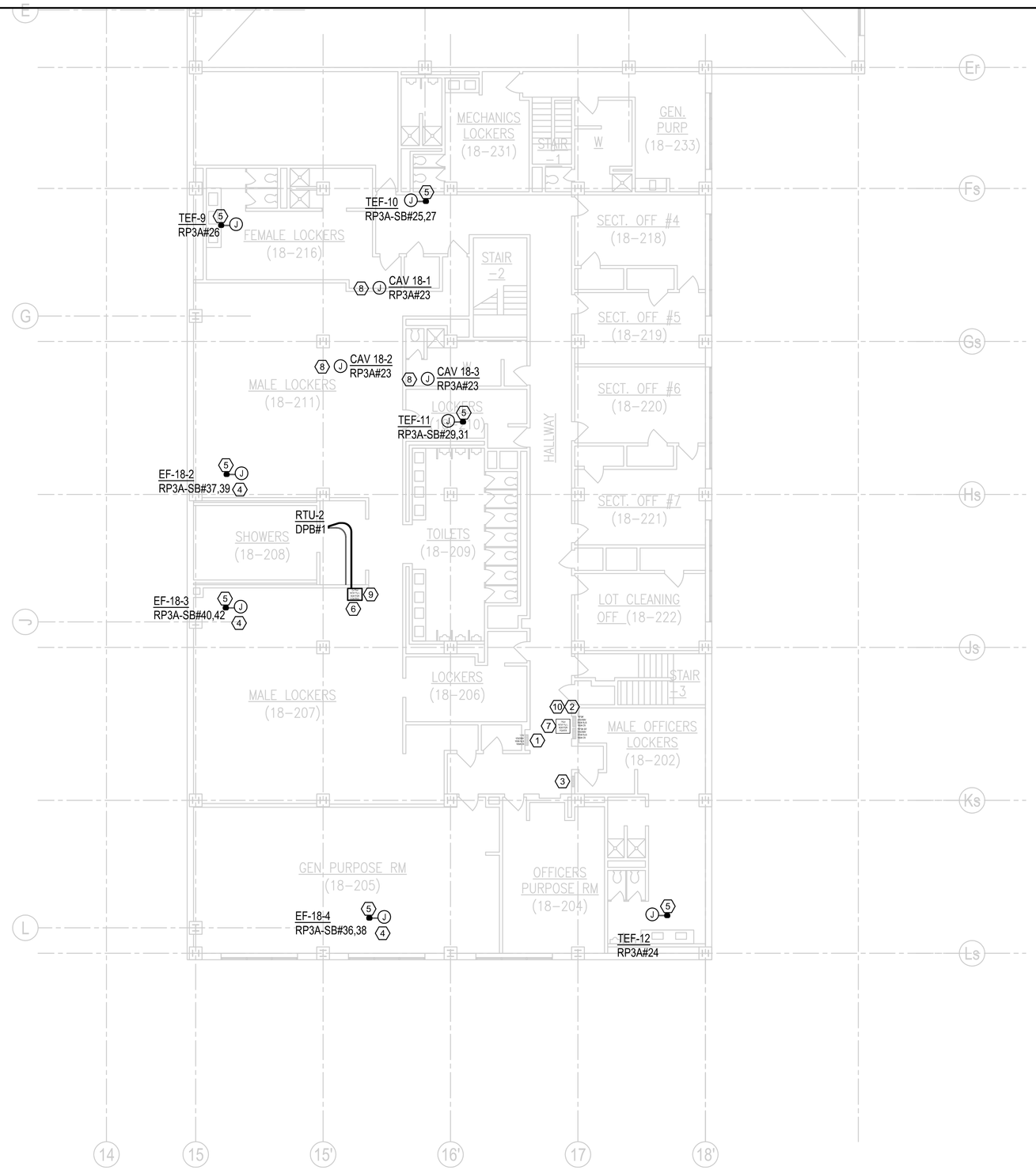
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ELECTRICAL 2ND FLOOR PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

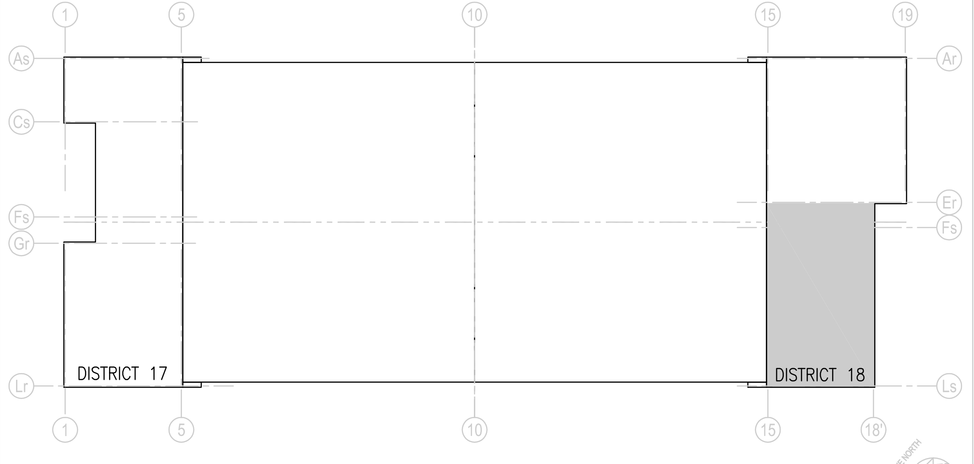
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PROJECT NO: DDC33000
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CHECKED BY: HG
DRAWING NUMBER:
E-105.00

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1 2ND FL ELECTRICAL PART PLAN-DISTRICT 18
3/32"=1'-0"
0 10'-8" 21'-4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

NEW

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES, CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS. CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT, THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER, ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED, CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED, CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
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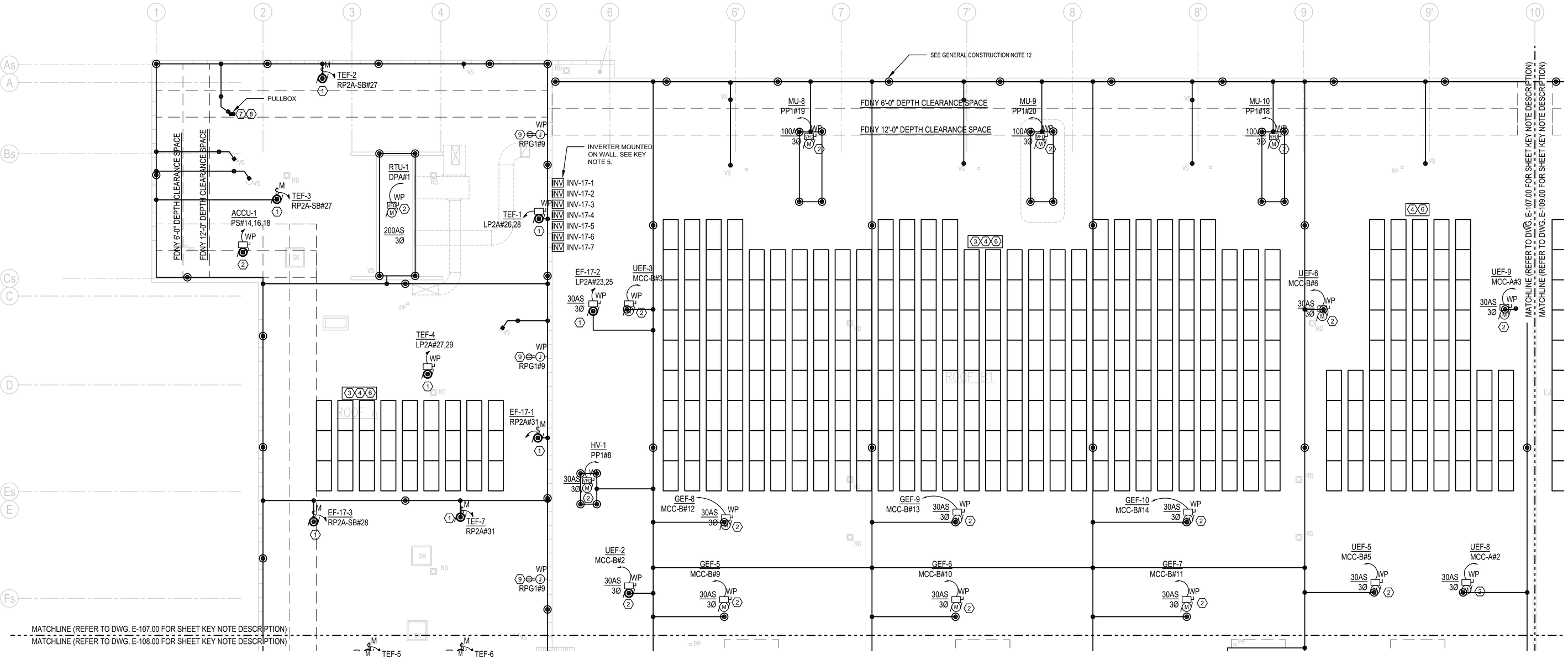
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DRAWING TITLE:
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SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
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DRAWN BY: HG
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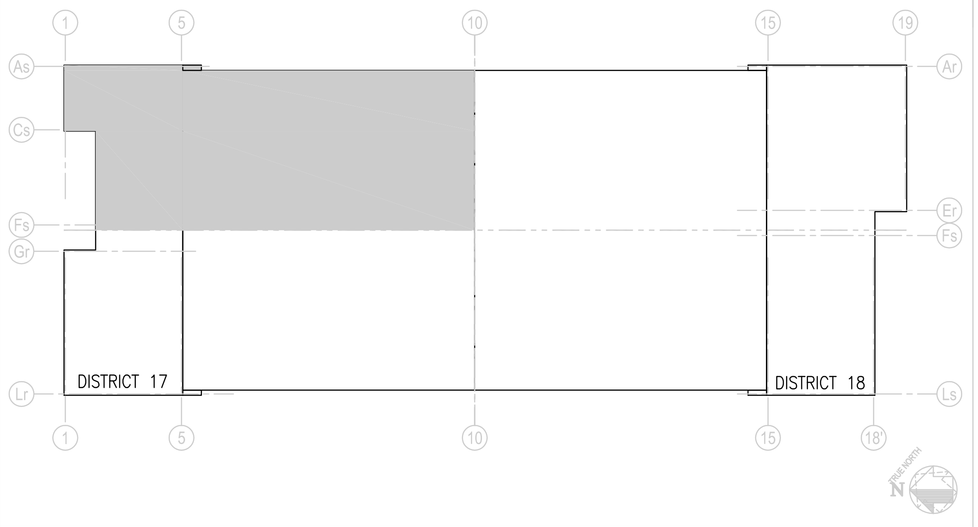
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1 ELECTRICAL ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

0 10' - 8" 21' - 4"

KEY PLAN



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11. CONTRACTOR SHALL COORDINATE THE CONNECTION OF ALL HVAC EQUIPMENT WITH THE MECHANICAL & FIRE ALARM CONTRACTOR.
12. FOR LIGHTNING PROTECTION DETAILS, REFER TO DRAWING E-506.00.

POWER PLAN NOTES:

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8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 1Ø CIRCUIT BREAKER WITH 2#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO NEW MECHANICAL UNIT.
2. CONTRACTOR TO REFER TO ELECTRICAL ONE LINE DIAGRAM E-602 FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO PROVIDE & INSTALL SOLAR PHOTOVOLTAIC PANEL 435WATT SIMILAR TO SUNPOWER MODEL SRP-E20-435NE-WHT-D OR APPROVED EQUAL.
4. CONTRACTOR TO PROVIDE & INSTALL BALLASTED P.V, SUPPORT STRUCTURE ON ROOF, STRUCTURE SHALL COMPLY WITH THE FDNY FIRE CODE REQUIREMENTS FOR COLLAPSIBLE OR MOVABLE STRUCTURE.
5. CONTRACTOR TO PROVIDE AND INSTALL (7) 33KW INVERTER (BASIS OF DESIGN SMA SUNNY TRIPOWER CORE 1) COMPLETE WITH WALL MOUNTING KIT. INVERTER SHALL MEET UL1741, SUITABLE FOR GRID CONNECTIVITY AND BE CERTIFIED BY NY STATE DEPARTMENT OF PUBLIC SERVICE
6. CONTRACTOR TO PROVIDE & INSTALL 3/4" RGS CONDUIT FROM EACH SET OF PV STRINGS TO INVERTERS LOCATED IN THE LOWER ROOF. CONTRACTOR TO FURNISH & INSTALLED ALL CONDUIT SUPPORT ABOVE NEW ROOF.
7. CONTRACTOR TO PROVIDE & INSTALL NEMA 3R PULL BOX WITH 1" RGS CONDUIT TO EACH INVERTER. CONTRACTOR TO FURNISH & INSTALLED ALL CONDUIT SUPPORT ABOVE NEW ROOF.
8. CONTRACTOR TO PROVIDE & INSTALL (28) 1" CONDUIT STUB DOWN IN ROOF ABOVE TRUCK WASH AREA.
9. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 1Ø CIRCUIT BREAKER WITH 2#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO NEW A ROOF SERVICE GFI-TYPE RECEPTACLES IN NEMA 3R BOX AND ENCLOSURE COVER.

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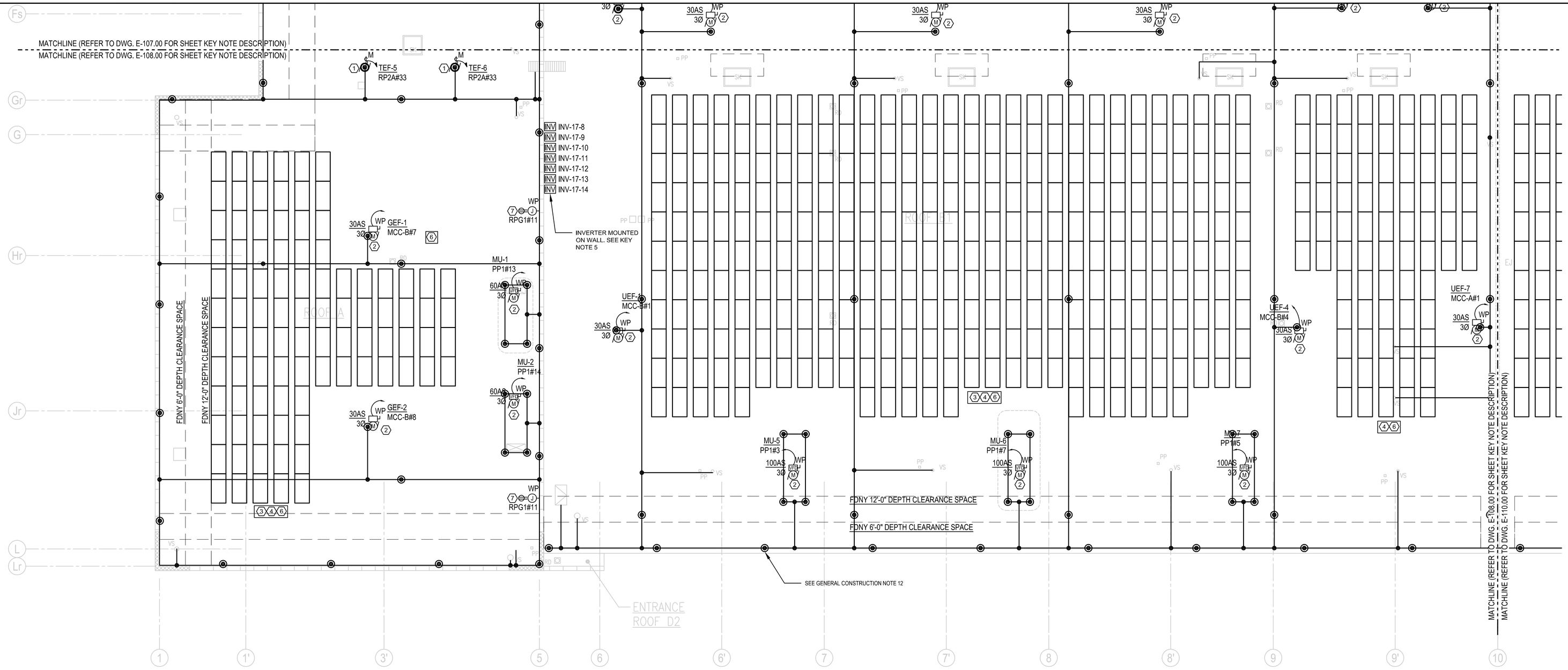
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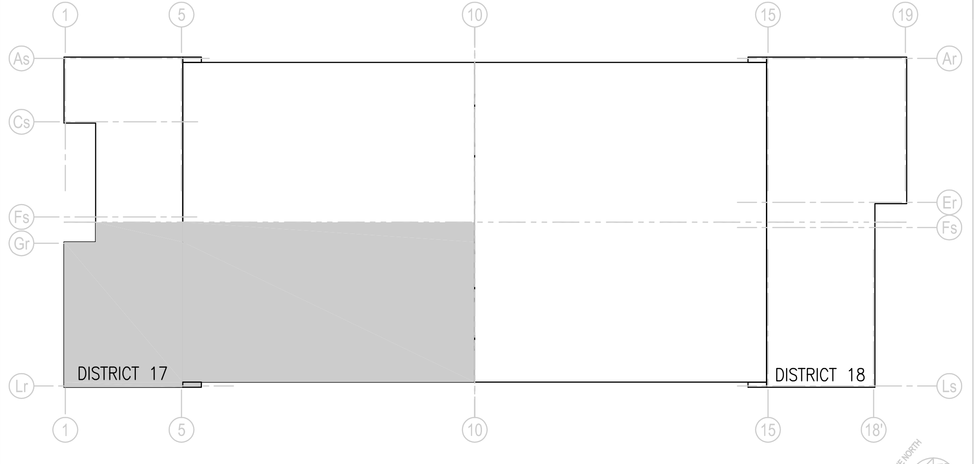
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KEY PLAN



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6. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINUMUM SIZE 3/4". ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
7. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY. REFER TO DRAWING FOR LOCATIONS.
8. REFER TO SHEET NOTES FOR ADDITIONAL INFORMATION.

SHEET KEYNOTES

1. CONTRACTOR TO PROVIDE AND INSTALL NEW 20A, 1Ø CIRCUIT BREAKER WITH 2#10AWG + 1#10AWG GROUND IN 3/4" RGS CONDUIT TO NEW MECHANICAL UNIT.
2. CONTRACTOR TO REFER TO ELECTRICAL ONE LINE DIAGRAM E-602 FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO PROVIDE & INSTALL SOLAR PHOTOVOLTAIC PANEL 435WATT SIMILAR TO SUNPOWER MODEL SRP-E20-435NE-WHT-D OR APPROVED EQUAL.
4. CONTRACTOR TO PROVIDE & INSTALL BALLASTED P.V. SUPPORT STRUCTURE ON ROOF. STRUCTURE SHALL COMPLY WITH THE FDNY FIRE CODE REQUIREMENTS FOR COLLAPSIBLE OR MOVABLE STRUCTURE.
5. CONTRACTOR TO PROVIDE AND INSTALL (7) 33KW INVERTER (BASIS OF DESIGN SMA SUNNY TRIPOWER CORE 1) COMPLETE WITH WALL MOUNTING KIT. INVERTER SHALL MEET UL1741, SUITABLE FOR GRID CONNECTIVITY AND BE CERTIFIED BY NY STATE DEPARTMENT OF PUBLIC SERVICE
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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

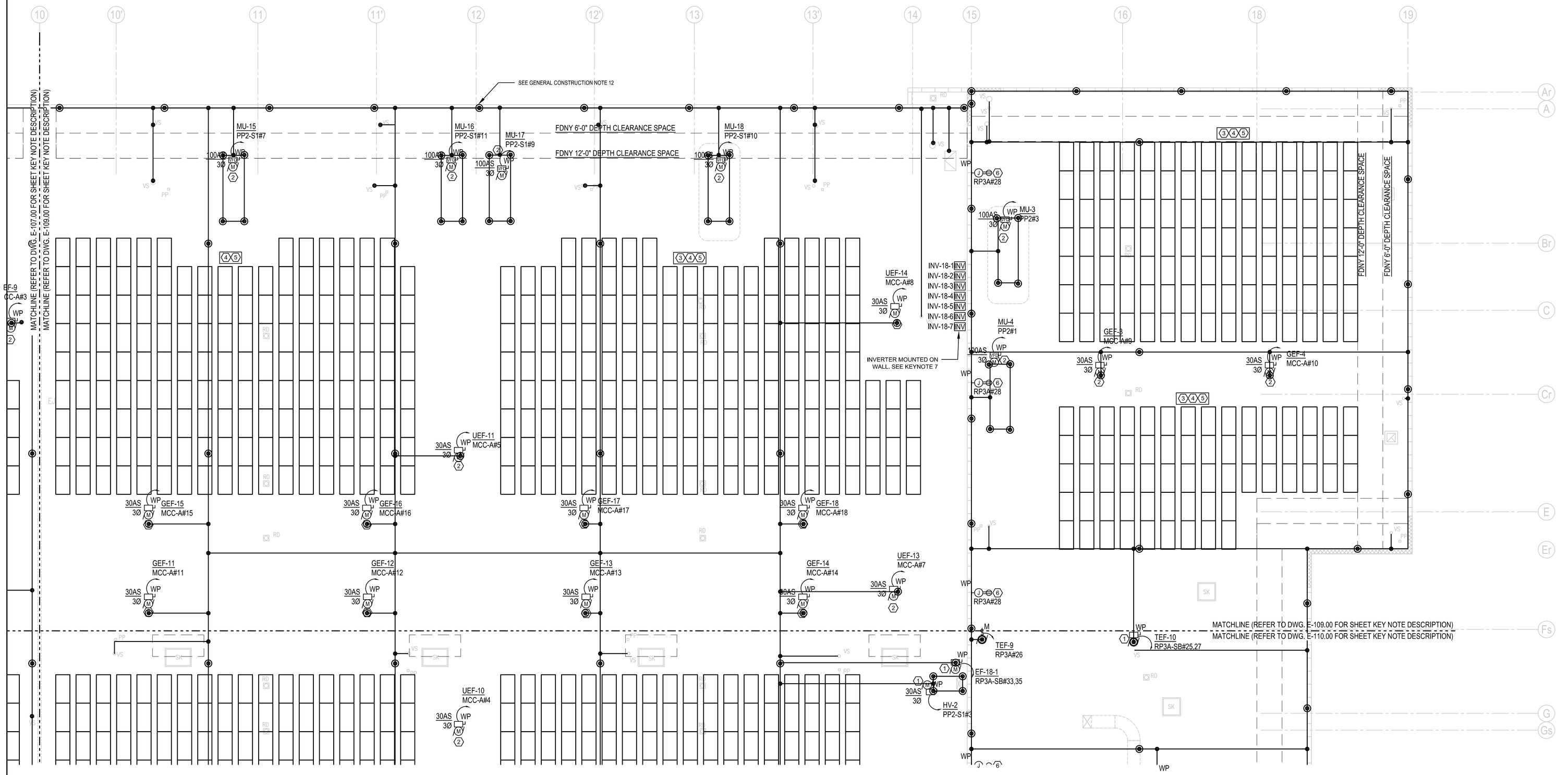
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DRAWING TITLE:
ELECTRICAL ROOF PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

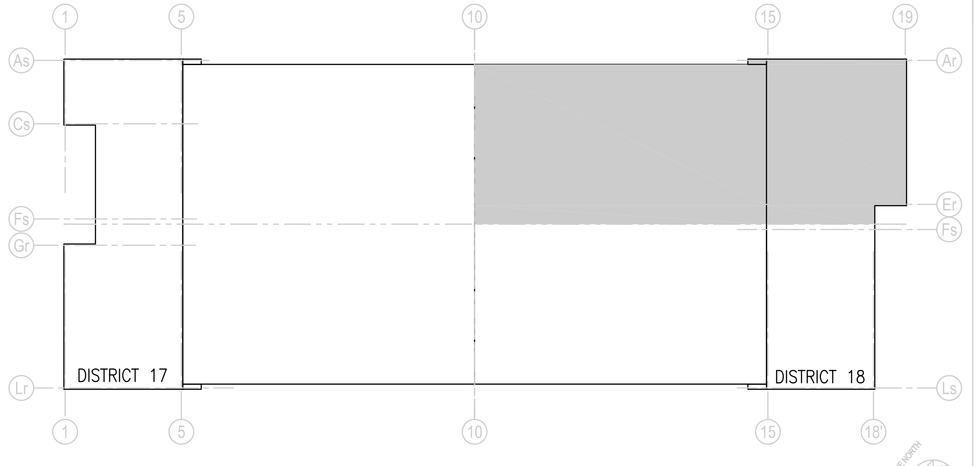
DATE:	09/27/2019
PROJECT NO:	DDC33000
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CHECKED BY:	HG
DRAWING NUMBER:	E-108.00

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1 ELECTRICAL ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES. CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS. CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT. THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER. ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED, CONTRACTOR SHALL NOTE 'GEF' & 'MU' MECHANICAL UNITS ARE ELECTRICALLY INTERLOCKED. CONTRACTOR SHALL COORDINATE WORK ON THESE UNITS SIMULTANEOUSLY.
11. CONTRACTOR SHALL COORDINATE THE CONNECTION OF ALL HVAC EQUIPMENT WITH THE MECHANICAL & FIRE ALARM CONTRACTOR.
12. FOR LIGHTNING PROTECTION DETAILS, REFER TO DRAWING E-506.00.

POWER PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SERVING THE FACILITY NO. 17 MECHANICAL UNITS ARE TO BE CONNECTED TO EXISTING 120/208V DISTRIBUTION PANELS, MOTOR CONTROL CENTER, RECEPTACLE PANELS & SHOP PANELS ON THIS FACILITY. CONTRACTOR TO REFER TO CODED NOTES FOR ADDITIONAL INFORMATION.
2. NEW CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH MOTOR, JUNCTION BOX OR ELECTRICAL DISCONNECT. CONTRACTOR SHALL PROVIDE DEDICATED RACEWAY & WIRING FOR ALL NEW BRANCH CIRCUITS. CONTRACTOR TO PROVIDE & INSTALL LABELS & IDENTIFY SOURCE OF POWER AS PER SPECIFICATION.
3. CONTRACTOR TO PROVIDE NEW CONDUITS, WIRES, BOXES & SUPPORTS FOR NEW BRANCH CIRCUIT FOR THE NEW MECHANICAL EQUIPMENT, ALL NEW INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, DSNY GARAGE BUILDING GUIDELINES, STANDARDS & CONTRACT DOCUMENTS.
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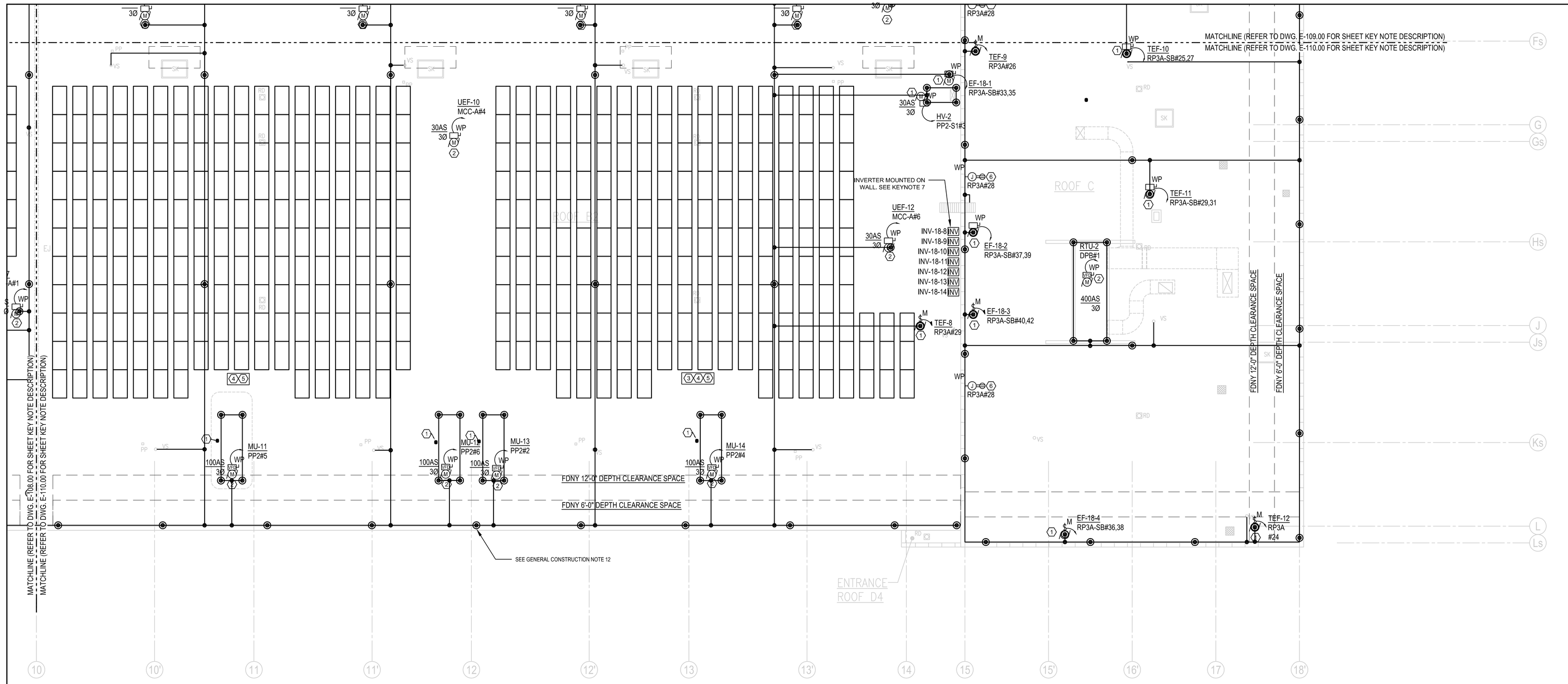
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DRAWING TITLE:
ELECTRICAL ROOF PART PLAN-DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
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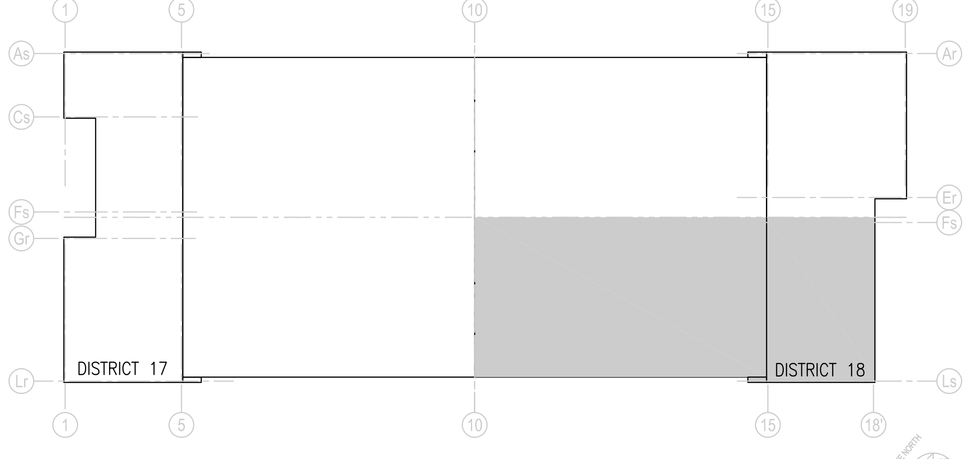
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1 ELECTRICAL ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"

0 10'-8" 21'-4"

KEY PLAN



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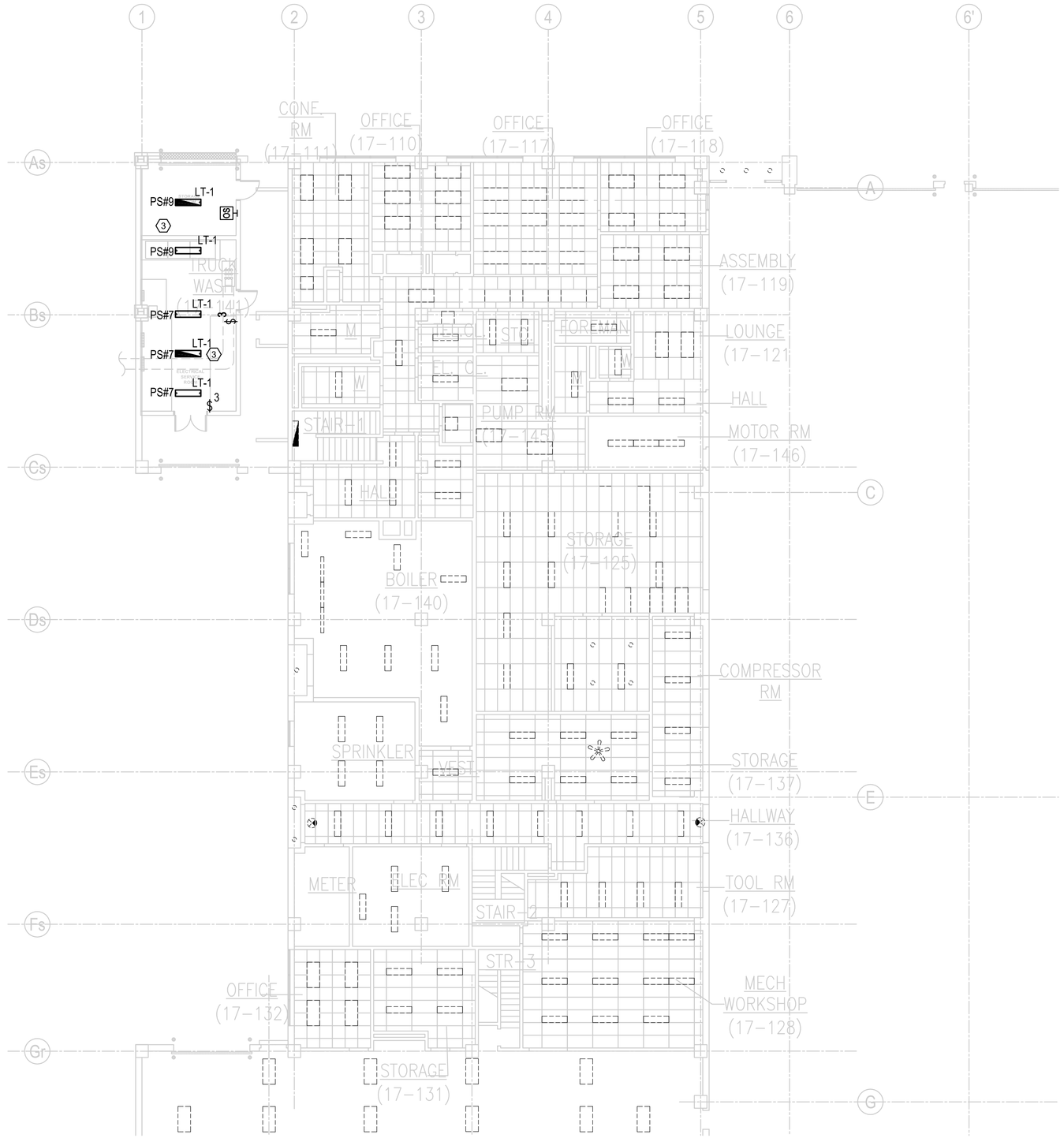
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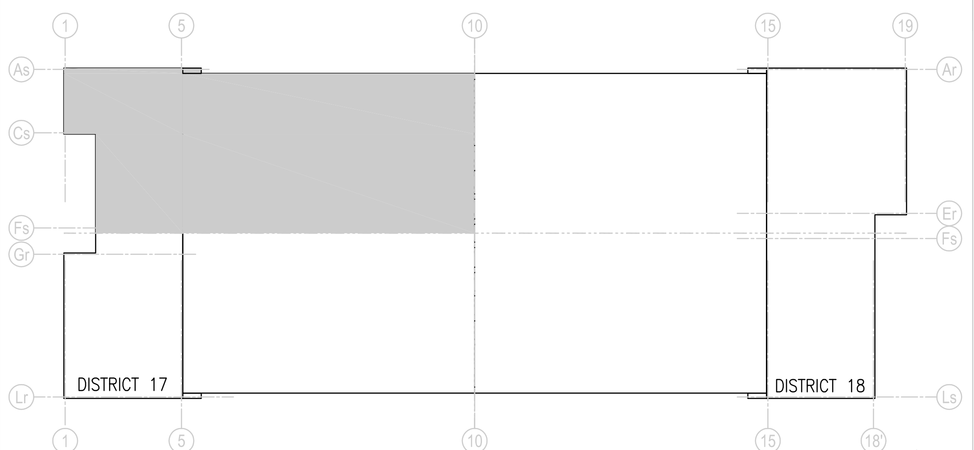
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1 1ST FLOOR ELECTRICAL PART PLAN-DISTRICT 17
3/32"=1'-0" 0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN
EXISTING TO BE REINSTALL
NEW

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10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER, ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED.

LIGHTING PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SHALL BE CONNECTED TO EXISTING 120/208V PANEL U.O.N.
2. ALL NEW WORK SHALL MATCH EXISTING BUILDING STANDARD'S & SHALL BE CARRIED OUT IN STRICT COMPLIANCE OF N.E.C. & REGULATIONS OF BUILDING & AUTHORITIES HAVING JURISDICTION.
3. CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH LIGHTING OR JUNCTION BOX. PROVIDE ALL CONDUITS, WIRES, BOXES & SUPPORTS. INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, BUILDING STANDARDS & CONTRACT DOCUMENTS.
4. ALL BRANCH CIRCUIT WIRING SHALL BE RUN IN CONDUIT EXPOSED IN WALLS & CEILING, U.O.N.
5. ELECTRICAL CONTRACTOR SHALL REVIEW & COORDINATE WITH OTHER TRADES DRAWINGS FOR THE EXACT LOCATION EQUIPMENT PRIOR TO COMMENCING WORK.
6. ALL NEW POWER CONDUITS PART OF PART OF THIS CONTRACT SHALL BE RAN EXPOSED AS CLOSED TO BUILDING STRUCTURE AS POSSIBLE, THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR LOCATION CONDUIT IN FIELD, LOCATION & QUANTITY OF PULL BOXES, CONDULETS, ETC SHALL BE DETERMINED BY THE CONTRACTOR BASED ON CONDUIT RUNS & TURNS. IT IS THE CONTRACTOR RESPONSIBILITY TO PROVIDE AS A MINIMUM THE NUMBER OF PULL BOXES IDENTIFIED ON THE CONTRACT DOCUMENT. CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
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9. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY, REFER TO DRAWING FOR LOCATIONS.
10. CONTRACTOR IS RESPONSIBLE FOR STORING, SECURING ALL EXISTING LIGHTING FIXTURES. ANY LIGHTING FIXTURE DAMAGED DUE TO CONTRACTORS SUPERVISION SHALL BE REPLACED AT THE CONTRACTORS EXPENSE WITH A NEW FIXTURE TO MATCH THE EXISTING.

SHEET KEYNOTES

1. EXISTING LIGHTING AFFECTED BY THE MECHANICAL REPLACEMENT OF DUCTWORK & DIFFUSERS, CONTRACTOR IS REQUIRED TO DISCONNECT, REMOVE AND STORE EXISTING LIGHTING FIXTURES AREA AFFECTED BY THE DUCTWORK.
2. CONTRACTOR SHALL CLEAN, RE-LAMP & REINSTALL ALL LIGHTING FIXTURES AS THE COMPLETION OF THE MECHANICAL INSTALLATION. EXISTING CONTROLS TO REMAIN. COORDINATE WITH OTHER TRADES AS REQUIRED.
3. CONTRACTOR TO PROVIDE AND INSTALL NEW VAPOR TIGHT LIGHTING FIXTURES IN THIS AREA WITH ASSOCIATED CONTROLS.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	
LT-1	DESCRIPTION:	ENCLOSED AND GASKETED FIBERGLASS LED FIXTURE WITH FROSTED ACRYLIC DIFFUSER, DIE CAST STEEL INTERIOR, STAINLESS STEEL LATCHES, HIGH EFFICIENCY LED, MEDIUM DISTRIBUTION, HALF FILLED DENOTES EMERGENCY FIXTURE.
	LAMP:	LED
	VOLTAGE:	UNIVERSAL (120V-277V)
	BALLAST:	0-10V HIGH EFFICIENCY DRIVER.
	EMERGENCY:	PROVIDE 90 MINUTES BATTERY BACKUP FOR FIXTURES INDICATED AS EMERGENCY
	MANUFACTURER:	DAY BRITE: VAPORLUME LED SERIES LITHONIA: FM LED SERIES METALUX: VAPORTITE LED SEREIS OAE

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

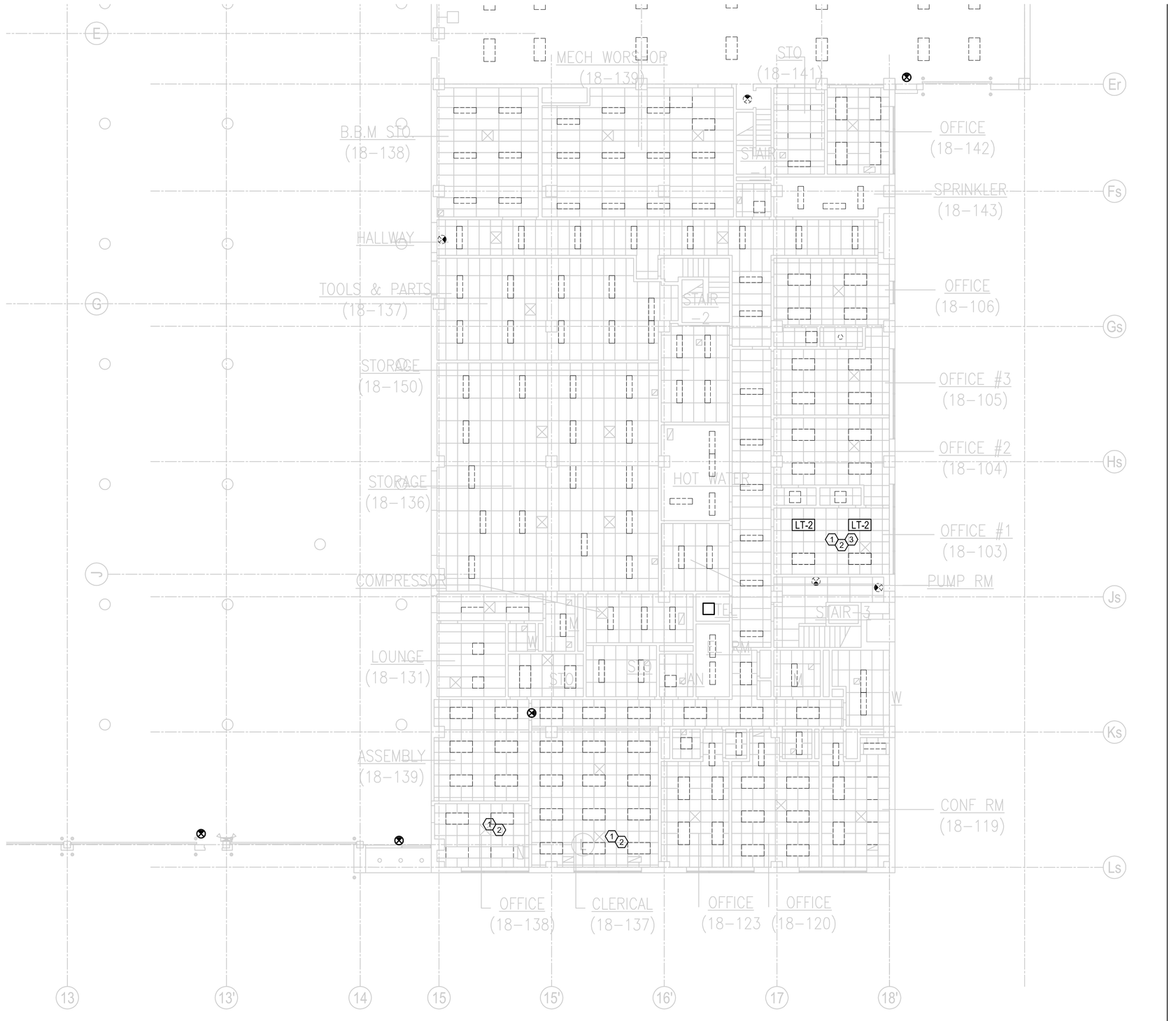
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DRAWING TITLE:
ELECTRICAL GROUND FLOOR LIGHTING PART PLAN-DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEVIN FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

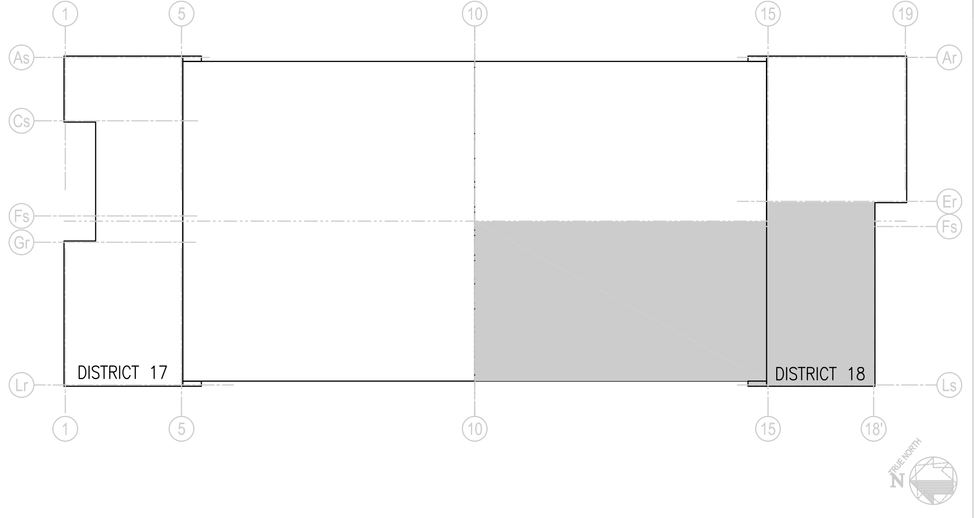
DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: HG
CHECKED BY: HG
DRAWING NUMBER:
E-201.00

Plotted: 9/27/2019 8:15:57 AM P:\NY\OMEP_EI\NPP\DDC33000\DRAWINGS\SHEETSE-201.00_DDC33000.DWG - khasan



1 1ST FL ELECTRICAL LIGHTING PART PLAN-DISTRICT 18
3/32"=1'-0"
0 10' - 8" 21' - 4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN	———
EXISTING TO BE REINSTALL	- - - - -
NEW	———

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK IS FOR THE RENOVATION & UPGRADE OF THE HVAC SYSTEM.
2. THE CONTRACTOR SHALL NOTE THAT BUILDING REMAINS OCCUPIED & ALL WORK SHALL BE CAREFULLY STAGE TO ENSURE THERE ARE NO DISTURBANCES TO NEITHER THE BUILDING OCCUPANTS OR THE BUILDING'S FUNCTION.
3. THE CONTRACTOR SHALL ABIDE BY THE NEW YORK CITY BUILDING RULES & ORDINANCES, CODE REQUIRED MEANS OF EGRESS MUST BE MAINTAINED.
4. THE CONTRACTOR SHALL MEET THE REQUIREMENT OF THE NYCEC 2011 WITH NYC AMENDMENTS FOR THE ELECTRICAL INSTALLATION.
5. CONTRACTOR SHALL BE FAMILIAR WITH THE PROCESS OF CONSTRUCTION & SHALL FOLLOW THE PROCEDURES DETAILED HEREIN. BEFORE UNDERGOING ANY WORK CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS & HAVE SIGN OFF FROM THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
6. WORK SHALL NOT COMMENCE UNTIL THE CONTRACTOR FULLY UNDERSTANDS THE SCOPE OF WORK & ALL OF ITS POTENTIAL HAZARDS. CONTRACTOR SHALL START WORK ONLY WHEN GIVEN DIRECTION TO PROCEED BY THE DDC & THE NYC DEPARTMENT OF BUILDINGS.
7. WORDING SUCH AS "RE-ROUTE/CAP" IMPLIES THAT THE CONTRACTOR SHALL TEMPORARILY UN-INSTALL A SYSTEM, RE-ROUTE OR CAP & RE-INSTALL THE SYSTEM TO ITS INITIAL WORKING ORDER AFTER THE WORK HAS BEEN COMPLETED.
8. THE CONSTRUCTION NOTES INDICATED WITH CODED NUMBERS PROVIDE INFORMATION TO THE CONTRACTOR AS TO SPECIAL CONDITIONS, EQUIPMENT OR SCOPE WHICH NEEDS TO BE PART OF THE CONTRACT. THE EXACT WORK PROCEDURE, STAGING & SCHEDULING OF WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL & FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
10. CONTRACTOR TO COORDINATE ALL REMOVAL OF EQUIPMENT WITH MECHANICAL CONTRACTOR, DDC & DSNY FACILITY ENGINEER, ALL LOCK OUT & TAG OUT PROCEDURES MUST BE OBSERVED.

LIGHTING PLAN NOTES:

1. ALL NEW POWER BRANCH CIRCUITS SHALL BE CONNECTED TO EXISTING 120/208V PANEL U.O.N.
2. ALL NEW WORK SHALL MATCH EXISTING BUILDING STANDARD'S & SHALL BE CARRIED OUT IN STRICT COMPLIANCE OF N.E.C. & REGULATIONS OF BUILDING & AUTHORITIES HAVING JURISDICTION.
3. CIRCUITS ARE DESIGNATED BY THE NUMBER SHOWN ADJACENT TO EACH LIGHTING OR JUNCTION BOX, PROVIDE ALL CONDUITS, WIRES, BOXES & SUPPORTS. INSTALLATION SHALL BE IN ACCORDANCE WITH CODE REQUIREMENTS, BUILDING STANDARDS & CONTRACT DOCUMENTS.
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7. CONTRACTOR IS RESPONSIBLE FOR PATCHING/ REPAIR CEILING/WALL AS REQUIRED WHERE AFFECTED BY THE ELECTRICAL WORK.
8. ALL EXPOSED CONDUIT SHALL BE RGS TYPE, MINIMUM SIZE 3/4", ALL EXPOSED JUNCTION BOXES & PULL BOXES SHALL BE NEMA 3R.
9. EMT IS ONLY ALLOWED FOR BRANCH CIRCUIT WIRING IN HUNG CEILING ONLY, REFER TO DRAWING FOR LOCATIONS.
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SHEET KEYNOTES

1. EXISTING LIGHTING AFFECTED BY THE MECHANICAL REPLACEMENT OF DUCTWORK & DIFFUSERS, CONTRACTOR IS REQUIRED TO DISCONNECT, REMOVE AND STORE EXISTING LIGHTING FIXTURES AREA AFFECTED BY THE DUCTWORK.
2. CONTRACTOR SHALL CLEAN, RE-LAMP & REINSTALL ALL LIGHTING FIXTURES AS THE COMPLETION OF THE MECHANICAL INSTALLATION. EXISTING CONTROLS TO REMAIN, COORDINATE WITH OTHER TRADES AS REQUIRED.
3. CONTRACTOR TO PROVIDE AND INSTALL NEW LIGHTING RECESS LIGHTING FIXTURE, CONNECT TO EXISTING CIRCUIT & CONTROLS.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	
LT-2	DESCRIPTION:	FLUORESCENT FIXTURE WITH CLEAR ACRYLIC DIFFUSER, DIE CAST STEEL INTERIOR AND (2) LAMP PER 48" SECTION. LUMINAIRE EFFICACY RATING SHALL BE 62 OR HIGHER.
	LAMP:	(2) 32 WATT 3500°K T8
	VOLTAGE:	120 VOLT
	BALLAST:	ELETRONIC RAPID START WITH LESS THAN 10% THD. BALLAST EFFICACY FACTOR MUST BE 1.44 OR HIGHER.
	MANUFACTURER:	DAY BRITE: 2DPG232 SERIES, LITHONIA: SP8 SERIES, METALUX: 2GR8432 SERIES,OAE

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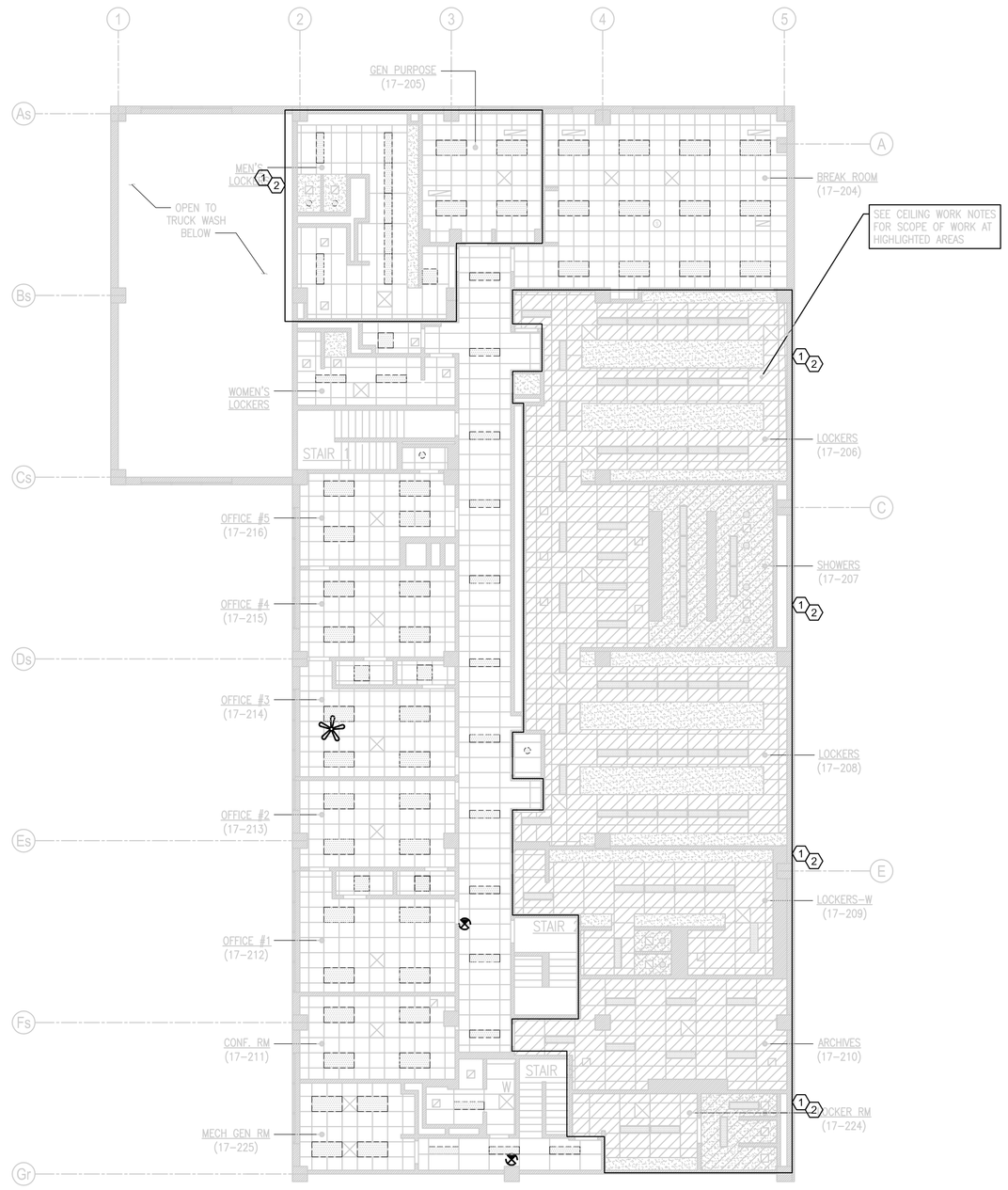
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SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTMANN · 074116 · LICENSED PROFESSIONAL ENGINEER

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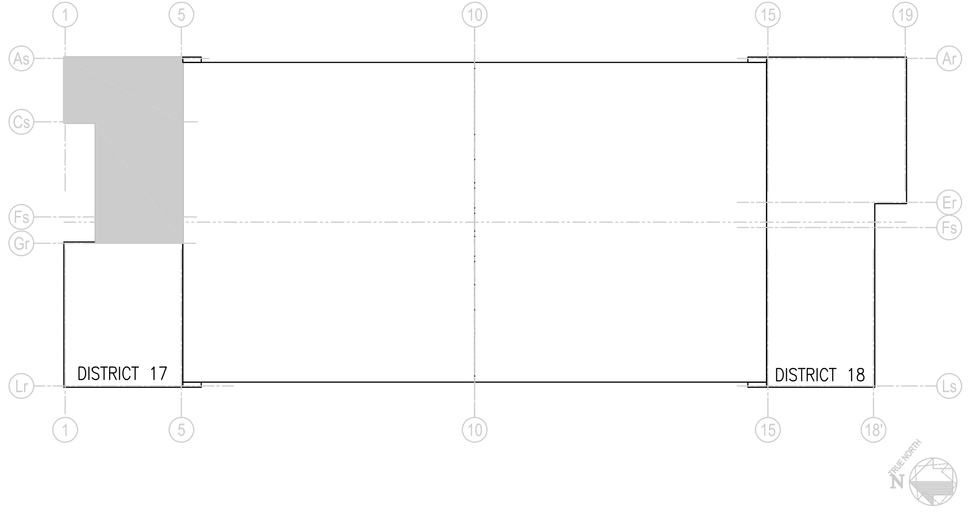
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1 2ND FL ELECTRICAL LIGHTING PART PLAN-DISTRICT 17
3/32"=1'-0"

0 10'-8" 21'-4"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REINSTALL

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NYC DDC Department of Design and Construction

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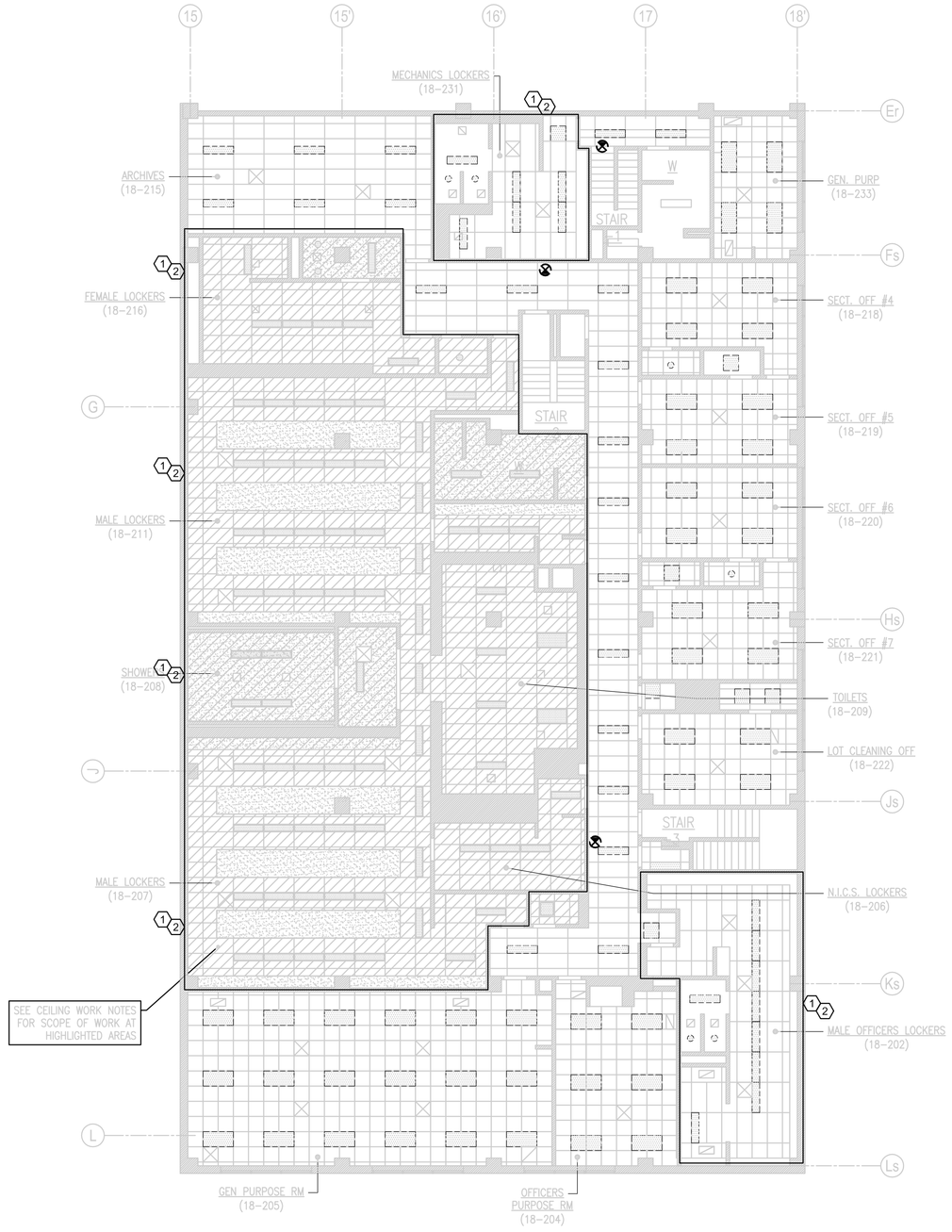
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DRAWING TITLE:
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SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

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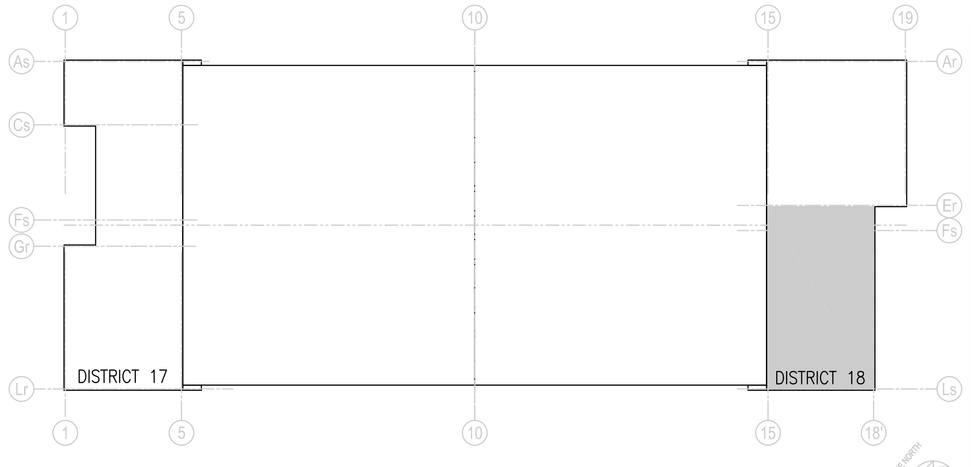
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1 E-106.00 2ND FL ELECTRICAL PART PLAN-DISTRICT 18
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KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REINSTALL

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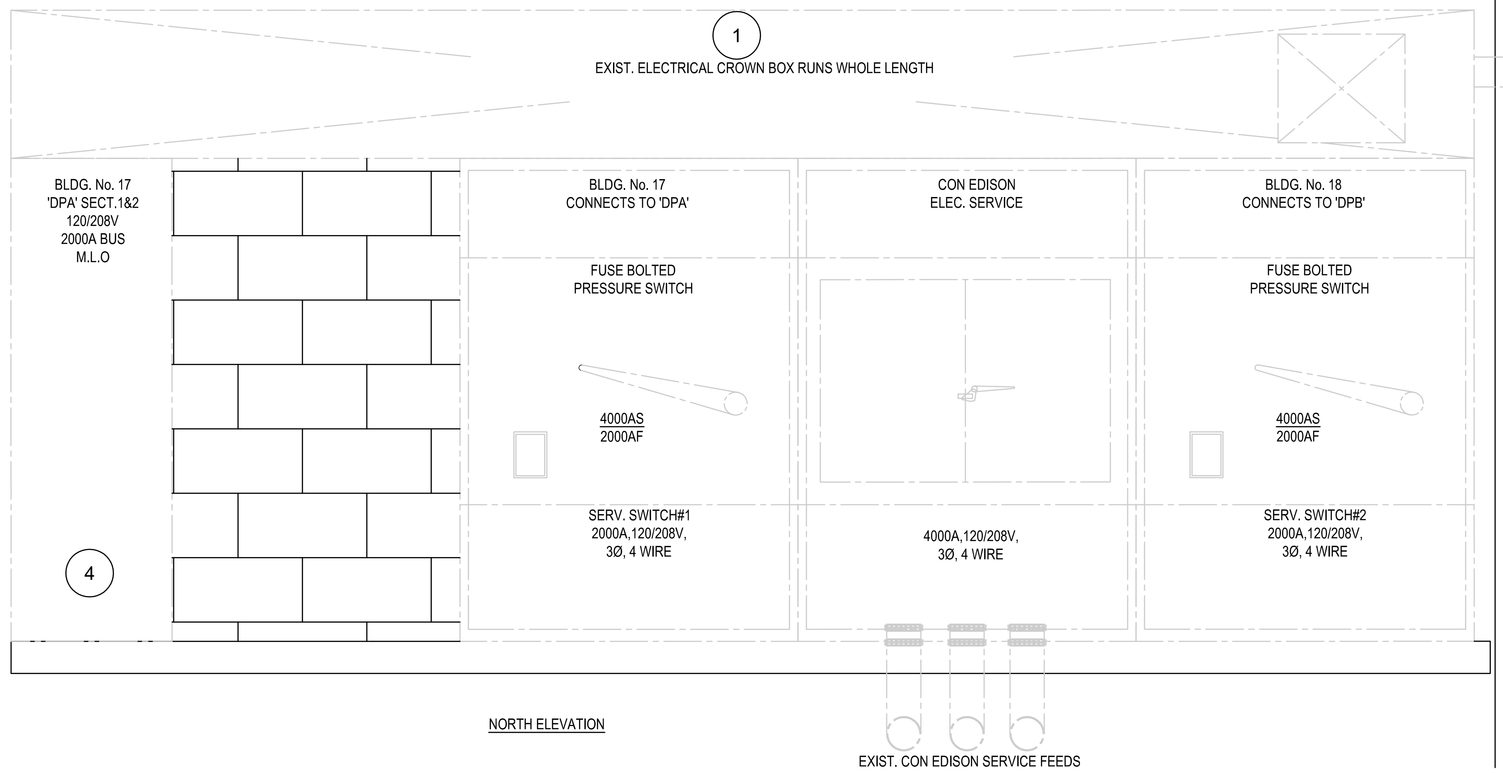
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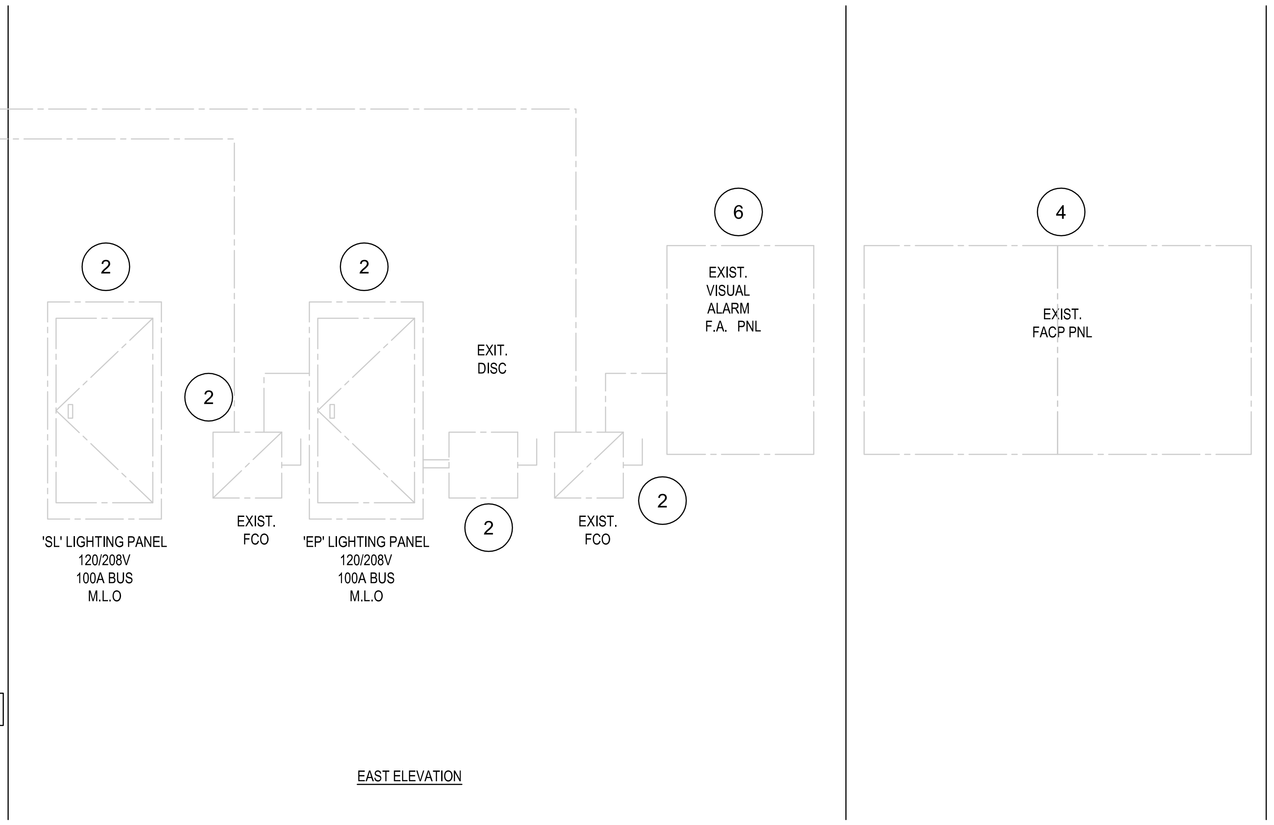
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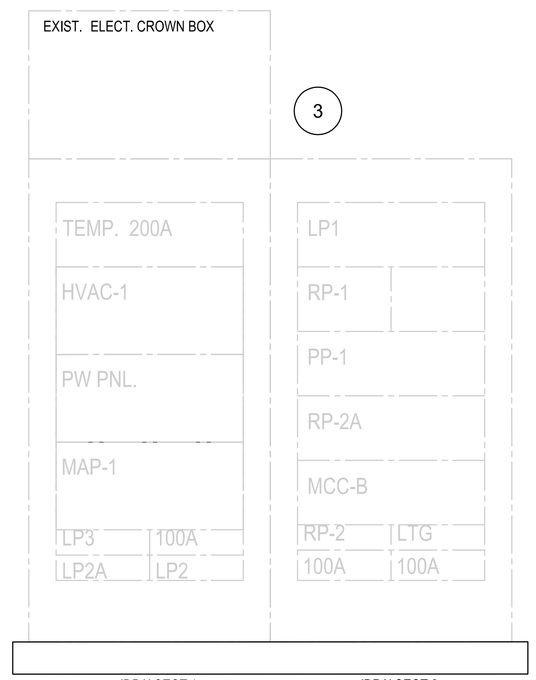
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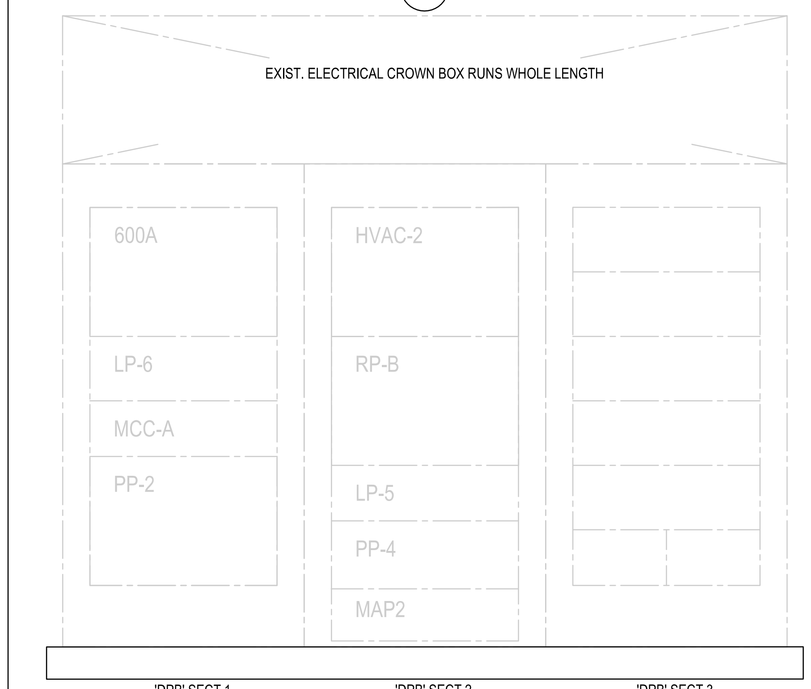




1 EXISTING ELEVATION OF MAIN ELECTRICAL SERVICE ROOM FACILITY No. 17-133

SCALE:





WEST ELEVATION

SOUTH ELEVATION

2 EXISTING ELEVATION OF MAIN ELECTRICAL SERVICE ROOM FACILITY No. 17-133

SCALE:

SHEET KEYNOTES

1. EXISTING FACILITY MAIN ELECTRICAL SERVICE EQUIPMENT TO REMAIN. COORDINATE WITH DDC AND DSNY PROJECT MANAGERS ALL WORK.
2. EXISTING ELECTRICAL PANELS AND FUSED SWITCHES TO REMAIN.
3. EXISTING FUSED SWITCH BOARD FOR SERVING FACILITY No. 17 TO REMAIN. PROVIDE & INSTALL NEW SWITCH & FUSE TO POWER CONNECTION TO NEW MECHANICAL UNITS. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION.
4. EXISTING FIRE ALARM CONTROL PANELS TO REMAIN. REFER TO FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
5. EXISTING FUSED SWITCH BOARD FOR SERVING FACILITY NO. 18 TO REMAIN. PROVIDE & INSTALL NEW SWITCH & FUSE TO POWER CONNECTION TO NEW MECHANICAL UNITS. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION.
6. EXISITING VISUAL ALARM CONTROL PANEL TO REMAIN.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

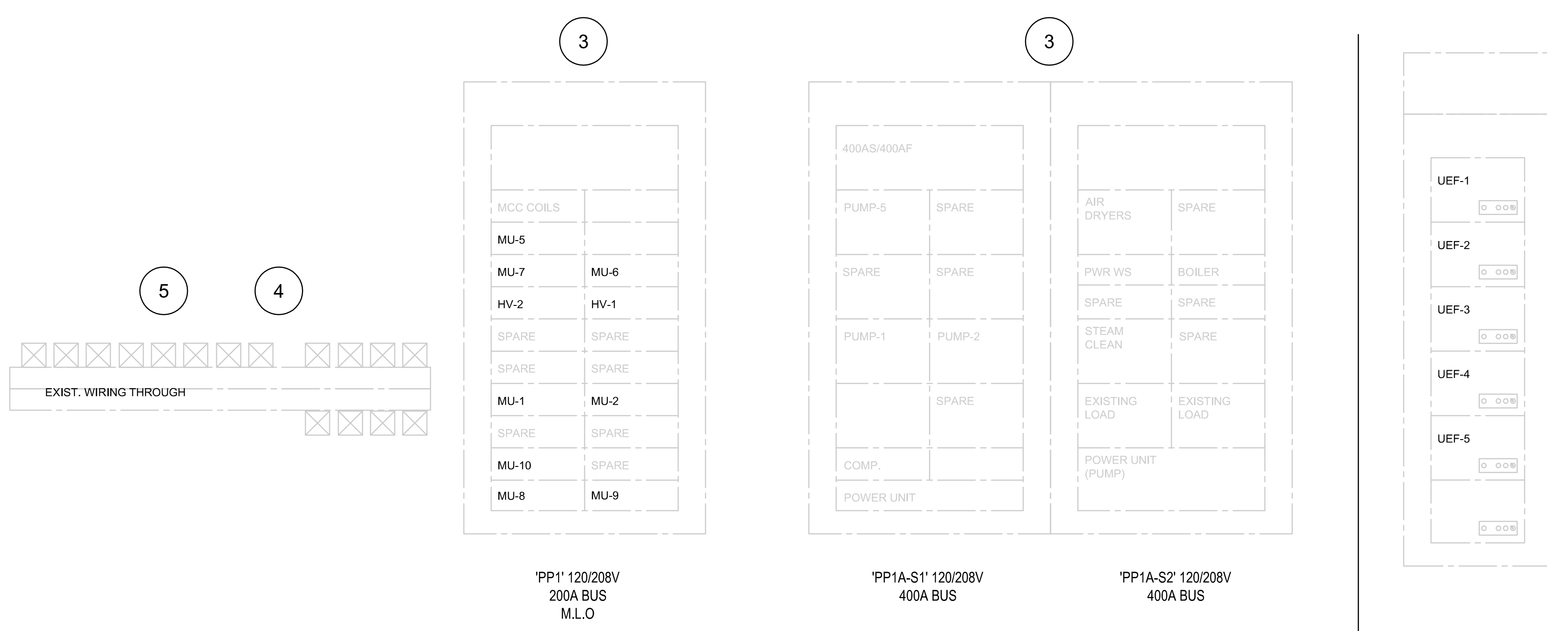
DRAWING TITLE:
ELECTRICAL EQUIPMENT ELEVATIONS

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

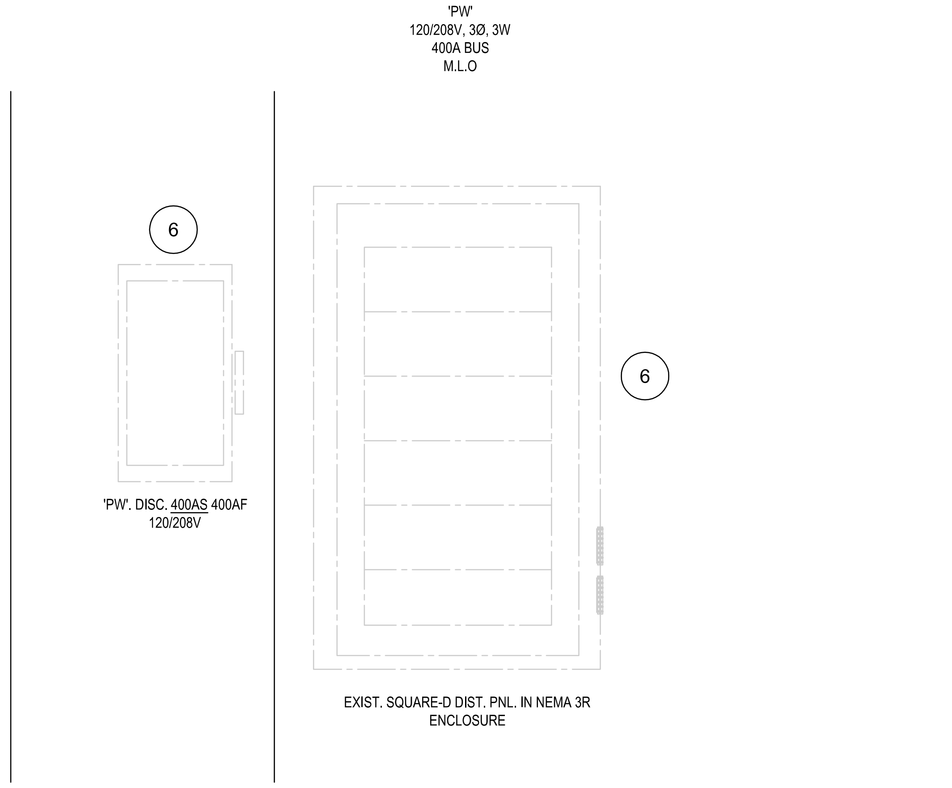
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DRAWN BY: XX
CHECKED BY: XX
DRAWING NUMBER:
E-401.00

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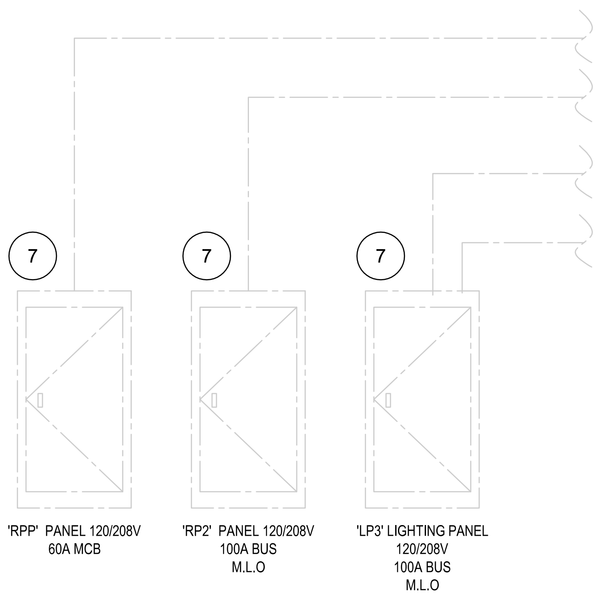
EXISTING ELEVATION OF ELEC. EQUIP MCC ROOM FACILITY No. 17

3 SCALE:



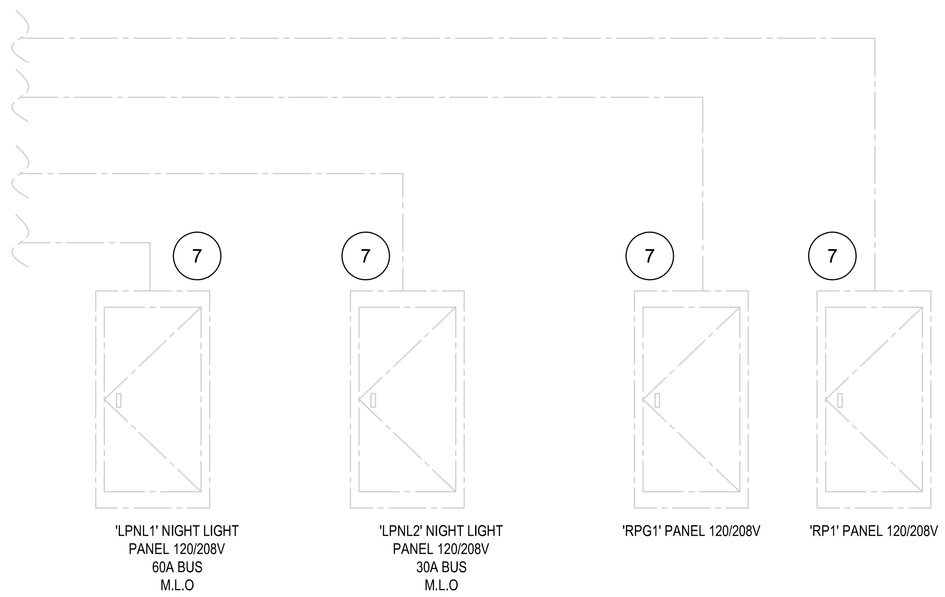
EXISTING ELEVATION OF ELEC. EQUIP TRUCK WASH ROOM FACILITY No. 17

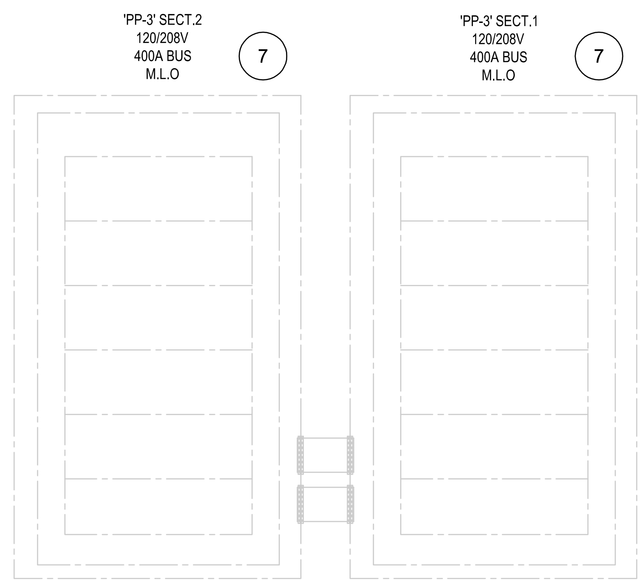
4 SCALE:



EXISTING ELEVATION OF ELEC. EQUIP. TEL ROOM FACILITY No. 17

5 SCALE:





EXISTING ELEVATION OF ELEC. EQUIP. GARAGE AREA FACILITY No. 17

6 SCALE:

SHEET KEYNOTES

1. EXISTING MOTOR CONTROL CENTER MCC-B 208/120V, 3Ø, 3 WIRE, 600A M.L.O. CONTRACTOR TO DISCONNECT & REMOVE EXISTING STARTERS & OVER CURRENT PROTECTION DEVICES.
2. PROVIDE & INSTALL NEW SWITCH & FUSE TO POWER CONNECTION TO NEW MECHANICAL UNITS. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION.
3. EXISTING PP1 & PP1A DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE. CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO NEW MECHANICAL UNITS. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION.
4. EXISTING WIRING THROUGH FOR FAN STARTERS & UNIT HEATERS. REMOVE EXISTING FAN STARTERS, ASSOCIATED WIRING. SHORTEN WIRING THROUGH.
5. NEW LOCATION FOR VFD, CO MONITORING PANEL & BMS CONTROLS. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.
6. EXISTING 'PW' DISCONNECT SWITCH & 'PW' DISTRIBUTION BOARD TO BE REMOVED. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.
7. EXISTING PANELS TO REMAIN. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.

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BROOKLYN, NY 11236
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LOT: 1 BLOCK: 8138

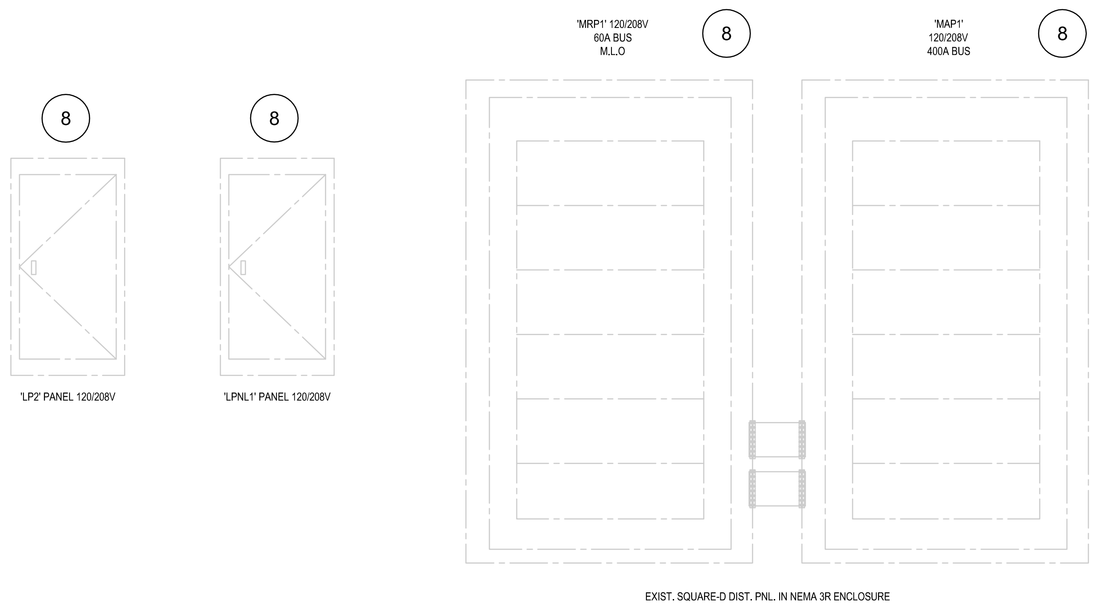
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ELECTRICAL EQUIPMENT ELEVATONS

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: XX
CHECKED BY: XX
DRAWING NUMBER:
E-402.00

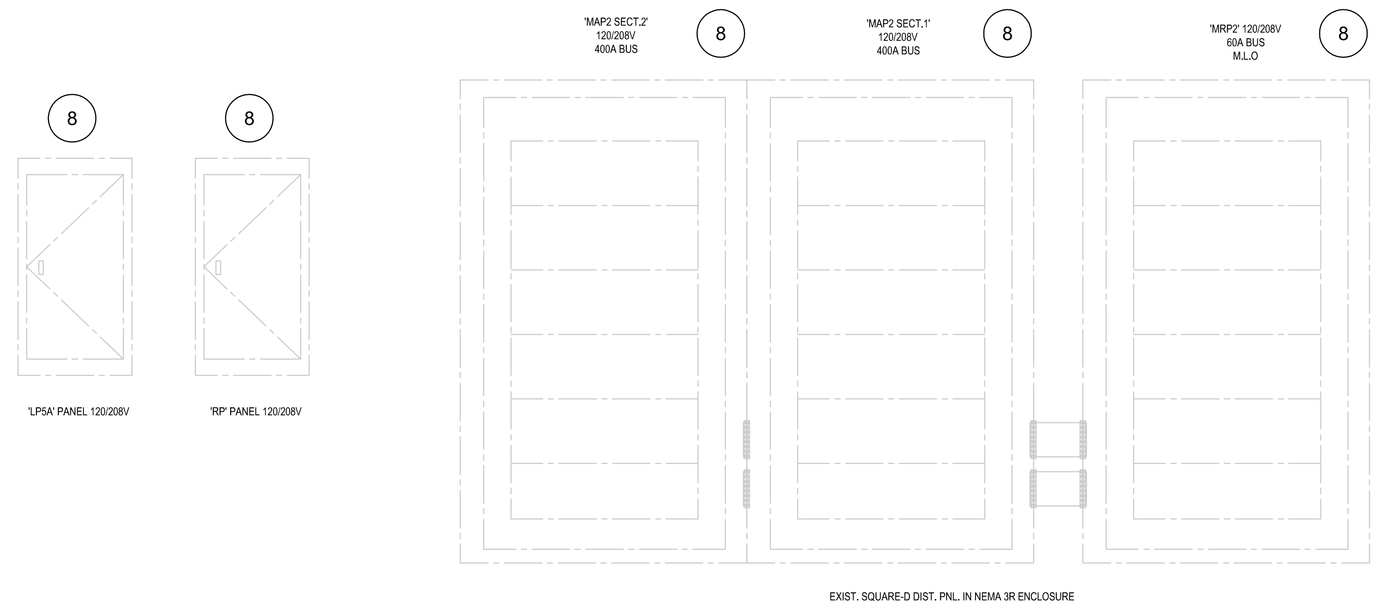
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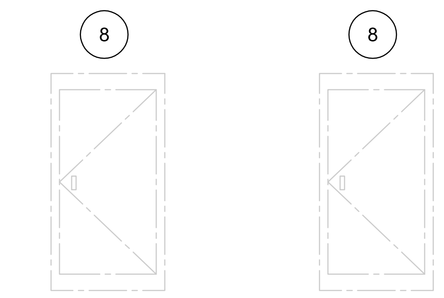
EXISTING ELEVATION OF ELEC. EQUIP. TRUCK SHOP FACILITY No. 17

7 SCALE:



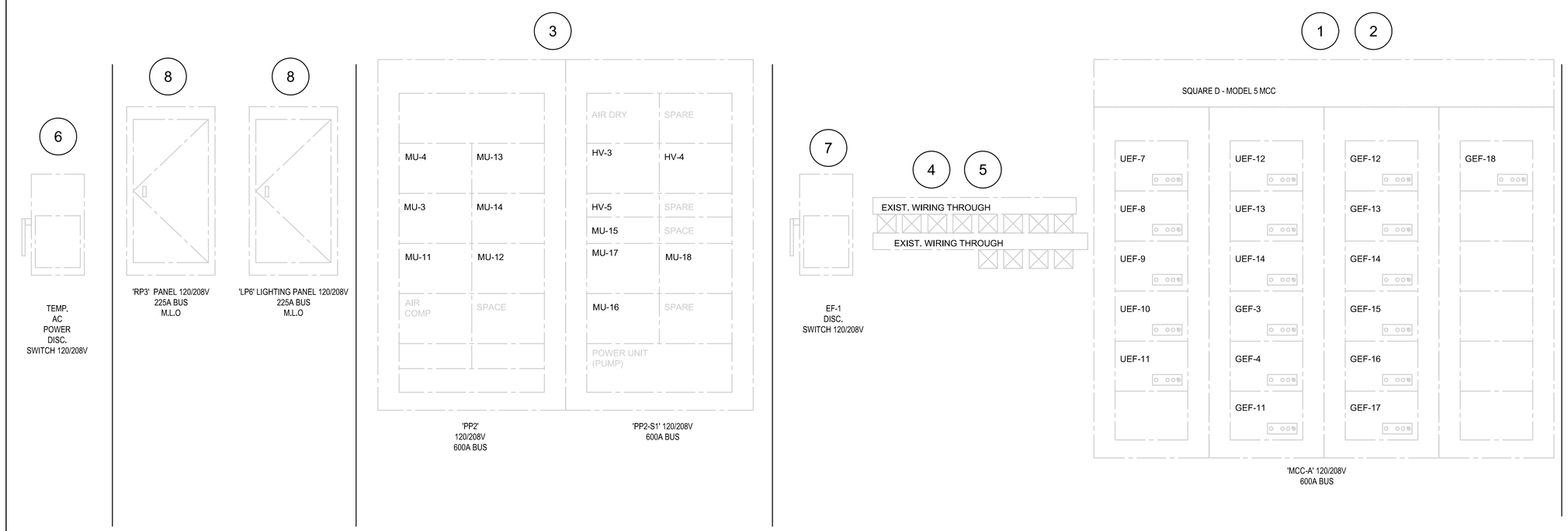
EXISTING ELEVATION OF ELEC. EQUIP. TRUCK SHOP FACILITY No. 18

8 SCALE:



EXISTING ELEVATION OF ELEC. EQUIP. GARAGE AREA FACILITY No. 18

9 SCALE:



EXISTING ELEVATION OF ELEC. EQUIP. MCC ROOM FACILITY No. 18

10 SCALE:

SHEET KEYNOTES

1. EXISTING MOTOR CONTROL CENTER MCC-A 208/120V, 3Ø, 3 WIRE, 600A M.L.O. CONTRACTOR TO DISCONNECT & REMOVE EXISTING STARTERS & OVER CURRENT PROTECTION DEVICES.
2. PROVIDE & INSTALL NEW SWITCH & FUSE TO POWER CONNECTION TO NEW MECHANICAL UNITS. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION.
3. EXISTING PP2 & PP2-S1 DISTRIBUTION PANEL 208/120V, 3Ø, 4 WIRE, CONTRACTOR TO PROVIDE & INSTALL NEW POWER CONNECTION TO NEW MECHANICAL UNITS. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION.
4. EXISTING WIRING THROUGH FOR FAN STARTERS & UNIT HEATERS. REMOVE EXISTING FAN STARTERS, ASSOCIATED WIRING, SHORTEN WIRING THROUGH.
5. NEW LOCATION FOR VFD, CO MONITORING PANEL & BMS CONTROLS. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.
6. EXISTING TEMP. AHU UNIT DISCONNECT SWITCH TO BE REMOVED. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.
7. EXISTING EF-1 UNIT DISCONNECT SWITCH TO BE REMOVED. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.
8. EXISTING PANELS TO REMAIN. REFER TO ELECTRICAL FLOOR PLANS FOR ADDITIONAL INFORMATION.

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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL EQUIPMENT ELEVATIONS

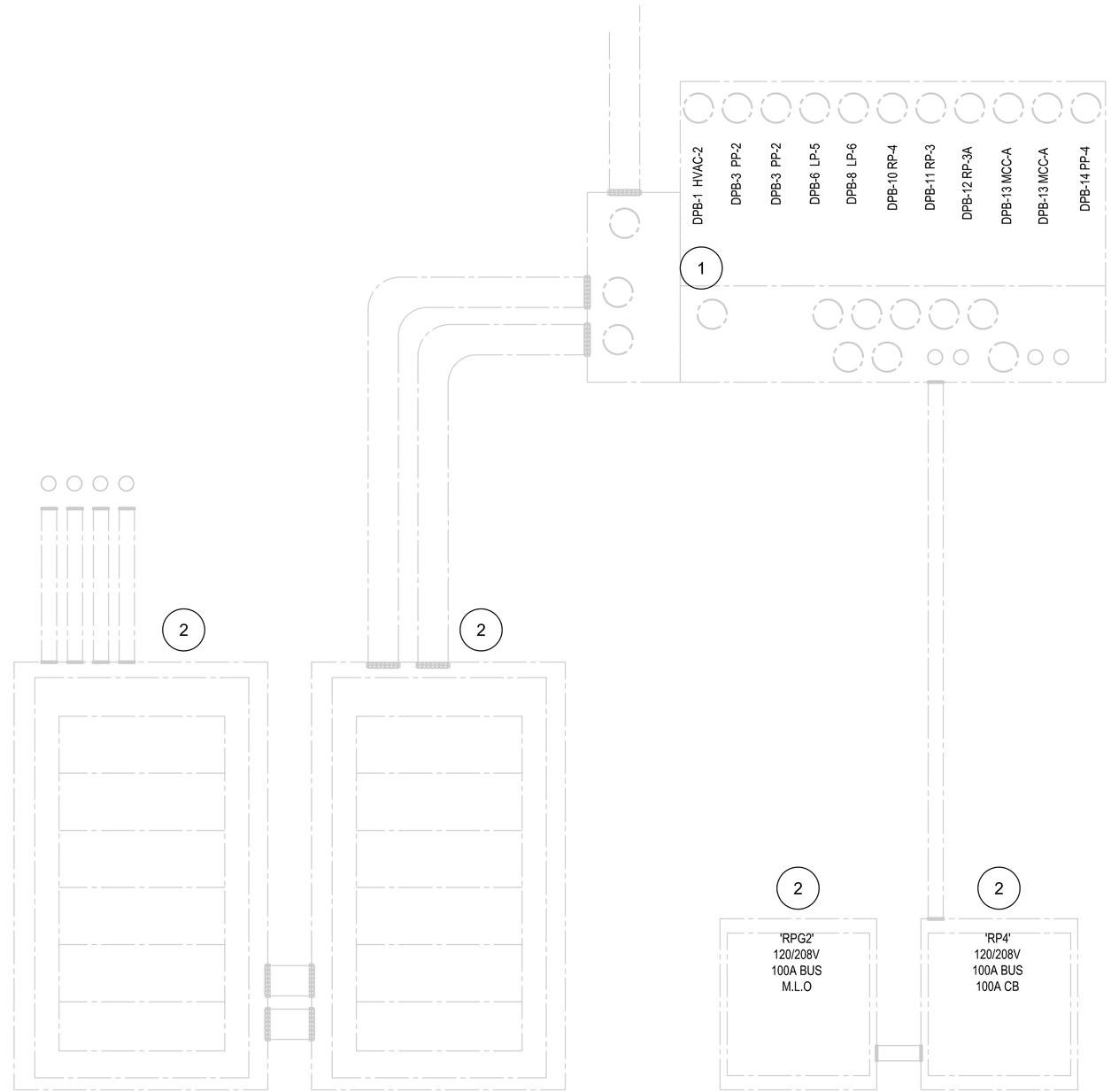
SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
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DRAWING NUMBER:	E-403.00

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EXISTING ELEVATION OF ELEC. EQUIP.
GARAGE AREA FACILITY No. 18

11 SCALE:

SHEET KEYNOTES

1. EXISTING CONDUIT AND FEEDER FOR UNIT HVAC-2 TO BE REMOVED AND REPLACED WITH NEW. REFER TO ELECTRICAL DRAWING E-602 FOR ADDITIONAL INFORMATION. CONTRACTOR TO FIELD VERIFY EXACT PATH AND LOCATION OF CONDUIT. COORDINATE ACCESS TO PULL BOX WITH DDC AND DSNY.
2. EXISTING PANELS TO REMAIN. REFER TO ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.

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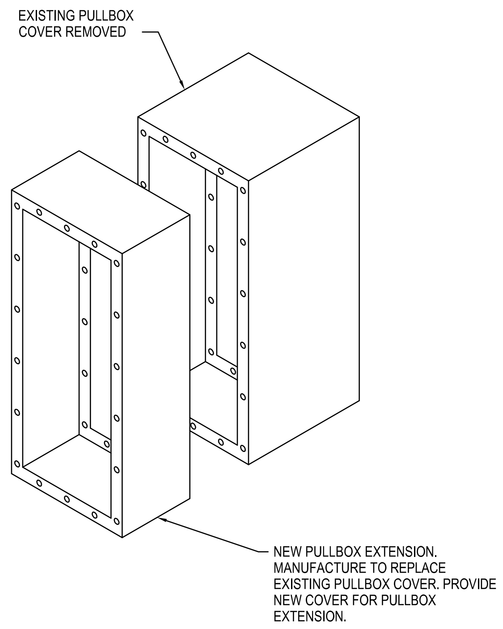
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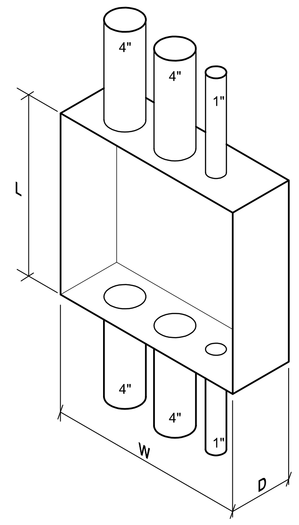
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1 PULLBOX EXTENSION

SCALE: NONE

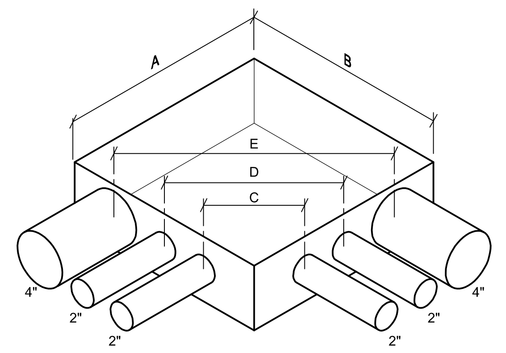


EXAMPLE:
L = 4" x 8 = 32"
W = 4"+4"+1"+6 = 15"
D = 4" x 1.5 = 6"

NOTE:
SIZES MAY NEED TO BE INCREASED TO MEET REQUIREMENTS OF NEC 370-28, COMPLY WITH STANDARD BOX SIZES OR FOR SHIELDED CABLES.

2 PULL BOX SIZING ('STRAIGHT' PULLS) LESS THAN 600V

SCALE: NONE

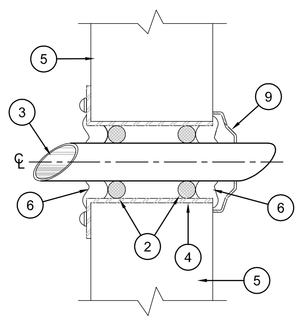


EXAMPLE:
A = (6 x 4") +2"+2" = 28"
B = (6 x 4") +2"+2" = 28"
C = (6 x 2") = 12" MINIMUM
D = (6 x 2") = 12" MINIMUM
E = (6 x 4") = 24"

NOTE:
SIZES MAY NEED TO BE INCREASED TO MEET REQUIREMENTS OF NEC 370-28, COMPLY WITH STANDARD BOX SIZES OR FOR SHIELDED CABLES.

3 PULL BOX SIZING ('L' PULLS) LESS THAN 600V

SCALE: NONE



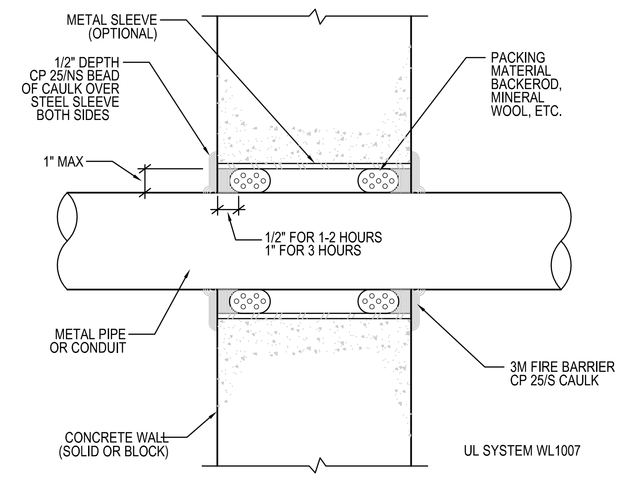
CONDUIT & SLEEVE THRU WALL

NOTES:

1. 6" MAXIMUM DIAMETER SLEEVE. SLEEVE TO BE SIZED TO ALLOW ~8" OF ANNULAR SPACE AROUND CONDUIT.
2. BACKER ROD SET SO THAT TOP OF ROD IS 1" INTO OPENING.
3. STEEL CONDUIT (4" MAXIMUM) CENTERED IN OPENING. MAXIMUM (1) ONE CONDUIT PER OPENING.
4. STEEL PIPE SLEEVE WITH ANCHOR TABS ON ONE SIDE SECURED TO WALL. PROVIDE SLEEVES FOR ALL CONDUITS AT EXTERIOR WALL ABOVE GRADE AND ALL CONDUITS 1.25" TO 4" DIAMETER THROUGH INTERIOR WALLS. FOR CONDUITS LESS THAN 1.25" PENETRATING FIRE AND/OR SMOKE PARTITIONS ON BUILDING INTERIOR, SLEEVE MAY BE OMITTED.
5. MASONRY OR CONCRETE PARTITION. REFER TO ARCHITECTURAL DRAWINGS.
6. INTUMESCENT ELASTOMERIC CAULKING COMPOUND FORCED INTO ANNULAR SPACE WITH A MINIMUM ~4" BEAD APPLIED TO PIPE AND OVER EDGE OF SLEEVE AT SLEEVE/WALL JOINT.
9. ESCUTCHEON AT WALL CONDUITS WHERE EXPOSED TO VIEW.

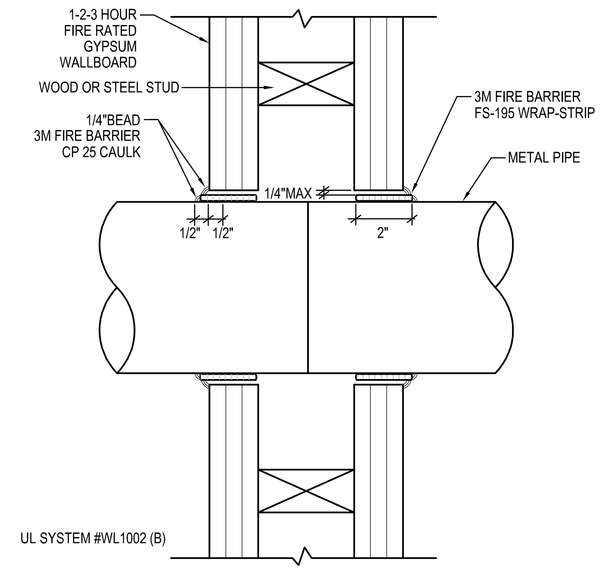
4 CABLE & CONDUIT PENETRATIONS

SCALE: NONE



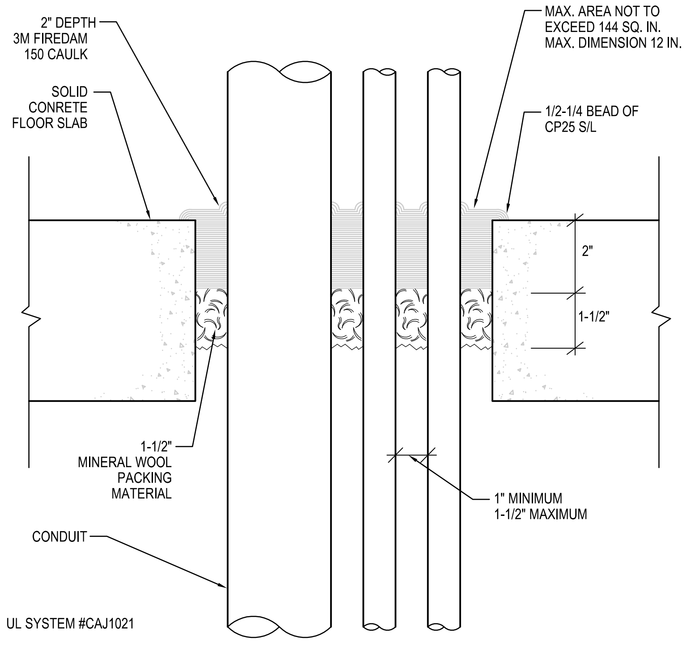
5 FIREPROOFING THROUGH CONCRETE WALL

SCALE: NONE



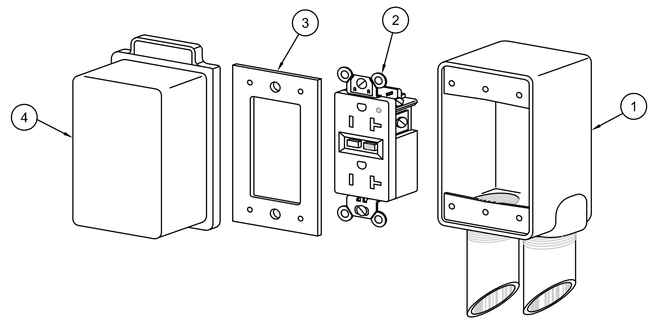
6 FIREPROOFING THROUGH GYPSUM WALL

SCALE: NONE



7 FIREPROOFING THRU CONCRETE SLAB

SCALE: NONE

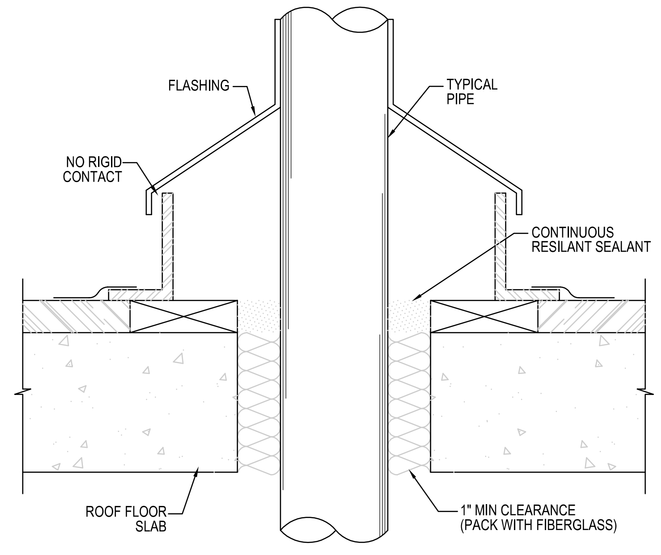


NOTES:

1. CAST OUTLET BOX, FERROUS METAL CONSTRUCTION, GALVANIZED WITH HUBS FOR RIGID CONDUIT, (MINIMUM 2 HUBS, REFER TO PLANS FOR NUMBER AND LOCATIONS). PROVIDE PLUGS FOR UNUSED HUBS.
2. GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE.
3. NEOPRENE GASKET PRECUT TO FIT RECEPTACLE AND BOX.
4. CAST ALUMINUM EXTRA DEEP LIFT COVER RAINTIGHT WHILE IN USE.

8 WEATHERPROOF OUTLET INSTALLATION

SCALE: NONE



9 TYPICAL ROOF PENETRATION DETAIL

SCALE: NONE

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ELECTRICAL DETAILS

SEAL & SIGNATURE

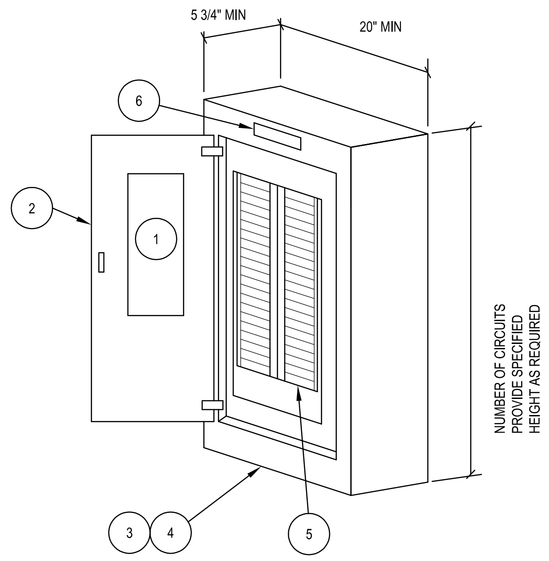
STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: HG
CHECKED BY: HG
DRAWING NUMBER:
E-501.00

Plotted: 9/27/2019 8:14:41 AM P:\NYO\MEP_EIN\PP\DDC33000\DRAWINGS\SHEETS\E-501.00_DDC33000.DWG - kslmpson

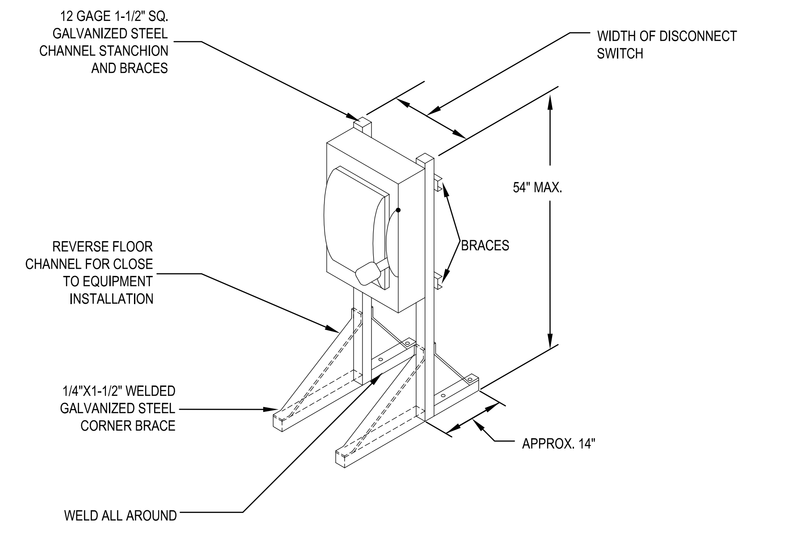
NOTES:

1. TYPEWRITTEN CIRCUIT SCHEDULE BEHIND CLEAR PLASTIC COVER ON INSIDE OF DOOR.
2. HINGED LOCKABLE DOOR WITHIN DOOR, FLUSH CATCH AND LOCK. ALL CABINETS KEYED ALIKE. KEYS TO MATCH EXISTING PANELBOARD WHERE ADDING TO EXISTING FACILITY.
3. WHERE INDICATED ON SCHEDULE PROVIDE VERTICALLY MOUNTED MAIN BREAKER AHEAD OF PANEL BUS.
4. FLUSH OR SURFACE MOUNTED PANELBOARD AS INDICATED ON DRAWINGS.
5. FACTORY INSTALLED METAL CIRCUIT NUMBERS SCREWED OR RIVETED TO TRIM.
6. LAMINATED, ENGRAVED NAME PLATE (MOUNTED UNDER DOOR IN AREAS EXPOSED TO PUBLIC VIEW) REFER TO SPECIFICATIONS "IDENTIFICATIONS AND WARNING SIGNS" FOR ADDITIONAL REQUIREMENTS.



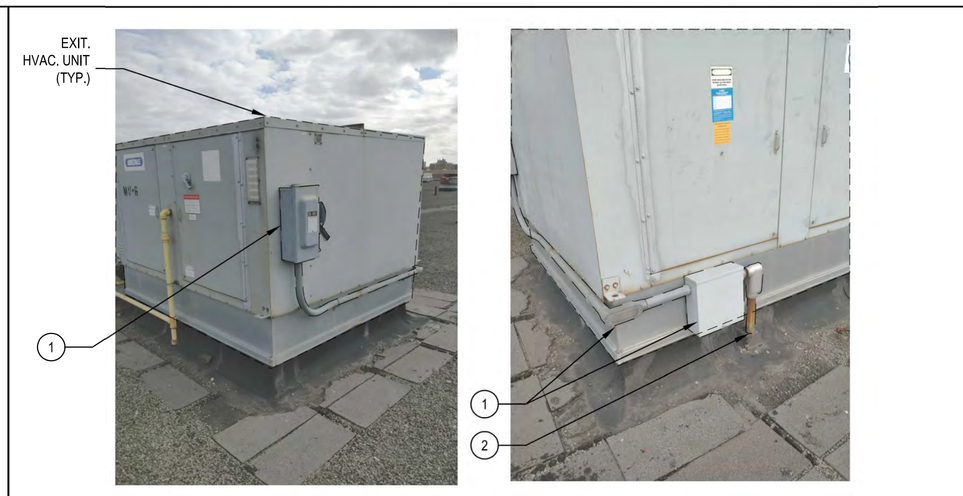
10 TYPICAL PANELBOARD

SCALE: NONE



11 FREE STANDING DISCONNECT

SCALE: NONE

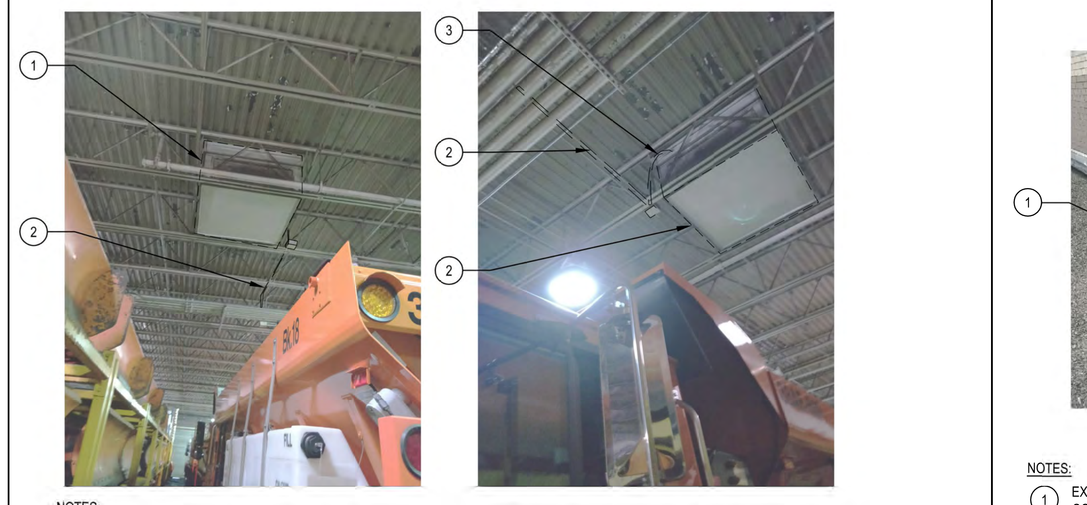


NOTES:

1. EXISTING HVAC UNITS TO BE REPLACED. THE ELECTRICAL CONTRACTOR SHALL TURN-OFF, DISCONNECT POWER TO THE EXISTING UNITS & REMOVE CONDUIT AND CABLE TO SOURCE PANEL. MECHANICAL CONTRACTOR TO REMOVE UNIT.
2. CONTRACTOR TO REMOVE CONDUIT STUB-UP & ALL ASSOCIATED CONDUIT SUPPORTS.

12 EXIST. CONDITIONS CONNECTION TO 'MU' UNITS AT ROOF

SCALE: NONE



NOTES:

1. EXISTING HVAC UNITS TO BE REPLACED. THE ELECTRICAL CONTRACTOR SHALL TURN-OFF, DISCONNECT POWER TO THE EXISTING UNITS & REMOVE CONDUIT AND CABLE TO SOURCE PANEL. MECHANICAL CONTRACTOR TO REMOVE UNIT.
2. CONTRACTOR TO REMOVE ALL RACEWAY, JUNCTION BOXES & ASSOCIATED CONDUIT SUPPORTS INSTALLED ON THE STRUCTURAL TRUSS SYSTEM
3. CONTRACTOR TO REMOVE CONDUIT FLEX CONNECTION & STUB-UP ON ROOF

13 EXIST. CONDITIONS CONNECTION TO FANS UNITS AT GARAGE

SCALE: NONE



NOTES:

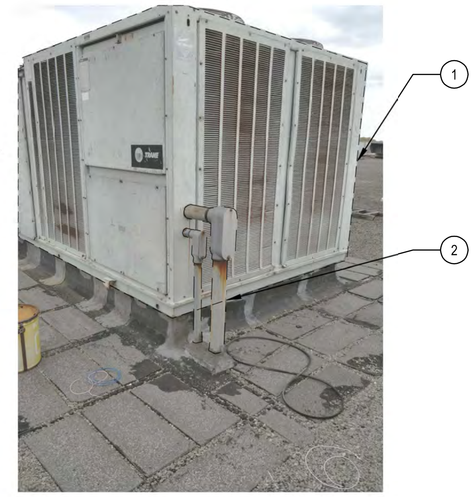
1. EXISTING HVAC UNITS TO BE REPLACED. THE ELECTRICAL CONTRACTOR SHALL TURN-OFF, DISCONNECT POWER TO THE EXISTING UNITS & REMOVE CONDUIT AND CABLE TO SOURCE PANEL. MECHANICAL CONTRACTOR TO REMOVE UNIT.

14 EXIST. CONDITIONS CONNECTION TO FANS UNITS AT GARAGE

SCALE: NONE

NOTES:

1. EXISTING HVAC-2 UNIT TO BE REPLACED. THE ELECTRICAL CONTRACTOR SHALL TURN-OFF, DISCONNECT POWER TO THE EXISTING UNITS & REMOVE CONDUIT AND CABLE TO SOURCE PANEL. MECHANICAL CONTRACTOR TO REMOVE UNIT.
2. CONTRACTOR TO REMOVE ALL RACEWAY, JUNCTION BOXES & ASSOCIATED CONDUIT SUPPORTS INSTALLED ON THE STRUCTURAL TRUSS SYSTEM IN THE GARAGE AREA.



15 EXIST. CONDITIONS CONNECTION TO 'HVAC-2' UNITS AT ROOF

SCALE: NONE

PULL BOX SIZING REQUIREMENT				
MAXIMUM CONDUIT SIZE (TRADE SIZE)	BOX SIZE WIDTH (IN)	BOX SIZE LENGTH (IN)	BOX SIZE DEPTH (IN)	ADD TO BOX SIZE FOR EACH ADDITIONAL CONDUIT (IN)
1	4	16	3	2
1 1/4	6	20	3	3
1 1/2	8	27	4	4
2	8	36	4	5
3	12	54	6	6
4	15	60	8	8

*1 ASSUMES INDUSTRY STANDARD AND NEC CODE IS TO DESIGN FOR A MAXIMUM OF 40% FILL. THE ACTUAL NUMBER OF CABLES WHICH CAN BE INSTALLED IN A PARTICULAR CONDUIT CAN BE SLIGHTLY MORE OR SIGNIFICANTLY LESS DEPENDING UPON FOLLOWING:

1. ALL CABLES MUST BE PULLED AT THE SAME TIME TO ACHIEVE THE GREATER FILL LEVELS
2. CONDUIT RUNS SHOULD BE LESS THAN 50 FEET IN LENGTH (REDUCE THE NUMBER OF CABLES BY 15% FOR CONDUIT RUNS BETWEEN 50 AND 100 FEET)
3. PULL BOXES SHOULD BE PLACED EVERY 100 FEET OR IF MORE THAN 180 DEGREES OF BENDS ARE INSTALLED IN THE CONDUIT
4. CONDUITS SHALL ENTER AND EXIT PULL BOXES IN A CONTINUOUS DIRECTION. PULL BOXES ARE NOT TO BE USED FOR 90 DEGREE BENDS

PULL BOX SHALL BE USED IF ANY OF THE FOLLOWING ARE MET:

1. ANY CONDUIT RUN THAT EXCEED 100 FEET.
2. ANY CONDUIT RUN THAT REQUIRE MORE THAN (2) 90 DEGREE BENDS.
3. PULLBOX MUST BE LOCATED TO PROVIDE FREE AND EASY ACCESS.
4. IN STRAIGHT SECTIONS OF CONDUIT ONLY (PULLBOXES SHOULD NEVER BE USED FOR RIGHT ANGLE BEND) AND MUST BE INSTALLED TO ALLOW CALE TO PASS THROUGH FROM ONE CONDUIT TO ANOTHER IN DIRECT LINE.
5. PULLBOXES MUST HAVE A LENGTH 8 TIMES THE TRADE-SIZE DIAMETER OF LARGEST CONDUIT PULLBOX SIZING.
6. COMPLY WITH NATIONAL ELECTRICAL CODE.

CONDUIT REQUIREMENT CABLE FILL FOR CAT 6 CABLE (OD SIZE 0.220) *1		
CONDUIT TRADE SIZE	CONDUIT ID (in)	40% FILL # OF CABLES
3/4"	0.824	5
1"	1.02	8
1-1/4"	1.275	13
1-1/2"	1.538	19
2"	2.04	34
3"	3	74
4"	4	132

CONDUIT REQUIREMENT CABLE FILL FOR CAT 6A CABLE (OD SIZE 0.275) *1		
CONDUIT TRADE SIZE	CONDUIT ID (in)	40% FILL # OF CABLES
3/4"	0.824	3
1"	1.02	5
1-1/4"	1.275	8
1-1/2"	1.538	12
2"	2.04	22
3"	3	47
4"	4	84

NOTES:

1. PULL BOX AND CONDUIT SHALL BE FURNISHED, INSTALLED BY ELECTRICAL CONTRACTOR
2. NOTES AND CHARTS ARE FOR REFERENCE ONLY.

16 COMMUNICATION CONDUIT & PULL BOX NOTES

SCALE: NONE

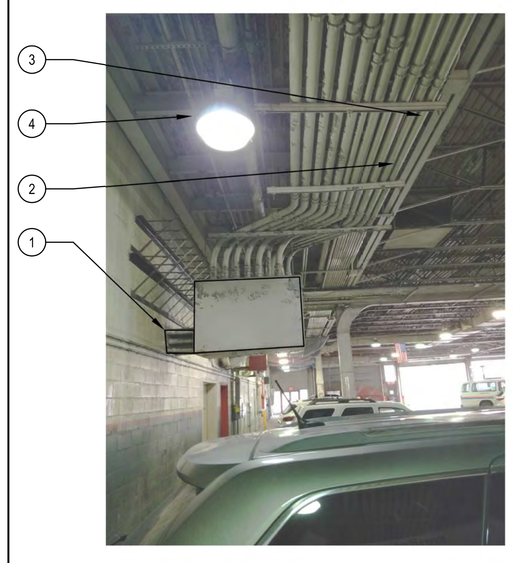


NOTES:

1. EXISTING PULL BOX ON FACILITY No. 17 GARAGE AREA. PULL BOX USED TO CONNECT EXISTING DISTRIBUTION BOARD 'DPA' IN THE MAIN ELECTRICAL SERVICE ROOM TO FACILITY No.18
2. EXISTING CONDUIT BANK WHICH CONNECT TO FACILITY No.18 TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS TO PULL BOXES WITH DDC & DSNY PROJECT MANAGER.
3. EXISTING CONDUITS FEEDING EXISTING UNITS HVAC-2 TO BE REPLACED WITH NEW. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION.
4. EXISTING CONDUITS FEEDING EXISTING UNITS AND LIGHTING TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS AND WORK ON GARAGE AREA WITH DDC & DSNY PROJECT MANAGERS. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.

17 EXIST. CONDITIONS (FACILITY No.17) CONDUIT RUNS & PULL BOX

SCALE: NONE



NOTES:

1. EXISTING PULL BOX ON FACILITY No. 17 GARAGE AREA. PULL BOX USED TO CONNECT EXISTING DISTRIBUTION BOARD 'DPB' IN THE MAIN ELECTRICAL SERVICE ROOM TO FACILITY No.18
2. EXISTING CONDUIT BANK WHICH CONNECT TO FACILITY No.18 TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS TO PULL BOXES WITH DDC & DSNY PROJECT MANAGER.
3. EXISTING CONDUITS FEEDING EXISTING UNITS HVAC-2 TO BE REPLACED WITH NEW. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION.
4. EXISTING CONDUITS FEEDING EXISTING UNITS AND LIGHTING TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS AND WORK ON GARAGE AREA WITH DDC & DSNY PROJECT MANAGERS. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.

18 EXIST. CONDITIONS (FACILITY No.17) CONDUIT RUNS & PULL BOX

SCALE: NONE

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DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL DETAILS

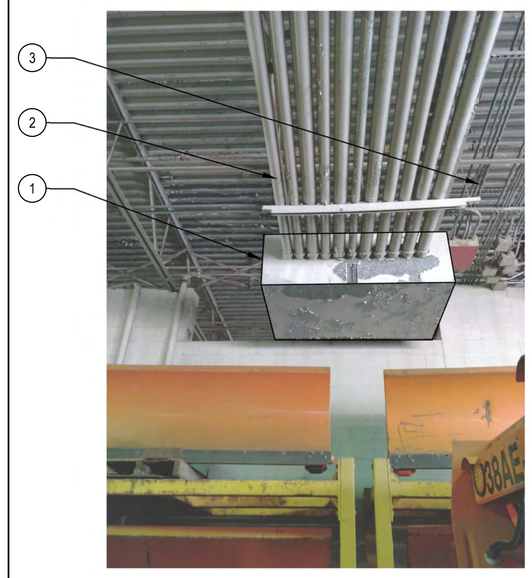
SEAL & SIGNATURE

STATE OF NEW YORK — HEATH TITTA — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: HG
CHECKED BY: HG
DRAWING NUMBER:
E-502.00

Plotted: 9/27/2019 8:14:12 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\E-502.00_DDC33000.DWG - ksimpson

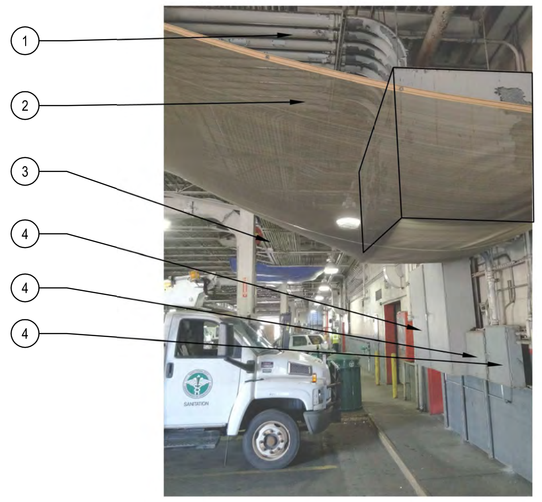
NOTES:



1. EXISTING CONDUIT BANK WHICH CONNECT TO FACILITY No.18 TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS TO PULL BOXES WITH DDC & DSNY PROJECT MANAGER.
2. EXISTING CONDUITS FEEDING EXISTING UNITS HVAC-2 TO BE REPLACED WITH NEW. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION.
3. EXISTING CONDUITS FEEDING EXISTING UNITS AND LIGHTING TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS AND WORK ON GARAGE AREA WITH DDC & DSNY PROJECT MANAGERS. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.

19 EXIST. CONDITIONS (FACILITY No.17) CONDUIT RUNS & PULL BOX

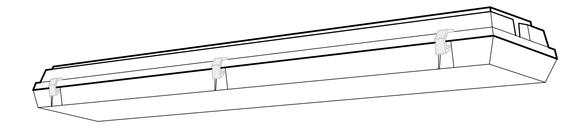
SCALE: NONE



1. EXISTING CONDUIT BANK WHICH CONNECTS TO FACILITY No.18 TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS TO PULL BOXES WITH DDC & DSNY PROJECT MANAGER.
2. EXISTING CONDUITS FEEDING EXISTING UNITS HVAC-2 TO BE REPLACED WITH NEW. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION.
3. EXISTING CONDUITS FEEDING EXISTING UNITS AND LIGHTING TO REMAIN. CONTRACTOR SHALL COORDINATE ALL ACCESS AND WORK ON GARAGE AREA WITH DDC & DSNY PROJECT MANAGERS. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.
4. EXISTING PANELS TO REMAIN. REFER TO DRAWINGS FOR ADDITIONAL INFORMATION.

20 EXIST. CONDITIONS (FACILITY No.18) CONDUIT RUNS & PULL BOX

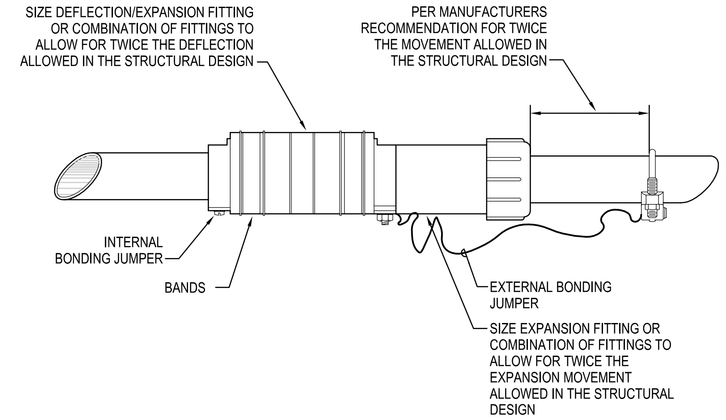
SCALE: NONE



DESCRIPTION:	ENCLOSED AND GASKETED FIBERGLASS LED FIXTURE WITH FROSTED ACRYLIC DIFFUSER, DIE CAST STEEL INTERIOR. STAINLESS STEEL LATCHES, HIGH EFFICIENCY LED, MEDIUM DISTRIBUTION.
LAMP:	LED
VOLTAGE:	MVOLT (120V-277V)
DRIVER:	0-10V HIGH EFFICIENCY DRIVER.
EMERGENCY:	PROVIDE 90 MINUTES BATTERY BACKUP FOR FIXTURES INDICATED AS EMERGENCY
MANUFACTURER:	DAY BRITE: VAPORLUME LED SERIES LITHONIA: FM LED SERIES METALUX: VAPORTITE LED SEREIS

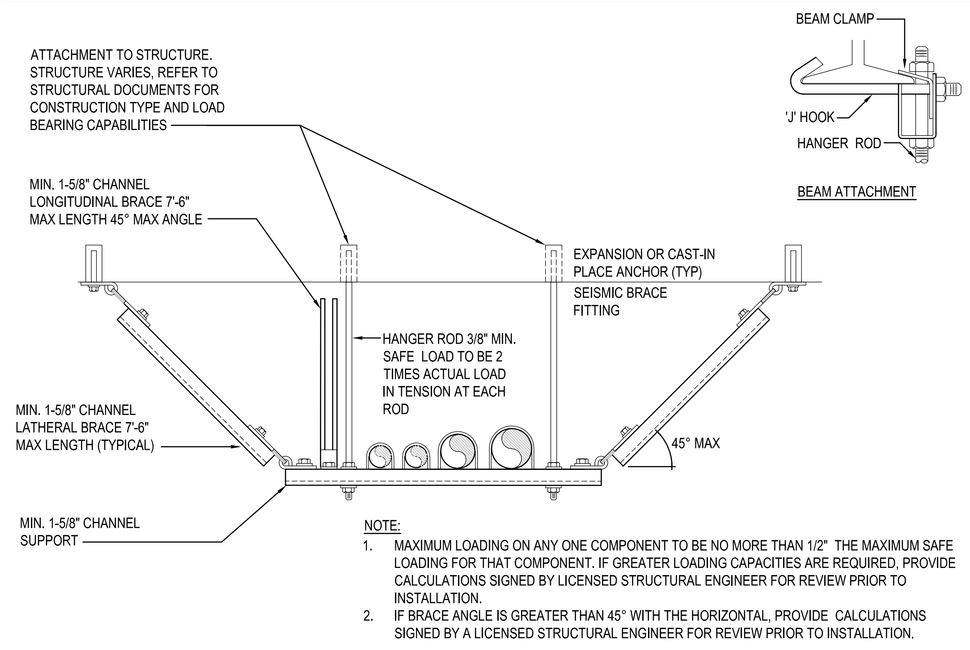
21 DUST TIGHT FIXTURE

SCALE: NONE



22 COMBINATION EXPANSION DEFLECTION FITTING

SCALE: NONE

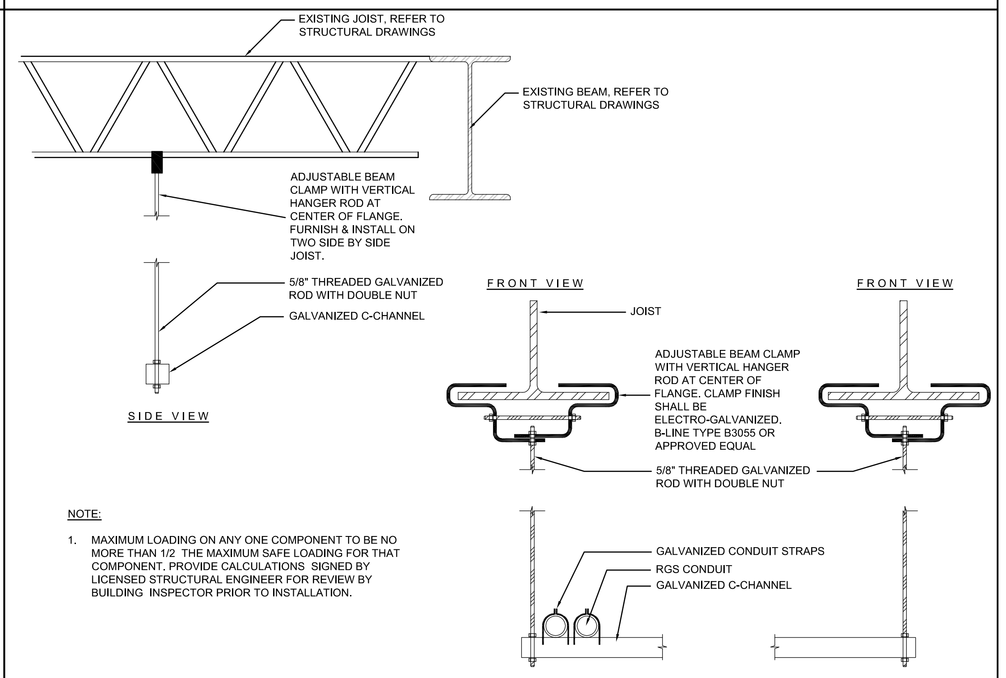


NOTE:

1. MAXIMUM LOADING ON ANY ONE COMPONENT TO BE NO MORE THAN 1/2" THE MAXIMUM SAFE LOADING FOR THAT COMPONENT. IF GREATER LOADING CAPACITIES ARE REQUIRED, PROVIDE CALCULATIONS SIGNED BY LICENSED STRUCTURAL ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
2. IF BRACE ANGLE IS GREATER THAN 45° WITH THE HORIZONTAL, PROVIDE CALCULATIONS SIGNED BY A LICENSED STRUCTURAL ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

23-A TRAPEZE CONDUIT SUPPORT

SCALE: NONE

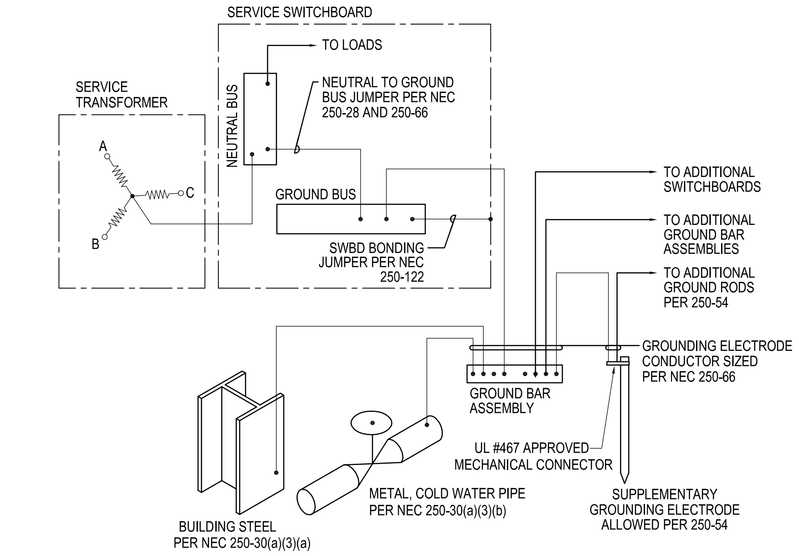


NOTE:

1. MAXIMUM LOADING ON ANY ONE COMPONENT TO BE NO MORE THAN 1/2 THE MAXIMUM SAFE LOADING FOR THAT COMPONENT, PROVIDE CALCULATIONS SIGNED BY LICENSED STRUCTURAL ENGINEER FOR REVIEW BY BUILDING INSPECTOR PRIOR TO INSTALLATION.

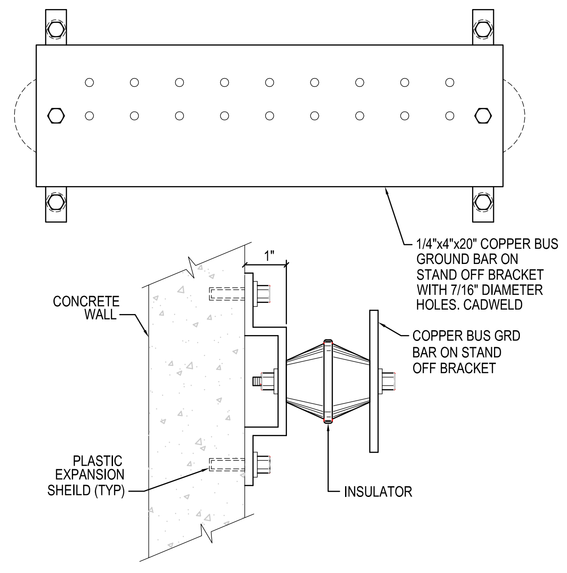
23-B CONDUIT SUPPORT FROM EXISTING JOIST

SCALE: NONE



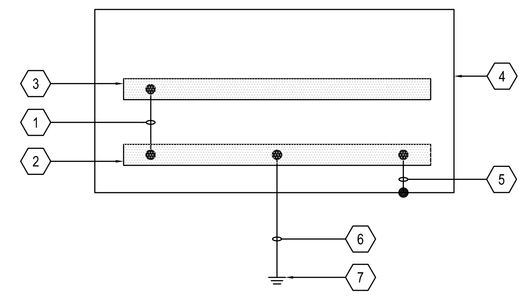
24 GROUNDING DETAIL

SCALE: NONE



25 TECHNICAL GROUND BUS MOUNTING TO CONCRETE

SCALE: NONE



NOTES:

1. MAIN BONDING JUMPER
2. EQUIPMENT GROUND BUS
3. NEUTRAL BUS
4. SERVICE EQUIPMENT ENCLOSURE
5. BOND TO ENCLOSURE
6. GROUNDING ELECTRODE CONDUCTOR
7. GROUNDING ELECTRODE SYSTEM

26 SYSTEM WITH GROUND BUS AND NEUTRAL BUS

SCALE: NONE

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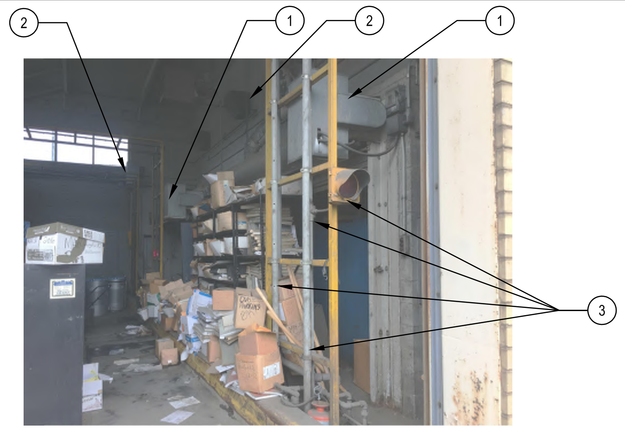
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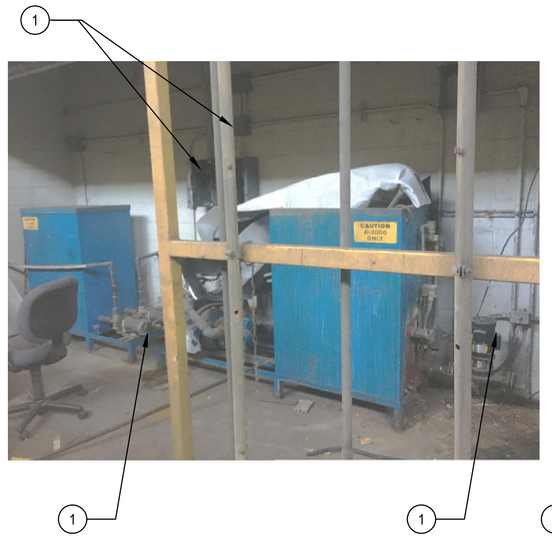


NOTES:

1. EXISTING ROLL UP DOOR POWER. CONTRACTOR TO REMOVE CONDUIT, WIRE & ALL ASSOCIATED SUPPORTS BACK TO SOURCE PANEL IN THIS ROOM. REFER TO DRAWING FOR ADDITIONAL INFORMATION.
2. EXISTING LIGHTING AND PERIMETER ROLL UP DOORS TO REMAIN
3. CONTRACTOR TO REMOVE ALL CONDUIT, SIGNAL & CONTROLS ASSOCIATED WITH THE WASH EQUIPMENT IN THIS ROOM.

27 EXIST. CONDITIONS (FACILITY No.17) TRUCK WASH AREA

SCALE: NONE



NOTES:

1. EXISTING WASH & RISER POWER CONNECTIONS. CONTRACTOR TO REMOVE CONDUIT, JUNCTION BOXES, WIRE & ALL ASSOCIATED SUPPORTS BACK TO SOURCE PANEL IN THIS ROOM. REFER TO DRAWING FOR ADDITIONAL INFORMATION.
2. CONTRACTOR TO REMOVE EXISTING STARTER WITH ALL CONDUIT AND WIRE FROM , SIGNAL & CONTROLS BACK TO POWER SOURCE IN THIS ROOM



28 EXIST. CONDITIONS (FACILITY No.17) TRUCK WASH AREA

SCALE: NONE

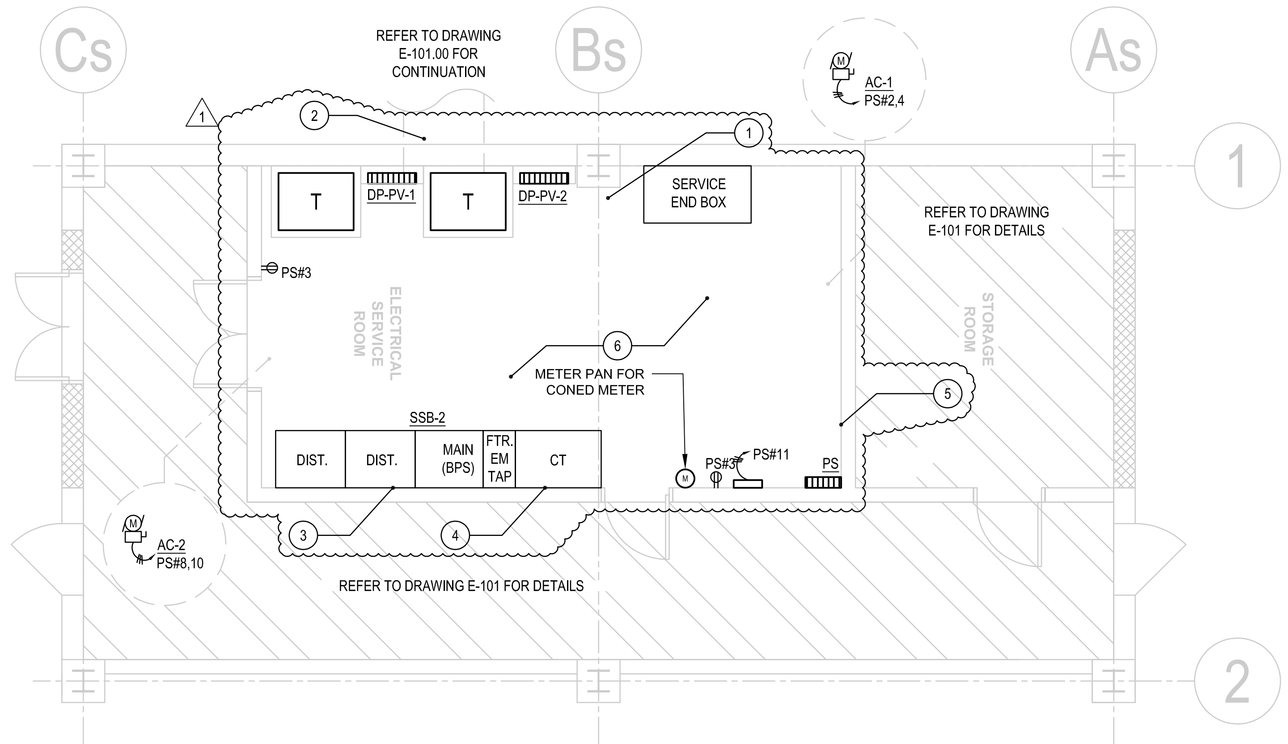


NOTES:

1. EXISTING HOT WATER GAS FIRED UNIT.CONTRACTOR TO REMOVE CONDUIT, JUNCTION BOXES, WIRE & ALL ASSOCIATED SUPPORTS BACK TO SOURCE PANEL IN THIS ROOM. REFER TO DRAWING FOR ADDITIONAL INFORMATION.

29 EXIST. CONDITIONS (FACILITY No.17) TRUCK WASH AREA

SCALE: NONE



NOTES:

1. CONTRACTOR TO PROVIDE AND INSTALL A NEW 4000AS/4000AF, 208/120V, 3Ø, 4W MAIN SERVICE SWITCHBOARD SSB-2 WITH BIDIRECTIONAL METERING, MAIN SERVICE SWITCH, SERVICE TAP AND DISTRIBUTION SECTION, AS SHOWN. CONTRACTOR SHALL COORDINATE WITH CON EDISON DISTRIBUTED GENERATION DIVISION FOR ALL METERING REQUIREMENTS.
2. CONTRACTOR TO PROVIDE CONDUCTORS IN NEW UNDERGROUND DUCT BANK FROM CONED TRANSFORMER VAULT TO SERVICE END BOX AS SHOWN.
3. 600A BUS, 500A MCB, WITH MIN (15) 40A, 3 POLE BREAKERS FOR PV INVERTERS, 480/277V DISTRIBUTION PANEL "DP-PV-1". REFER TO DRAWING E603.00 FOR WIRE AND CONDUIT SIZES.
4. 600A BUS, 500A MCB, WITH MIN (15) 40A, 3 POLE BREAKERS FOR PV INVERTERS, 480/277V DISTRIBUTION PANEL "DP-PV-2". REFER TO DRAWING E603.00 FOR WIRE AND CONDUIT SIZES.
5. PROVIDE ENERGY MONITORING SYSTEM WITH DISPLAY UNIT AS REQUIRED, COMPLETE WITH COMMUNICATION CABLE (CATEGORY 6) TO EACH INVERTER LOCATED ON THE ROOF. SYSTEM SHALL DISPLAY, AT MINIMUM, GENERATION IN KWH, VOLTAGE, AMPERAGE, POWER FACTOR AND INVERTER CAPACITY. COORDINATE ADDITIONAL REQUIREMENTS FOR INFORMATION DISPLAY WITH THE CITY OF NEW YORK.
6. PRIOR TO SUBMITTAL OF EQUIPMENT FOR APPROVAL, CONTRACTOR SHALL SUBMIT AN APPLICATION AND PAY ALL APPLICABLE FEES FOR NEW SERVICE AND DISTRIBUTED GENERATION APPROVAL AS REQUIRED BY CONSOLIDATED EDISON INCLUDING A DETAILED STUDY. CONTRACTOR SHALL SUBMIT CONED RULING AND ASSOCIATED DOCUMENTS TO THE COMMISSIONER AND THE CITY OF NEW YORK FOR FINAL APPROVAL RECORD.

30 NEW ENLARGED ELECTRICAL SERVICE ROOM & EQUIPMENT CONNECTION

SCALE: 1/4"=1'

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
-	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

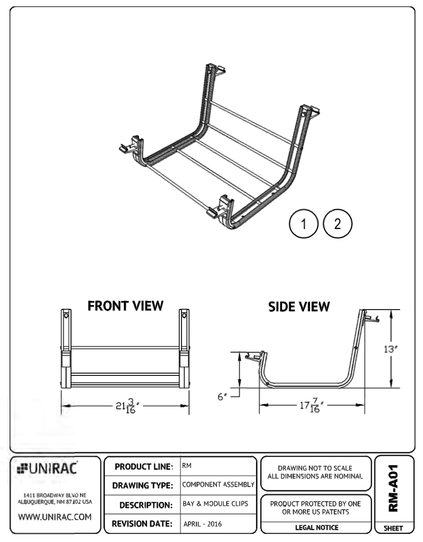
LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL DETAILS

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC33000
DRAWN BY: XX
CHECKED BY: XX
DRAWING NUMBER:
E-504.00

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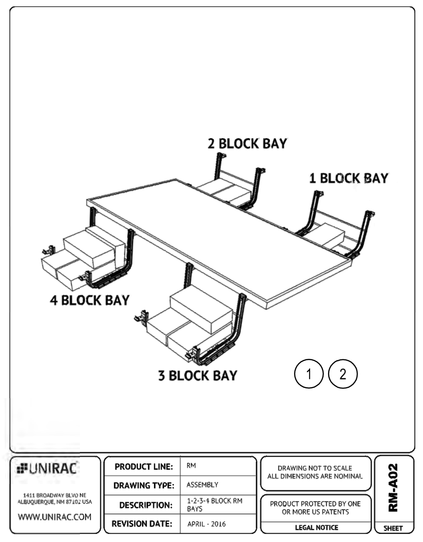


NOTES:

1. CONTRACTOR TO PROVIDE & INSTALL SOLAR PHOTOVOLTAIC PANEL SUPPORT STRUCTURE. BASIS OF DESIGN USES UNIRAC BALLASTED SUPPORT SYSTEM OR APPROVED EQUAL.
2. CONTRACTOR TO COORDINATE ALL QUANTITIES, MODEL NUMBER, MATERIALS AND INSTALLATION, MOUNTING AND SUPPORT OF PHOTOVOLTAIC PANEL ON SITE.

31 PHOTO VOLTAIC PANEL SUPPORT - BAY & MODULE CLIPS

SCALE: NONE

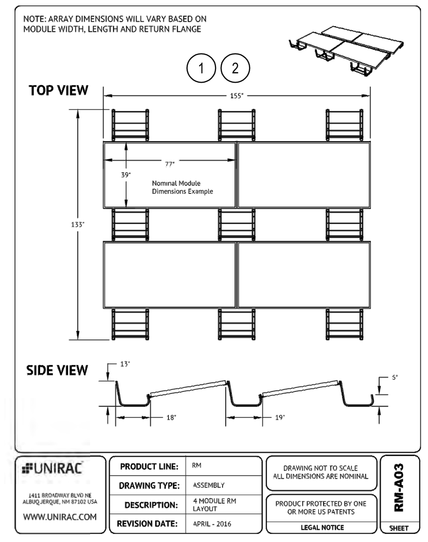


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32 PHOTO VOLTAIC PANEL SUPPORT - BLOCK RM BAYS

SCALE: NONE

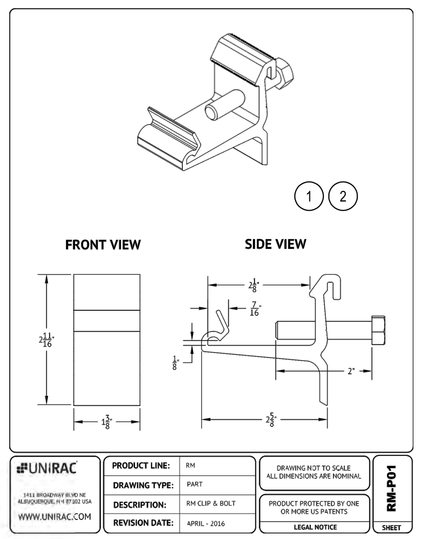


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33 PHOTO VOLTAIC PANEL SUPPORT - 4 MODULE LAYOUT

SCALE: NONE

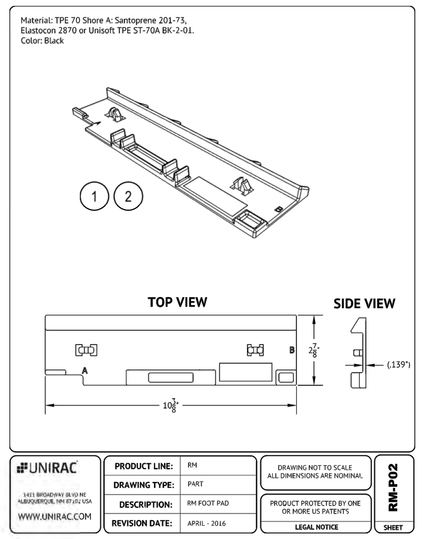


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34 PHOTO VOLTAIC PANEL SUPPORT - CLIP AND BOLT

SCALE: NONE

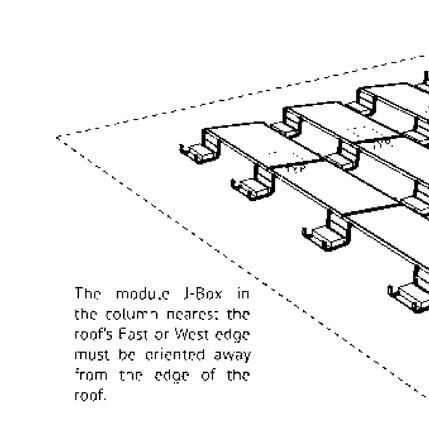


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35 PHOTO VOLTAIC PANEL SUPPORT - FOOT PAD

SCALE: NONE



NOTES:

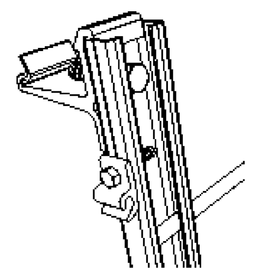
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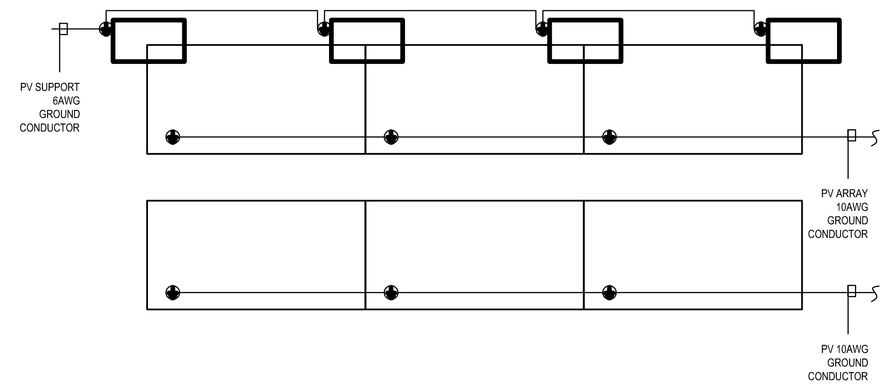
36 PHOTO VOLTAIC PANEL SUPPORT - TYPICAL LAYOUT

SCALE: NONE

NOTES:

1. BALLASTED SYSTEM BAY, PROVIDE BARE GROUND CONDUCTOR WITH ILSCO LAYIN GROUND LUG FOR 6AWG GROUND CONDUCTOR. BOND TO LIGHTNING PROTECTION GROUND.





37 PHOTO VOLTAIC PANEL GROUNDING - TYPICAL LAYOUT

SCALE: NONE

SYSKA HENNESSY GROUP
A member company of SH Group, Inc.
Syska Hennessy Group, Inc.
1515 Broadway
New York, NY 10036
Tel: 212.921.2300
Fax: 212.556.3333
www.syska.com

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A&W ARCHITECTS & ENGINEERS, P.C.
96 Morton Street, NY, New York 10014-3309

VJ ASSOCIATES
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DOB BSCAN STICKER

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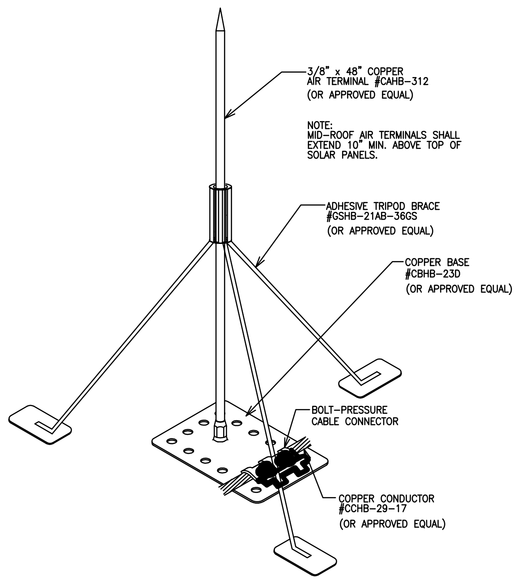
DRAWING TITLE:
ELECTRICAL DETAILS

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH FITZPATRICK · 024116 · LICENSED PROFESSIONAL ENGINEER

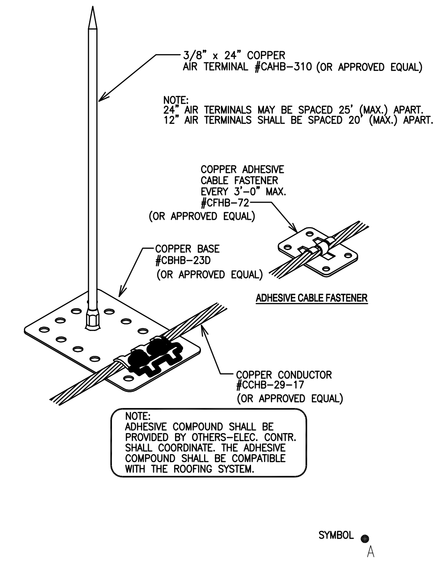
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	XX
CHECKED BY:	XX
DRAWING NUMBER:	E-505.00

Plotted: 9/27/2019 8:12:22 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\E-505.00_DDC33000.DWG - ksimpson
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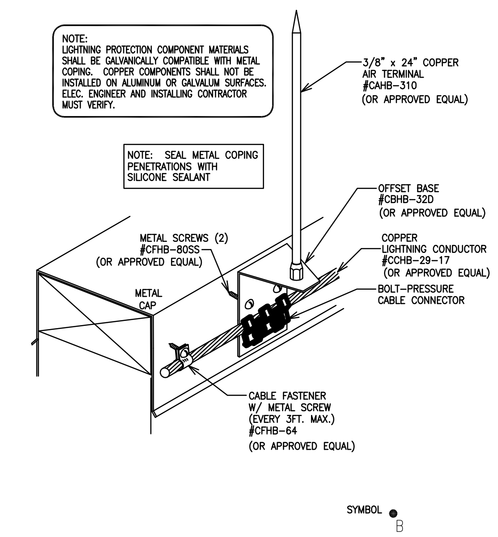
38 AIR TERMINAL AT MID-ROOF

SCALE: NONE



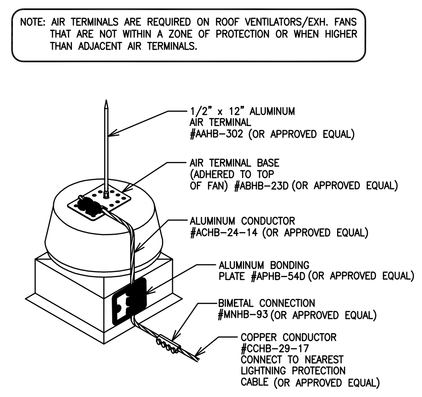
39 ADHESIVE TYPE AIR TERMINAL

SCALE: NONE



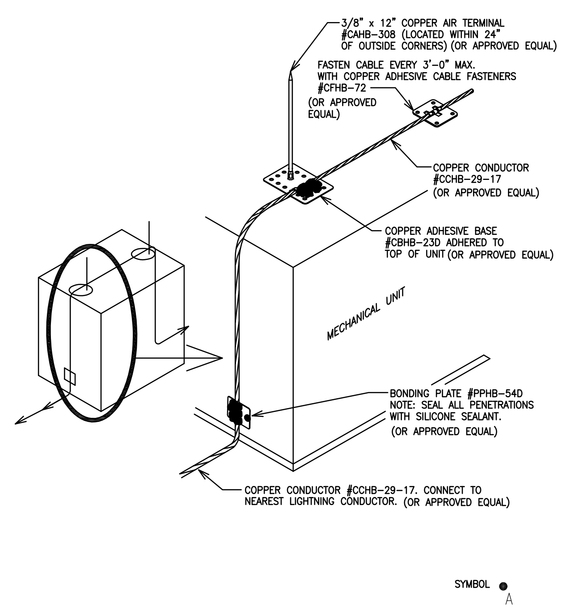
40 OFFSET AIR TERMINAL BASE

SCALE: NONE



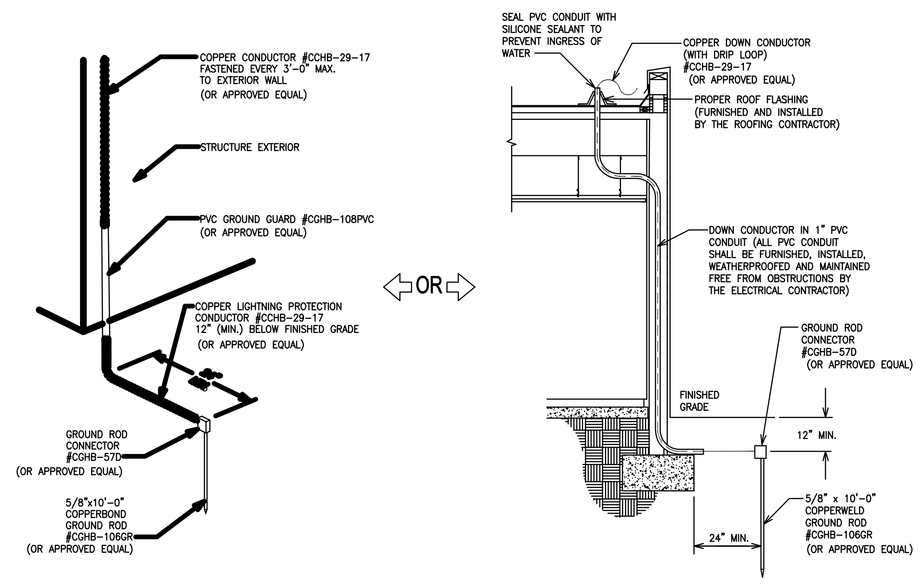
41 AIR TERMINAL AT EXH. FAN

SCALE: NONE



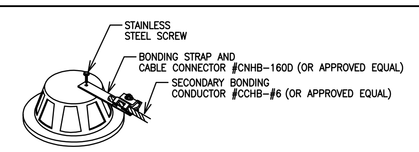
42 LIGHTNING PROTECTION AT ROOF TOP UNIT

SCALE: NONE

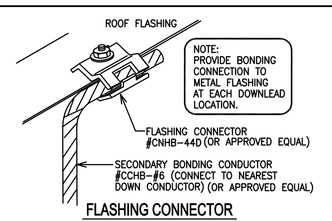


43 EXPOSED/CONCEALED LIGHTNING PROTECTION DOWN CONDUCTOR & GROUNDING

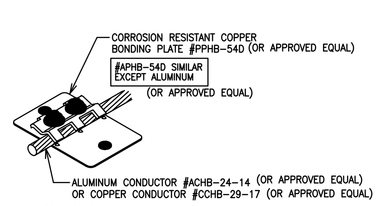
SCALE: NONE



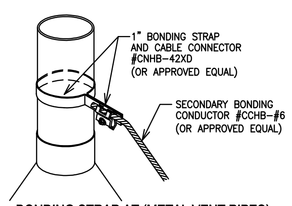
BONDING LUG (METAL ROOF DRAINS)
NTS



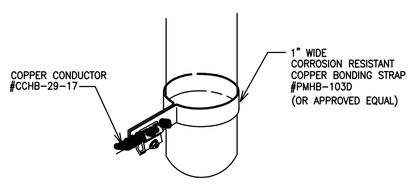
FLASHING CONNECTOR
NTS



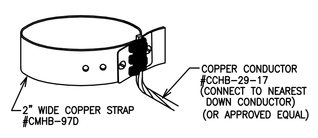
BONDING PLATE
NTS



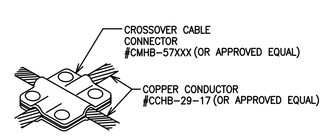
BONDING STRAP AT (METAL VENT PIPES)
NTS



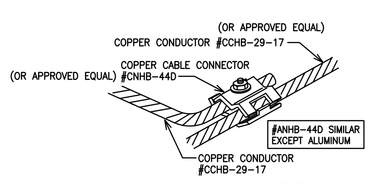
PIPE CLAMP (RAILINGS, ANTENNAS, ETC.)
NTS



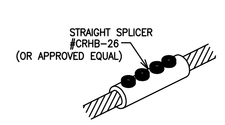
WATERLINE BONDING STRAP
NTS



CROSSOVER CABLE CONNECTOR
NTS



CABLE CONNECTOR
NTS



STRAIGHT SPLICER
NTS

44 EQUIPMENT CONNECTION DETAILS LIGHTNING PROTECTION

SCALE: NONE

LIGHTNING PROTECTION NOTES

1. ALL MATERIALS SHOWN ARE MANUFACTURED BY HEARY BROS. LIGHTNING PROTECTION CO., INC. ARE SHOWN FOR INFORMATION ONLY, ALL MODEL EQUIPMENT, MATERIAL COULD BE SUBSTITUTED AS LONG AS THEY ARE OF SIMILAR QUALITY, MATERIAL AND MEET THE REQUIREMENT OF THE SPECIFICATION.

2. THE LIGHTNING PROTECTION SYSTEM AS SHOWN ON DRAWING HAS BEEN DESIGNED IN ACCORDANCE WITH UL96A & NFPA-780 LIGHTNING PROTECTION SYSTEM STANDARDS.

3. CONDUCTORS SHALL MAINTAIN A HORIZONTAL OR DOWNWARD COURSE, FREE FROM "U" OR "V" (DOWN AND UP) POCKETS.

4. NO BEND OF CONDUCTOR SHALL FORM AN ANGLE OF LESS THAN 90° NOR SHALL HAVE A RADIUS OF BEND LESS THAN 8".

5. 24" AIR TERMINALS SHALL BE SPACED 25'-0" MAXIMUM AROUND THE ROOF PERIMETER AND/OR ALONG ROOF RIDGES. AIR TERMINALS SHALL BE LOCATED WITHIN 2'-0" OF OUTSIDE CORNERS.

6. AIR TERMINALS SHALL BE SPACED EVERY 50'-0" MAXIMUM IN CENTER ROOF AREAS.

7. ACTUAL JOBSITE CONDITIONS MAY REQUIRE SLIGHT ALTERATIONS IN AIR TERMINAL, DOWN CONDUCTOR AND GROUND ROD LOCATIONS.

8. BARE COPPER MATERIALS SHALL NOT BE INSTALLED ON ALUMINUM OR GALVALUM SURFACES, AND ALUMINUM MATERIALS SHALL NOT BE INSTALLED ON COPPER SURFACES.

9. ALL LIGHTNING PROTECTION CONDUCTORS SHALL BE FASTENED EVERY 3'-0" MAX.

10. ALL BOLTS ON BOLT-PRESSURE CONNECTORS SHALL BE TORQUED AT 150 FT-LB.

11. ALL CONNECTIONS MUST BE USED WITH UL LISTED CABLE OF SAME METAL TYPE.

12. METALLIC BODIES OF INDUCTANCE SITUATED WITHIN 6'-0" OF A LIGHTNING CONDUCTOR OR ANOTHER BONDED METAL BODY SHALL BE INTERCONNECTED TO THE LIGHTNING CONDUCTOR SYSTEM, UNLESS INHERENTLY GROUNDED.

13. BOND ALL LARGE METAL BODIES TO THE MAIN LIGHTNING PROTECTION CONDUCTOR. (I.E.; EXHAUST FANS, ROOF VENTS, METAL COOLING TOWERS, HVAC UNITS, LADDERS, RAILINGS, ANTENNAS, SKYLIGHTS, METAL STACKS AND ANY OTHER LARGE METAL BODY WHOSE HEIGHT EXCEEDS THAT OF THE AIR TERMINAL IN USE, UNLESS PROTECTED BY HIGHER ROOF ELEVATIONS).

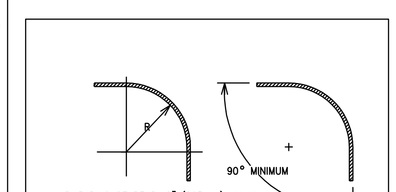
14. CONNECTIONS TO GROUND RODS SHALL BE MADE AT A POINT NOT LESS THAN 1'-0" BELOW FINISHED GRADE AND 2'-0" AWAY FROM FOUNDATION WALL.

15. BOND TO WATERLINES (DOMESTIC & FIRE).

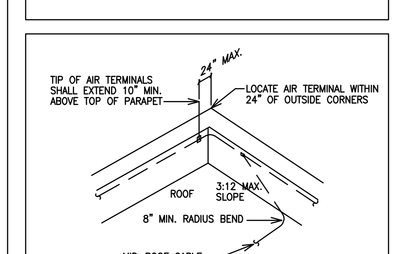
16. A LIGHTNING ARRESTOR, PROTECTOR OR ANTENNA DISCHARGE UNIT SHALL BE INSTALLED ON EACH ELECTRIC AND TELEPHONE SERVICE AND RADIO AND TELEVISION ANTENNA LEAD-IN BY THE ELECTRICAL CONTRACTOR, IN ACCORDANCE WITH NFPA-70.

17. TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) OF SERVICES SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. (I.E. COMPUTERS, COPIERS, TELEPHONE, ETC.).

18. PROVIDE UL MASTER LABEL CERTIFICATION UPON COMPLETION OF INSTALLATION.



8" MIN. RADIUS BEND IN CABLE



AIR TERMINALS SHALL BE LOCATED WITHIN 24" OF OUTSIDE CORNERS
NTS

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120 West John Street Hicksville, NY 11801
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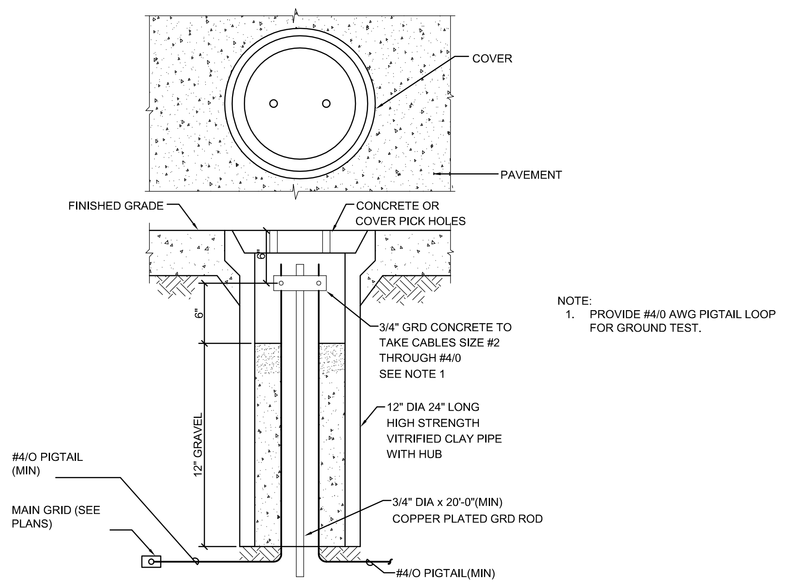
SEAL & SIGNATURE

STATE OF NEW YORK — KEITH FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	KH
CHECKED BY:	AE
DRAWING NUMBER:	E-506.00

Plotted: 9/27/2019 8:12:06 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEET\SE-506.00_DDC33000.DWG - ksimpson

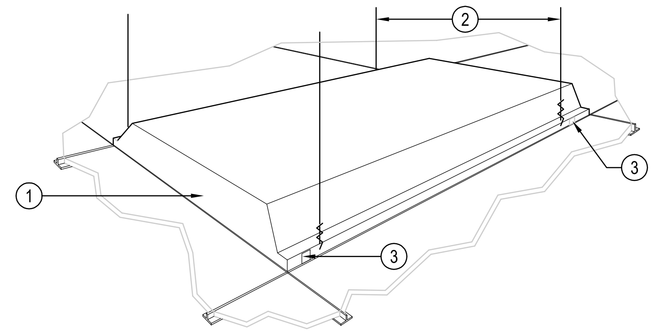
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NOTE:
1. PROVIDE #4/0 AWG PIGTAIL LOOP FOR GROUND TEST.

45 ELECTRICAL GROUND TEST WELL

SCALE: NONE



NOTES:

1. RECESSED FLUORESCENT LIGHT FIXTURE IN DEMOUNTABLE CEILING.
2. PROVIDE TWO(2) TEN GAUGE STEEL SUPPORT WIRES ON DIAGONAL CORNERS OR (4) TWELVE GAUGE AT FOUR CORNERS TIED TO BUILDING STRUCTURE INDEPENDENTLY OF CEILING SUPPORTS. ALLOW 1/4" SLACK IN WIRE.
3. PROVIDE FOUR(4) CLIPS ATTACHED TO FIXTURES TO POSITIVELY TIE FIXTURE TO T-BAR CEILING CHANNEL SUSPENSION.

46 LAY-IN LIGHTING FIXTURE INSTALLATION

SCALE: NONE

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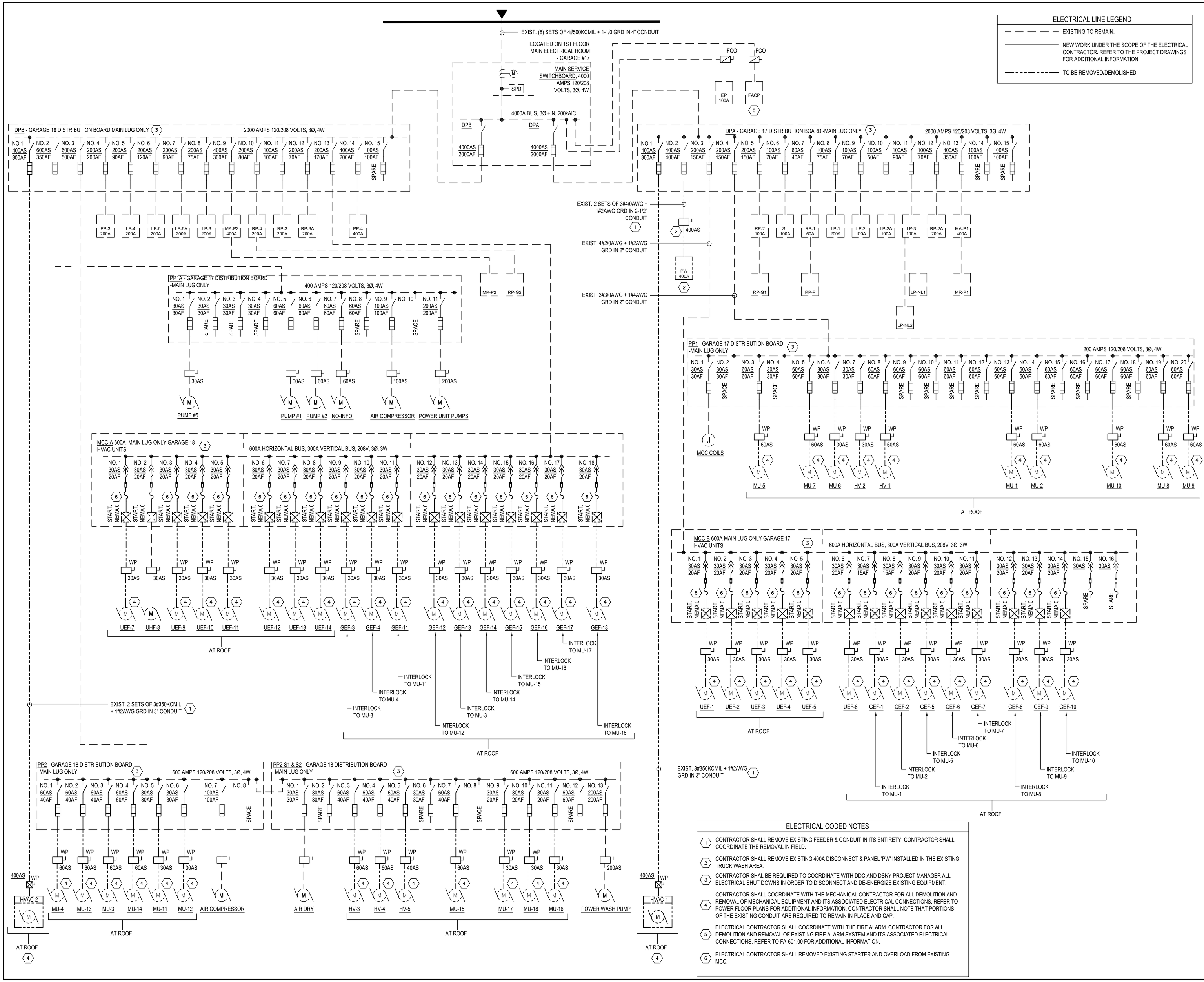
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SEAL & SIGNATURE
STATE OF NEW YORK · SETH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

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DRAWN BY: SHG
CHECKED BY: SHG
DRAWING NUMBER:
E-507.00

Plotted: 9/27/2019 8:11:57 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\E-507.00-DDC33000.DWG - khasan
ref \\nyo-srv-fs1.syska.net\SHG\nyo\mep_e\npp\ddc33000\Drawings\Elements\TB-36X48.dwg



ELECTRICAL CODED NOTES

1. CONTRACTOR SHALL REMOVE EXISTING FEEDER & CONDUIT IN ITS ENTIRETY. CONTRACTOR SHALL COORDINATE THE REMOVAL IN FIELD.
2. CONTRACTOR SHALL REMOVE EXISTING 400A DISCONNECT & PANEL 'PW' INSTALLED IN THE EXISTING TRUCK WASH AREA.
3. CONTRACTOR SHAL BE REQUIRED TO COORDINATE WITH DDC AND DSNY PROJECT MANAGER ALL ELECTRICAL SHUT DOWNS IN ORDER TO DISCONNECT AND DE-ENERGIZE EXISTING EQUIPMENT.
4. CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR ALL DEMOLITION AND REMOVAL OF MECHANICAL EQUIPMENT AND ITS ASSOCIATED ELECTRICAL CONNECTIONS. REFER TO POWER FLOOR PLANS FOR ADDITIONAL INFORMATION. CONTRACTOR SHALL NOTE THAT PORTIONS OF THE EXISTING CONDUIT ARE REQUIRED TO REMAIN IN PLACE AND CAP.
5. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE FIRE ALARM CONTRACTOR FOR ALL DEMOLITION AND REMOVAL OF EXISTING FIRE ALARM SYSTEM AND ITS ASSOCIATED ELECTRICAL CONNECTIONS. REFER TO FA-601.00 FOR ADDITIONAL INFORMATION.
6. ELECTRICAL CONTRACTOR SHALL REMOVED EXISTING STARTER AND OVERLOAD FROM EXISTING MCC.

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www.hiranigroup.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

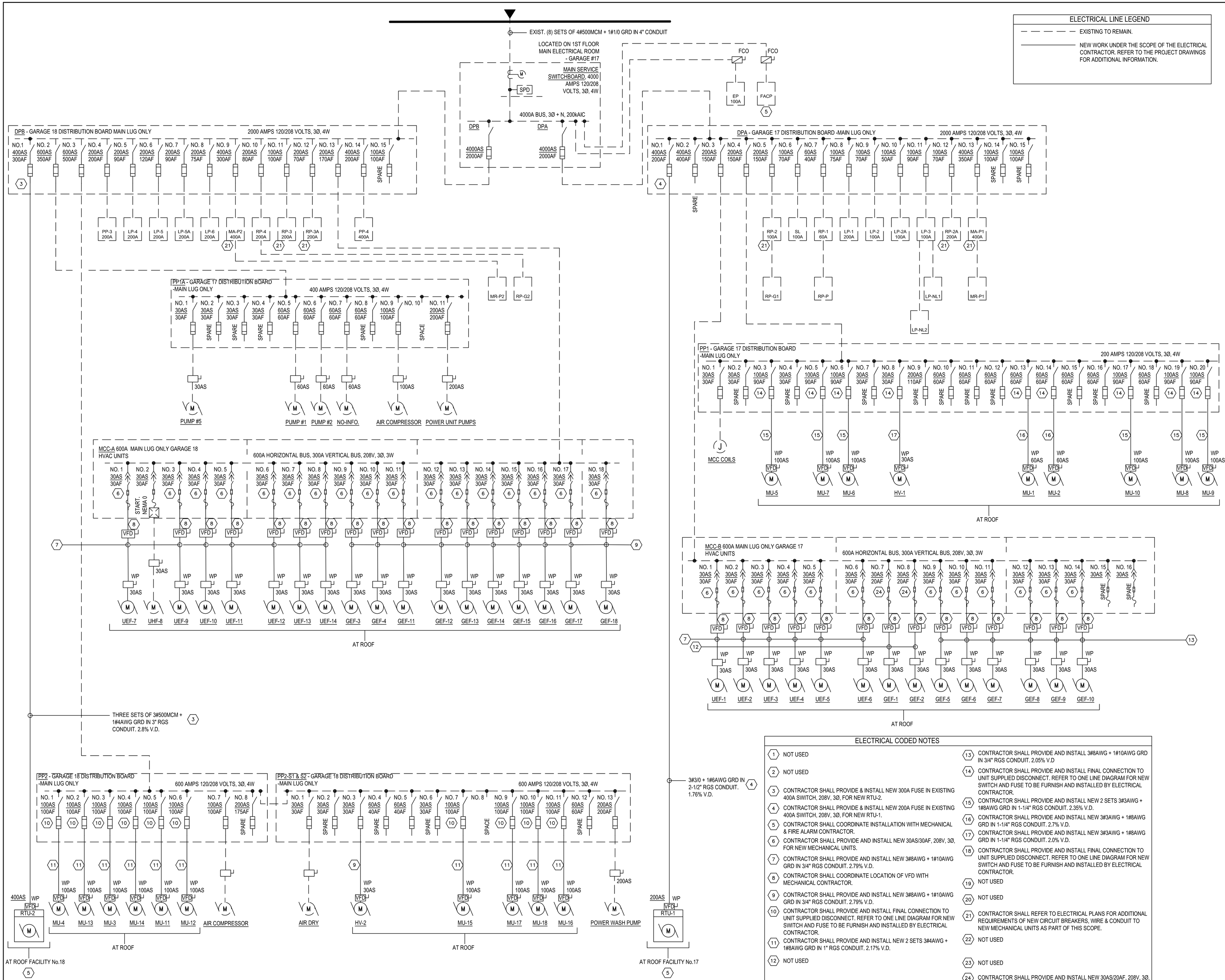
LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL ONE LINE DIAGRAM - DEMOLITION

SEAL & SIGNATURE
STATE OF NEW YORK · 024116 · REGISTERED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	E-601.00

Plotted: 9/27/2019 8:11:42 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\E-601.00_DDC33000.DWG - khassan



ELECTRICAL LINE LEGEND

- EXISTING TO REMAIN.
- NEW WORK UNDER THE SCOPE OF THE ELECTRICAL CONTRACTOR. REFER TO THE PROJECT DRAWINGS FOR ADDITIONAL INFORMATION.

ELECTRICAL CODED NOTES

1. NOT USED
2. NOT USED
3. CONTRACTOR SHALL PROVIDE & INSTALL NEW 300A FUSE IN EXISTING 400A SWITCH, 208V, 3Ø, FOR NEW RTU-2.
4. CONTRACTOR SHALL PROVIDE & INSTALL NEW 200A FUSE IN EXISTING 400A SWITCH, 208V, 3Ø, FOR NEW RTU-1.
5. CONTRACTOR SHALL COORDINATE INSTALLATION WITH MECHANICAL & FIRE ALARM CONTRACTOR.
6. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 30AS/30AF, 208V, 3Ø, FOR NEW MECHANICAL UNITS.
7. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 3#8AWG + 1#10AWG GRD IN 3/4" RGS CONDUIT. 2.79% V.D.
8. CONTRACTOR SHALL COORDINATE LOCATION OF VFD WITH MECHANICAL CONTRACTOR.
9. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 3#8AWG + 1#10AWG GRD IN 3/4" RGS CONDUIT. 2.79% V.D.
10. CONTRACTOR SHALL PROVIDE AND INSTALL FINAL CONNECTION TO UNIT SUPPLIED DISCONNECT. REFER TO ONE LINE DIAGRAM FOR NEW SWITCH AND FUSE TO BE FURNISH AND INSTALLED BY ELECTRICAL CONTRACTOR.
11. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 2 SETS 3#4AWG + 1#8AWG GRD IN 1" RGS CONDUIT. 2.17% V.D.
12. NOT USED
13. CONTRACTOR SHALL PROVIDE AND INSTALL 3#8AWG + 1#10AWG GRD IN 3/4" RGS CONDUIT. 2.05% V.D
14. CONTRACTOR SHALL PROVIDE AND INSTALL FINAL CONNECTION TO UNIT SUPPLIED DISCONNECT. REFER TO ONE LINE DIAGRAM FOR NEW SWITCH AND FUSE TO BE FURNISH AND INSTALLED BY ELECTRICAL CONTRACTOR.
15. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 2 SETS 3#3AWG + 1#8AWG GRD IN 1-1/4" RGS CONDUIT. 2.35% V.D.
16. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 3#3AWG + 1#8AWG GRD IN 1-1/4" RGS CONDUIT. 2.7% V.D.
17. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 3#3AWG + 1#8AWG GRD IN 1-1/4" RGS CONDUIT. 2.0% V.D.
18. CONTRACTOR SHALL PROVIDE AND INSTALL FINAL CONNECTION TO UNIT SUPPLIED DISCONNECT. REFER TO ONE LINE DIAGRAM FOR NEW SWITCH AND FUSE TO BE FURNISH AND INSTALLED BY ELECTRICAL CONTRACTOR.
19. NOT USED
20. NOT USED
21. CONTRACTOR SHALL REFER TO ELECTRICAL PLANS FOR ADDITIONAL REQUIREMENTS OF NEW CIRCUIT BREAKERS, WIRE & CONDUIT TO NEW MECHANICAL UNITS AS PART OF THIS SCOPE.
22. NOT USED
23. NOT USED
24. CONTRACTOR SHALL PROVIDE AND INSTALL NEW 30AS/20AF, 208V, 3Ø, FOR NEW MECHANICAL UNITS.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

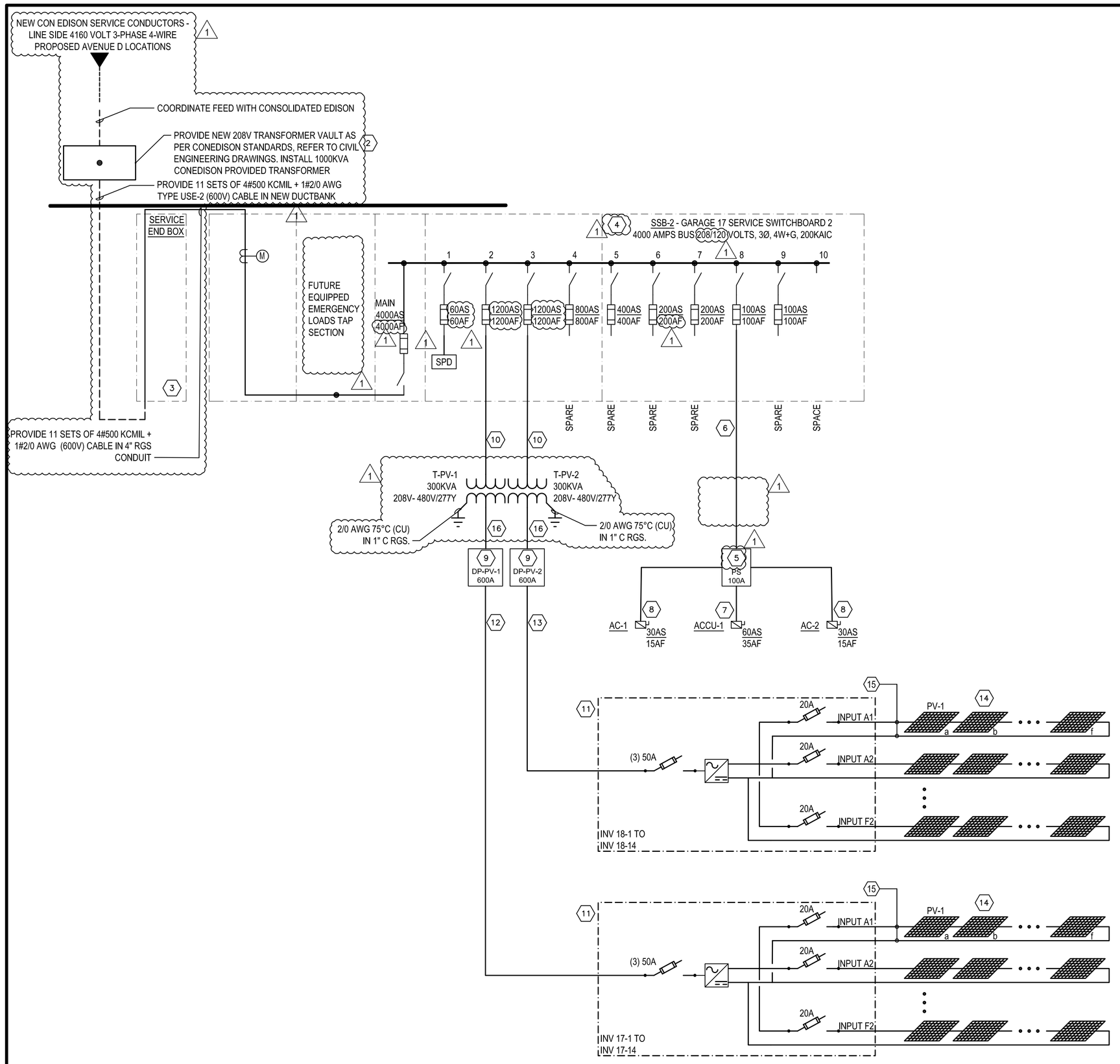
DRAWING TITLE:
ELECTRICAL ONE LINE DIAGRAM - INSTALLATION

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTMANN · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	KH
CHECKED BY:	AE
DRAWING NUMBER:	E-602.00

Plotted: 9/27/2019 8:11:11 AM P:\NYC\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\E-602.00_DDC33000.DWG - khasan



PANEL NAME: DP-PV-1				Bus Type: Cu	PANEL VOLTAGE: 480/277V		AIC: 65KAIC	
					PHASE & WIRE: 3PH,4W		FED FROM: SSB-2	
TYPE: NEMA 1		Location/Room #:		NEW/EXISTING: NEW	BUS: 600		FED FROM AMPS: 600	
MOUNTING: SURFACE		Electrical Service RM		BRANCH: NORMAL	MAINS: 500		LUGS: MCB	

CIRCUIT NO	CODE	BREAKER TRIP	POLE	LOAD TYPE & DESCRIPTION	NOTE	REC	LOAD (VA)	PHASES (VA) A	B	C	LOAD (VA)	REC	NOTE	LOAD TYPE & DESCRIPTION	BREAKER POLE	TRIP	CIRCUIT CODE	NO
1	1	50	3	INV-17-1			7800	15600			7800			INV-17-8	3	50	1	2
3	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	4
5	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	6
7	1	50	3	INV-17-2			7800	15600			7800			INV-17-9	3	50	1	8
9	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	10
11	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	12
13	1	50	3	INV-17-3			7800	15600			7800			INV-17-10	3	50	1	14
15	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	16
17	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	18
19	1	50	3	INV-17-4			7800	15600			7800			INV-17-11	3	50	1	20
21	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	22
23	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	24
25	1	50	3	INV-17-5			7800	15600			7800			INV-17-12	3	50	1	26
27	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	28
29	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	30
31	1	50	3	INV-17-6			7800	15600			7800			INV-17-13	3	50	1	32
33	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	34
35	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	36
37	1	50	3	INV-17-7			7800	15600			7800			INV-17-14	3	50	1	38
39	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	40
41	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	42
43		50	3	SPARE				0						SPARE	3	50		44
45		-	-	with circuit above	-	-			0			-	-	with circuit above	-	-		46
47		-	-	with circuit above	-	-				0		-	-	with circuit above	-	-		48
49		50	3	SPARE				0						SPARE	3	50		50
51		-	-	with circuit above	-	-			0			-	-	with circuit above	-	-		52
53		-	-	with circuit above	-	-				0		-	-	with circuit above	-	-		54
55		20	1	SPARE				0						SPARE	1	20		56
57		20	1	SPARE					0					SPARE	1	20		58
59		20	1	SPARE						0				SPARE	1	20		60

NOTES:										
			CONN. VA	109200	109200	109200	CONNECTED KVA	327.6	L1A	SUM
	DEMAND	VA	136500	136500	136500	CONT (CODE 1)	409.5	0.0	410
		AMPS	493	493	493	N-CONT (CODE 2):	0.0	0.0	0
						RECEP (CODE 3):	0.0	0.0	0
						KITCH (CODE 4):	0.0	0.0	0
						# OF KITCHEN EQ:	0.0		
JOB: DDC33000						PANEL DEMAND KVA :			410
BY: SHG						(MINIMUM PANEL SIZE) DEMAND AMPS :			493
ISSUE DATE:						MINIMUM X'FMR. KVA SIZE :			307

PANEL NAME: DP-PV-2				Bus Type: Cu	PANEL VOLTAGE: 480/277V		AIC: 65KAIC	
					PHASE & WIRE: 3PH,4W		FED FROM: SSB-2	
TYPE: NEMA 1		Location/Room #:		NEW/EXISTING: NEW	BUS: 600		FED FROM AMPS: 600	
MOUNTING: SURFACE		Electrical Service RM		BRANCH: NORMAL	MAINS: 500		LUGS: MCB	

CIRCUIT NO	CODE	BREAKER TRIP	POLE	LOAD TYPE & DESCRIPTION	NOTE	REC	LOAD (VA)	PHASES (VA) A	B	C	LOAD (VA)	REC	NOTE	LOAD TYPE & DESCRIPTION	BREAKER POLE	TRIP	CIRCUIT CODE	NO
1	1	50	3	INV-18-1			7800	15600			7800			INV-18-8	3	50	1	2
3	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	4
5	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	6
7	1	50	3	INV-18-2			7800	15600			7800			INV-18-9	3	50	1	8
9	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	10
11	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	12
13	1	50	3	INV-18-3			7800	15600			7800			INV-18-10	3	50	1	14
15	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	16
17	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	18
19	1	50	3	INV-18-4			7800	15600			7800			INV-18-11	3	50	1	20
21	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	22
23	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	24
25	1	50	3	INV-18-5			7800	15600			7800			INV-18-12	3	50	1	26
27	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	28
29	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	30
31	1	50	3	INV-18-6			7800	15600			7800			INV-18-13	3	50	1	32
33	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	34
35	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	36
37	1	50	3	INV-18-7			7800	15600			7800			INV-18-14	3	50	1	38
39	1	-	-	with circuit above	-	-	7800		15600		7800	-	-	with circuit above	-	-	1	40
41	1	-	-	with circuit above	-	-	7800			15600	7800	-	-	with circuit above	-	-	1	42
43		50	3	SPARE				0						SPARE	3	50		44
45		-	-	with circuit above	-	-			0			-	-	with circuit above	-	-		46
47		-	-	with circuit above	-	-				0		-	-	with circuit above	-	-		48
49		50	3	SPARE				0						SPARE	3	50		50
51		-	-	with circuit above	-	-			0			-	-	with circuit above	-	-		52
53		-	-	with circuit above	-	-				0		-	-	with circuit above	-	-		54
55		20	1	SPARE				0						SPARE	1	20		56
57		20	1	SPARE					0					SPARE	1	20		58
59		20	1	SPARE						0				SPARE	1	20		60

NOTES:										
			CONN. VA	109200	109200	109200	CONNECTED KVA	327.6	L1A	SUM
	DEMAND	VA	136500	136500	136500	CONT (CODE 1)	409.5	0.0	410
		AMPS	493	493	493	N-CONT (CODE 2):	0.0	0.0	0
						RECEP (CODE 3):	0.0	0.0	0
						KITCH (CODE 4):	0.0	0.0	0
						# OF KITCHEN EQ:	0.0		
JOB: DDC33000						PANEL DEMAND KVA :			410
BY: SHG						(MINIMUM PANEL SIZE) DEMAND AMPS :			493
ISSUE DATE:						MINIMUM X'FMR. KVA SIZE :			307

PANEL NAME: PS				Bus Type: Cu	PANEL VOLTAGE: 208/120V		AIC: 65kAIC	
					PHASE & WIRE: 3PH,4W		FED FROM: SSB-2	
TYPE: NEMA 1		Location/Room #:		NEW/EXISTING: NEW	BUS: 100		FED FROM AMPS: 100	
MOUNTING: SURFACE		Electrical Service RM		BRANCH: NORMAL	MAINS: 100		LUGS: MCB	

CIRCUIT NO	CODE	BREAKER TRIP	POLE	LOAD TYPE & DESCRIPTION	NOTE	REC	LOAD (VA)	PHASES (VA) A	B	C	LOAD (VA)	REC	NOTE	LOAD TYPE & DESCRIPTION	BREAKER POLE	TRIP	CIRCUIT CODE	NO
1	1	20	1	UH-1			250	300			50			AC-1	2	15	2	2
3	3	20	1	RECPT (STOR. & ELEC RM)	-	-	540		540			-	-	with circuit above	-	-	2	4
5	3	20	1	RECPT (CORR.)	-	-	540			540		-	-	SPARE	1	20		6
7	1	20	1	LIGHTS (ELEC RM)			100	150			50			AC-2	2	15	2	8
9	1	20	1	LIGHTS (STOR RM)	-	-	150		150			-	-	with circuit above	-	-	2	10
11	1	20	1	ENERGY MONITOR SYS.	-	-	150			150				SPARE	1	20		12
13		20	1	SPARE				2750			2750	-	-	ACCU-1	3	35	1	14
15		20	1	SPARE	-	-			2750		2750	-	-	with circuit above	-	-	1	16
17		20	1	SPARE	-	-				2750	2750	-	-	with circuit above	-	-	1	18
19		20	1	SPARE			0							SPARE	1	20		20
21		20	1	SPARE	-	-		0						SPARE	1	20		22
23		20	1	SPARE	-	-			0					SPARE	1	20		24
25		20	1	SPARE			0							SPARE	1	20		26
27		20	1	SPARE	-	-		0						SPARE	1	20		28
29		20	1	SPARE	-	-			0					SPARE	1	20		30
31		20	1	SPARE			0							SPARE	1	20		32
33		20	1	SPARE	-	-		0						SPARE	1	20		34
35		20	1	SPARE	-	-			0					SPARE	1	20		36
37		20	1	SPARE			0							SPARE	1	20		38
39		20	1	SPARE	-	-		0						SPARE	1	20		40
41		20	1	SPARE	-	-			0					SPARE	1	20		42

NOTES:										
			CONN. VA	3200	3440	3440	CONNECTED KVA	10.1	L1A	SUM
	DEMAND	VA	3975	4165	4165	CONT (CODE 1)	11.1	0.0	11
		AMPS	33	35	35	N-CONT (CODE 2):	0.1	0.0	0
						RECEP (CODE 3):	1.1	0.0	1
						KITCH (CODE 4):	0.0	0.0	0
						# OF KITCHEN EQ:	0.0		
JOB: DDC33000						PANEL DEMAND KVA :			12
BY: SHG						(MINIMUM PANEL SIZE) DEMAND AMPS :			34
ISSUE DATE:						MINIMUM X'FMR. KVA SIZE :			10

ELECTRICAL CODED NOTES (#)

1. NOT USED
2. CONTRACTOR TO COORDINATE LOCATION OF TRANSFORMER VAULT WITH CONED AS SHOWN ON CIVIL DRAWINGS. CONTRACTOR SHALL PROVIDE WIRING AND DUCKBANK INFRASTRUCTURE FROM TRANSFORMER VAULT TO SERVICE ENTRY BOX (SEB) AS SHOWN ON DETAIL 30 ON E-504.
3. CONTRACTOR TO PROVIDE SERVICE END BOX BUILD TO CONED STANDARDS WITH PROVISION FOR 12 LIMITER LUGS PER PHASE AND NEUTRAL, BOTTOM ENTRY AND TOP EXIT, BOX MOUNTED ON FLOOR WITH CONDUIT STUB-UPS FROM BELOW. PROVIDE CROWN BOX TO FACILITATE INSTALLATION OF FEEDERS FROM SEB TO SSB-2.
4. CONTRACTOR TO PROVIDE NEW SERVICE SWITCHBOARD 2 (SSB-2) AS SHOWN, COMPLETE WITH METERING AND INSTRUMENTATION SECTION AS SPECIFIED BY CONED SPEC 377. PROVIDE MAIN SERVICE DISCONNECT AND DISTRIBUTION SECTION AS SHOWN, PROVIDE INTEGRATED SURGE PROTECTIVE DEVICE PER SPECIFICATION 26 24 13. METERING EQUIPMENT AND DEVICES SHALL BE PROVIDED BY CONED AND INSTALLED BY THE CONTRACTOR.
5. CONTRACTOR TO PROVIDE AND INSTALL NEW 100A MCB, 120/208V, 3Ø, 42 POLE PANEL 'PS'.
6. CONTRACTOR TO PROVIDE AND INSTALL 4#2AWG + 1#8AWG GRD IN 1-1/2" RGS CONDUIT.
7. CONTRACTOR TO PROVIDE AND INSTALL 3#10AWG + 1#10AWG GRD IN 3/4" RGS CONDUIT. 2.06% V.D.
8. CONTRACTOR TO PROVIDE AND INSTALL NEW 2#10AWG + 1#10AWG GRD IN 3/4" RGS CONDUIT. 0.5% V.D.
9. CONTRACTOR TO PROVIDE AND INSTALL (1) 600A BUS, 500A MCB PANELBOARD.
10. CONTRACTOR TO PROVIDE 4 SETS OF 3 #500 KCMIL + 1 #2/0 AWG GROUND, 75°C (CU) IN 3-1/2" RGS CONDUIT.
11. CONTRACTOR TO PROVIDE AND INSTALL 33 KW SMA SUNNY TRI-POWER CORE1 INVERTER WITH OVERCURRENT PROTECTION AND ASSOCIATED CONTROLS (TOTAL OF 28). PROVIDE SHIELDED CATEGORY 6 CABLE IN 3/4" TO INTERCONNECT ALL INVERTERS TO CONTROL CENTER IN ELECTRICAL ROOM. PROVIDE OVERCURRENT AC AND DC CURRENT LIMITING FUSES AS SPECIFIED BY THE MANUFACTURER.
12. CONTRACTOR TO PROVIDE 3 #2 AWG + 1 #8 AWG GROUND, 75°C (CU) IN 1 -1/2" RGS CONDUIT. 1.5% V.D.
13. CONTRACTOR TO PROVIDE 3 #2/0 AWG + 1 #6 AWG GROUND, 75°C (CU) IN 2" RGS CONDUIT. 1.5% V.D.
14. CONTRACTOR TO PROVIDE AND INSTALL PHOTOVOLTAIC PANELS AS SHOWN MODEL: SPR-435NE-WHT-D OR APPROVED EQUAL.
15. CONTRACTOR TO PROVIDE 2#12AWG + 1#12AWG GRD, 75°C (CU) IN 3/4" RGS CONDUIT. PROVIDE MANUFACTURER REQUIRED CONNECTOR AS REQUIRED.
16. CONTRACTOR TO PROVIDE 2 SETS OF 4 #300 KCMIL + 1 #1 AWG GROUND, 75°C (CU) IN 3-1/2" .

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
-	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL ONE LINE DIAGRAM AND PANEL SCHEDULES - NEW SERVICE ROOM

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC33000
DRAWN BY: KH
CHECKED BY: AE
DRAWING NUMBER:
E-603.00

Plotted: 8/30/2021 1:52:49 PM P:\NYC\MEP_EN\PP\DDC33000\DRAWINGS\SHEETS\E-603.00_DDC33000.DWG - aengelman

1 - 3/4"	QUANTITY - SIZE OF CONDUIT
2 - 30A	FEEDER AMPACITY (SEE FEEDER SCHEDULE)
5	SETS OF CONDUCTORS

ELECTRICAL LINE LEGEND

- NEW EQUIPMENT / DEVICES. REFER TO THE PROJECT DRAWINGS FOR ADDITIONAL INFORMATION.
- A.C PHASE ØA LINE / CONNECTION
- A.C PHASE ØB LINE / CONNECTION
- A.C PHASE ØC LINE / CONNECTION
- GROUND LINE / CONNECTION
- NEUTRAL LINE / CONNECTION
- D.C LINE POSITIVE / CONNECTION
- D.C LINE NEGATIVE / CONNECTION

PROTECTION RELAYS

PROTECTIVE RELAYS SHALL BE INTEGRAL TO THE INVERTER AND SHALL BE PROVIDED PER REQUIREMENTS OF UL 1741, UL 1741SA AND IEEE 1547.

33KW INVERTER 'INV-17-1' TO 'INV-17-14' PV. STRING CALC.

PANEL SPECS:
P = 435 WATTS
Voc = 85.6 VOLTS
Vmp = 72.9 VOLTS
Isc = 6.43 AMPS
Imp = 5.97 AMPS

INVERTER SPECS:
QUANTITY = 14
MAX POWER = 33 KW
DC INPUT VOLTAGE = 600 VOLTS

PV PANELS / STRING SPECS:
P = 2.610 KW
Voc = 564.3 VOLTS @ MIN. TEMP
Vmp = 376.3 VOLTS @ MAX. TEMP
Isc = 6.43 AMPS
Imp = 5.97 AMPS

ARRAY SPECS:
PV MODULES PER ARRAY = 6
TOTAL PV MODULES = 846

P = 373.2 KW
Voc = 564.3 VOLTS @ MIN. TEMP
Vmp = 376.3 VOLTS @ MAX. TEMP
PV ARRAY DC POWER / INVERTER AC POWER OUTPUT = 1.00

33KW INVERTER 'INV-18-1' TO 'INV-18-14' PV. STRING CALC.

PANEL SPECS:
P = 435 WATTS
Voc = 85.6 VOLTS
Vmp = 72.9 VOLTS
Isc = 6.43 AMPS
Imp = 5.97 AMPS

INVERTER SPECS:
QUANTITY = 14
MAX POWER = 33 KW
DC INPUT VOLTAGE = 600 VOLTS

PV PANELS / STRING SPECS:
P = 2.610 KW
VOC = 564.3 VOLTS @ MIN. TEMP
VMP = 376.3 VOLTS @ MAX. TEMP
ISC = 6.43 AMPS
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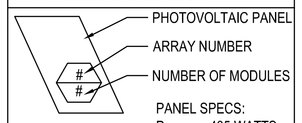
ARRAY SPECS:
PV MODULES PER ARRAY = 6
TOTAL PV MODULES = 846

P = 373.2 KW
Voc = 564.3 VOLTS @ MIN. TEMP
Vmp = 376.3 VOLTS @ MAX. TEMP
PV ARRAY DC POWER / INVERTER AC POWER OUTPUT = 1.00

PV FEEDER SCHEDULE

AMP	CONDUCTORS
25A	2#12AWG + 1#12AWG GRD, 75°C (CU)
35A	2#10AWG + 1#10AWG GRD, 75°C (CU)
115A	3#2AWG + 1#6AWG GRD, 75°C (CU)
175A	3#2/0AWG + 1#6AWG GRD, 75°C (CU)
800A	2 SETS 3#350MCM + 1#1AWG GRD, 75°C (CU)
3000A	8 SETS 4#500MCM + 1#500MCM GRD, 75°C (CU)

PV PANEL INFORMATION



PANEL SPECS:
P = 435 WATTS
Voc = 85.6 VOLTS
Vmp = 72.9 VOLTS
Isc = 6.43 AMPS
Imp = 5.97 AMPS

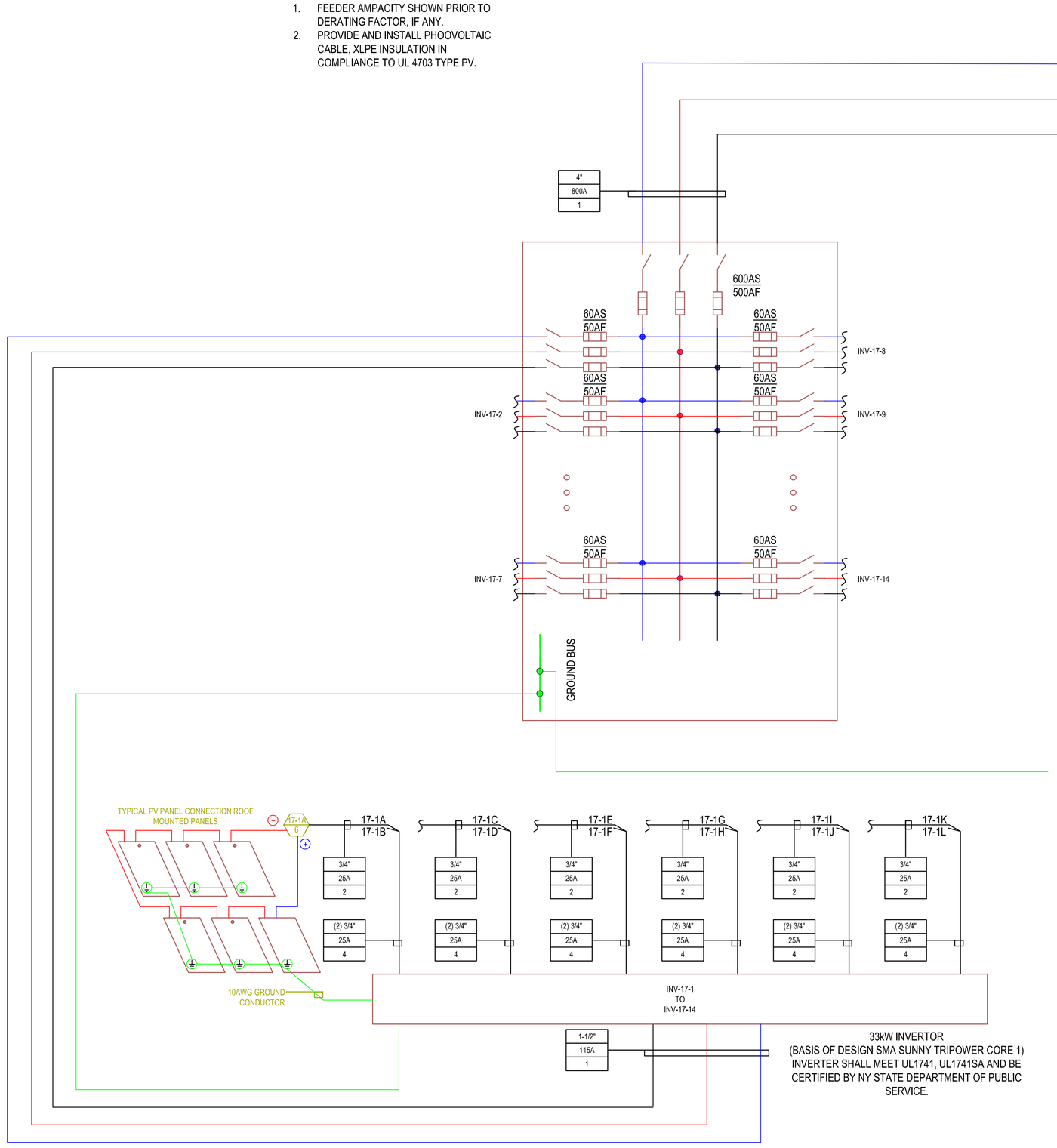
NOTE:
1. FEEDER AMPACITY SHOWN PRIOR TO DERATING FACTOR, IF ANY.
2. PROVIDE AND INSTALL PHOOVOLTAIC CABLE, XLPE INSULATION IN COMPLIANCE TO UL 4703 TYPE PV.

GENERAL SHEET NOTES:

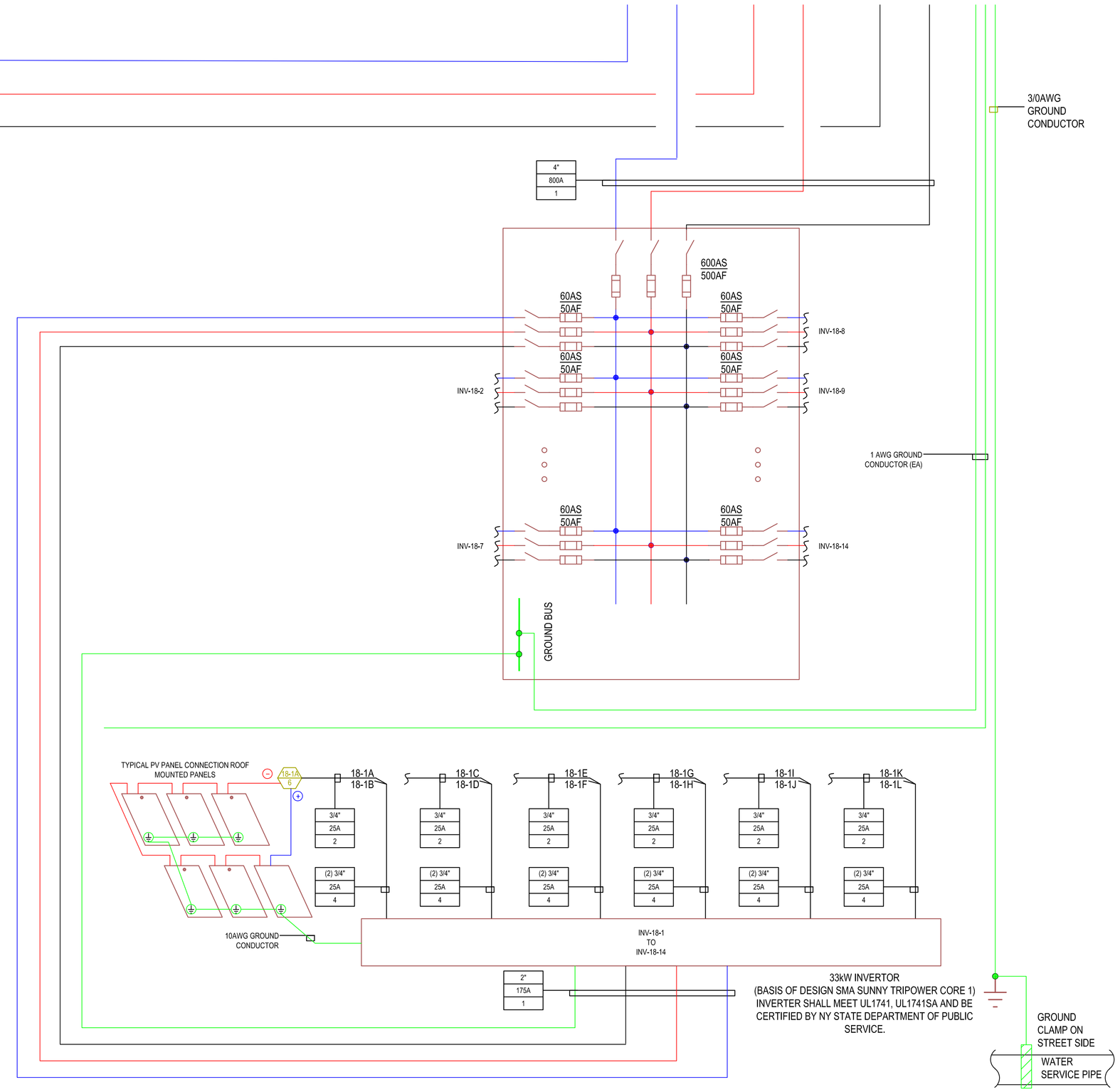
1. FOR SYMBOLS AND ABBREVIATION, REFER TO DRAWING E-001.
2. FOR ELECTRICAL CODED NOTES AND PHOTOVOLTAIC SINGLE LINE DIAGRAM, REFER TO DRAWING E-603.

1

FROM SERVICE SWITCHBOARD SSB-2 VIA TRANSFORMER. REFER TO DRAWING E-603 FOR CONTINUATION.



33kW INVERTOR
(BASIS OF DESIGN SMA SUNNY TRIPOWER CORE 1)
INVERTER SHALL MEET UL1741, UL1741SA AND BE CERTIFIED BY NY STATE DEPARTMENT OF PUBLIC SERVICE.



33kW INVERTOR
(BASIS OF DESIGN SMA SUNNY TRIPOWER CORE 1)
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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
ELECTRICAL THREE LINE DIAGRAM - PHOTOVOLTAIC SYSTEM

SEAL & SIGNATURE

DATE:
PROJECT NO: DDC33000
DRAWN BY: KH
CHECKED BY: AE
DRAWING NUMBER:
E-604.00

Plotted: 8/18/2021 6:32:42 PM P:\NY\OMEP_E\NPP\DDC33000\DRAWINGS\SHEETS\E-604.00_DDC33000.DWG - khasan

ABBREVIATIONS

-A-		GC	GENERAL CONTRACTOR
AFF	ABOVE FINISHED FLOOR	GPM	GALLONS PER MINUTE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	-I-	
		IN	INCH
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	-M-	
		MAX	MAXIMUM
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS	MIN	MINIMUM OR MINUTE
-C-		-N-	
CLG	CEILING	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
-D-			
DEMO	DEMOLITION	NIC	NOT IN CONTRACT
DN	DOWN	NTS	NOT TO SCALE
DWG	DRAWING	-P-	
-E-		PSI	POUNDS PER SQUARE INCH
EX	EXISTING TO REMAIN	-S-	
-F-		SP	SPRINKLER, SPRINKLER PIPING
FCVA	FLOOR CONTROL VALVE ASSEMBLY	SQ FT	SQUARE FEET
		-T-	
FDC	FIRE DEPARTMENT CONNECTION	TYP	TYPICAL
FHC	FIRE HOSE CABINET	-U-	
FHR	FIRE HOSE RACK	UL	UNDERWRITERS LABORATORY
FLR	FLOOR	-W-	
FP	FIRE PROTECTION	W/	WITH
FT	FEET / FOOT	W/O	WITHOUT
-G-			
GAL	GALLON		

SYMBOLS LEGEND

ANNOTATION	
1 TITLE FP-201 SCALE: NTS	TITLE MARK DETAIL OR PLAN NO. - 1 FOUND IN FP-201
1	SHEET KEYNOTE
1	REVISION CLOUD (DELTA 1)
2 FP-201	DETAIL BOUNDARY B DETAIL NO. - 2
	POINT OF CONNECTION
	POINT OF DISCONNECTION
FIRE PROTECTION LINES	
———	NEW PIPING
———	EXISTING TO REMAIN
-------- (D) --------	EXISTING TO BE DEMOLISHED
FITTINGS	
⊗	RISER
⊏	CAPPED OUTLET

⊂	PIPING CONN - BOTTOM
○	PIPING CONN - UP
⊂	PIPING CONN - DOWN
SPRINKLER HEADS	
● N	NEW PENDANT SPRINKLER
○ N	NEW UPRIGHT SPRINKLER
▼ N	NEW SIDE WALL SPRINKLER
N R	EX SP TO BE RELOCATED
E	EX SP TO REMAIN
D	EX SP TO BE DEMOLISHED
⊠	SPRINKLER W/ GUARD
VALVES	
	OS&Y VALVE W/ TAMPER SWITCH
MISCELLANEOUS	
PRV	PRESSURE REDUCING VALVE
	FIRE HOSE RACK
	SPRINKLER FLR. CNTL. ASSEMBLY

COMPLIANCE NOTES - NYC

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH NYC ADMINISTRATIVE CODE AND NFPA 13-2007, AS MODIFIED BY APPENDIX Q OF THE NYC BUILDING CODE.

2. COMPLIANCE WITH TECHNICAL BUILDING BULLETIN #2012-029
   2.1. I,_____, HEREBY CERFITY THAT THE SYSTEM'S NEWLY CALCULATED HYDRAULIC DEMAND AS PER 2014 CODE DUE TO WORK FILED UNDER THIS APPLICATION IS EQUAL TO OR LESS THAN HYDRAULIC DEMAND OF THE EXISTING SYSTEM PRIOR TO CURRENT OR PROPOSED MODIFICATIONS.

3. COMPLIANCE WITH TECHNICAL BUILDING BULLETING #2012-009
   3.1. EXISTING BUILDINGS WITH AUTOMATIC SPRINKLER SYSTEMS:
   3.1.1. THE ENTIRE FLOOR SPRINKLER SYSTEM SHALL REMAIN INTACT, EXCEPT THAT SPRINLKER HEADS IN THE AREA UNDERGOING ALTERATIONS SHALL COMPLY WITH AND SHALL BE PLACED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE CODE-REFERENCE NFPA 13.
   3.1.2. OWNER SHALL NOTIFY FDNY OF SPRINKLER SYSTEM DISCONNECTION BY SUBMITTING A LETTER OF NOTIFICATION.

SPRINKLER DESIGN CRITERIA

1. THE SPRINKLER SYSTEM IN THIS BUILDING SHALL BE IN ACCORDANCE WITH NYC BUILDING CODE 2014 AND NFPA-13 2007. THE BUILDING OCCUPANCY IS CLASS 'B'.

2. OCCUPANCY CRITERIA
   A. LIGHT HAZARD- OFFICE SPACE, SEATING AREA, AND CONFERENCE ROOMS DENSITY 0.10 GPM/SQ. FT. OVER MOST HYDRAULICALLY REMOTE 1500 SQ. FT. MAXIMUM COVERAGE PER SPRINKLER HEAD 225 SQ.FT. 52,000 SQ. FT. MAXIMUM AREA LIMITATION.
   B. ORDINARY HAZARD GROUP 1 - MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS. DENSITY 0.15 GPM PER SQ. FT OVER MOST HYDRAULICALLY REMOTE 1500 SQ. FT. MAXIMUM COVERAGE PER SPRINKLER HEAD 130 SQ. FT. 52,000 SQ. FT. MAXIMUM AREA LIMITATION.

3. MINIMUM PRESSURE AND WATER DISCHARGE:
   A. LIGHT HAZARD MINIMUM PRESSURE AT SPRINKLER HEAD 7 PSI OR 14.87 GPM.

4. HYDRAULICALLY CALCULATED SYSTEMS SHALL MEET THE FOLLOWING CRITERIA:
   A. EXACT LOCATION OF SPRINKLER HEADS IN FINISHED AREAS WITH SUSPENDED CEILINGS SHALL BE AS INDICATED ON ARCHITECTURAL REFLECTED CEILING PLANS WITH HEADS IN CENTER OF TILES.
   B. WHENEVER ROLLED GROOVED CONNECTIONS ARE USED, ALLOWANCE FOR ADDITIONAL PRESSURE LOSS AT GROOVES SHALL BE MADE AS FOLLOWS:
      a. FOR EACH COUPLING ON STRAIGHT RUN INCLUDING STRAIGHT FLOW THROUGH TEE OR CROSS: ADD 1 EQUIVALENT FOOT OF PIPE.
      b. FOR EACH COUPLING AT ELBOW, TEE OR CROSS WHERE DIRECTION OF FLOW CHANGES: ADD 2 EQUIVALENT FEET OF PIPE.
   C. EQUIVALENT FITTING LENGTHS USED IN HYDRAULIC CALCULATIONS SHALL BE IN ACCORDANCE WITH NFPA 13-2007 SECTION NO. 22.4.3 AS REFERENCED BY THE NYCBC. WHEREVER FITTINGS ARE USED IN CONJUNCTION WITH SCHEDULE 40 PIPE, EQUIVALENT FITTING LENGTHS INDICATED IN NFPA 13-2007 TABLE 22.4.3.1.1 SHALL BE USED. EQUIVALENT LENGTH FOR INTERNAL PIPE DIAMETERS DIFFERENT FROM SCHEDULE 40 STEEL PIPE SHALL BE MULTIPLIED BY A FACTOR AS PER SEC. 22.4.3.1.3.
   D. EACH SPRINKLER IN THE DESIGN AREA AND THE REMAINDER OF THE HYDRAULICALLY DESIGNED SYSTEM SHALL DISCHARGE AT A FLOW RATE AT LEAST EQUAL TO THE STIPULATED MINIMUM WATER APPLICATION RATE (DENSITY) MULTIPLIED BY THE AREA OF SPRINKLER OPERATION. WHERE SPRINKLERS ARE REQUIRED TO DISCHARGE A SPECIFIC FLOW OR PRESSURE RATHER THAN A DENSITY, EACH SPRINKLER IN THE DESIGN AREA SHALL DISCHARGE AT A FLOW OR PRESSURE AT LEAST EQUAL TO THE MINIMUM REQUIRED IN ACCORDANCE WITH NFPA STANDARD NO. 13-2007, PARAGRAPH 22.4.4.6.1, AS REFERENCED BY NYCBC.
   E. HYDRAULIC CALCULATIONS SHALL BE BROUGHT BACK TO CONNECTION TO WATER SUPPLY.

5. FLOW TEST DATA:
   A. CONTRACTOR SHALL OBTAIN FLOW DATA INDICATING RESIDUAL PRESSURES ASSOCIATED WITH BUILDING SYSTEM AND SUBMIT DATA WITH HYDRAULIC CALCULATIONS.
   B. THESE HYDRAULIC CALCULATIONS ALONG WITH PUMP OR WATER FLOW TEST ARE TO BE SUBMITTED FOR APPROVAL TO THE ENGINEER AND TO THE INSURANCE UNDERWRITER. HYDRAULIC CALCULATIONS SHALL BE BROUGHT BACK TO THE LOCATION OF THE PUMP OR WATER FLOW TEST.
   C. SPRINKLER CONTRACTOR SHALL SUBMIT HYDRAULIC CALCULATIONS AND FIRE PROTECTION DRAWINGS, SIGNED AND SEALED BY HIS ENGINEER WHO IS LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED.
   D. CONSTRUCTION MAY ONLY BEGIN WHEN APPROVALS ARE GRANTED.
   E. RESULT OF HYDRAULIC CALCULATIONS SHALL INDICATE MINIMUM 10% PRESSURE SAFETY MARGIN, I.E., EXCESS OF PRESSURE AVAILABLE OVER PRESSURE REQUIRED.
   F. AVAILABLE PRESSURE AT FLOOR:
      a. REFER TO RISER DIAGRAM.

SPRINKLER SCHEDULE

SYMBOL	DESCRIPTION	MANUFACTURER & MODEL	AREA	DENSITY	I.D. #
○ N	UPRIGHT SPRINKLER	RELIABLE MODEL# F1FR56	OFFICE	0.10/SQ. FT.	RA 1425

SHEET INDEX

NO.	TITLE	SCALE
SP-001.00	SPRINKLER SYMBOLS, ABBREVIATIONS AND NOTES (SHEET 1 OF 3)	NONE
SP-002.00	SPRINKLER GENERAL NOTES (SHEET 2 OF 3)	NONE
SP-003.00	SPRINKLER GENERAL NOTES (SHEER 3 OF 3)	NONE
SP-101.00	SPRINKLER 1ST FLOOR PLAN - DISTRICT 17	1/8" = 1'-0"
SP-501.00	SPRINKLER DETAILS	NONE
SP-601.00	SPRINKLER RISER DIAGRAM	NONE

OUT OF SERVICE FIRE PROTECTION NOTES

1. THE FOLLOWING ACTIONS ARE TO BE UNDERTAKEN PRIOR TO PLACING ANY FIRE PROTECTION SYSTEM (SPRINKLER OR FIRE STANDPIPE) AS PER FIRE CODE SEC. 901.7:
   a. NOTIFICATION SHALL BE PROVIDED TO THE FDNY.
   b. A FIRE WATCH SHALL BE ESTABLISHED AND MAINTAINED BY ONE OR MORE PERSONS HOLDING A CERTIFICATE OF FITNESS FOR FIRE GUARD.
   c. ANY OTHER ACTIONS AS DIRECTED BY THE FDNY IN ADDITION TO OR IN LIEU OF THE ACTIONS ABOVE UNTIL THE FIRE PROTECTION SYSTEM HAS BEEN RETURNED TO SERVICE.
   d. WHERE UTILIZED, FIRE GUARDS SHALL BE PROVIDED WITH AT LEAST ONE APPROVED MEANS OF NOTIFICATION TO THE FDNY AND THEIR ONLY DUTY SHALL BE TO PERFORM CONSTANT PATROLS OF THE PROTECTED PREMISES AND KEEP WATCH FOR FIRES.

2. THE BUILDING'S OWNER SHALL ASSIGN AN IMPAIRMENT COORDINATOR AS REQUIRED BY FIRE CODE SEC. 901.7.1.

3. A TAG SHALL BE USED TO INDICATE THAT A SYSTEM, OR PORTION THEREOF, IS OUT OF SERVICE AS PER FIRE CODE SEC. 901.7.2.

4. A TAG SHALL BE POSTED AT EACH FIRE DEPARTMENT CONNECTION, SYSTEM CONTROL VALVE, FIRE ALARM CONTROL UNIT, FIRE ALARM ANNUNCIATOR AND FIRE COMMAND CENTER, INDICATING WHICH SYSTEM, OR PART THEREOF, IS OUT OF SERVICE. THE FDNY SHALL SPEICIFY WHERE THE TAG IS TO BE PLACE AS PER FIRE CODE SEC. 901.7.3.

5. PLANNED REMOVAL FROM SERVICE AS PER FIRE CODE 901.7.4:
   a. THE CERTIFICATE OF FITNESS HOLDER AND THE IMPAIRMENT COORDINATOR SHALL BE MADE AWARE OF AND AUTHORIZE THE PLACING OF SYSTEMS OUT OF SERVICE. BEFORE AUTHORIZING SUCH ACTION THE IMPAIRMENT COORDINATOR SHALL:
      i. DETERMINE THE EXTENT AND EXPECTED DURATION OF THE OUT OF SERVICE CONDITION.
      ii. INSPECT THE AREAS OF THE BUILDING OR BUILDINGS INVOLVED AND ASSES THE INCREASED RISKS.
      iii. MAKE APPROPRIATE RECOMMENDATIONS TO THE OWNER.
      iv. NOTIFY THE FDNY AND THE RESPONSIBLE PERSON DESIGNATED BY THE OWNER TO ISSUE HOT WORK AUTHORIZATION IN ACCORDANCE WITH CHAPTER 26 OF THE FIRE CODE (IF ANY).
      v. NOTIFY THE CENTRAL STATION AND INSURANCE CARRIER.
      vi. NOTIFY THE OCCUPANTS IN THE AFFECTED AREA (IF ANY).
      vii. PLACE OUT OF SERVICE TAGS AT ALL REQUIRED AND APPROPRIATE LOCATIONS.
      viii. MAINTAIN SYSTEM IN SERVICE UNTIL WORK IS READY TO BEGIN.

6. RESTORATION SYSTEMS TO SERVICE AS PER FIRE CODE SEC. 901.7.6.
   a. IMPAIRMENT COORDINATOR SHALL TAKE THE FOLLOWING STEPS TO RESTORE AN IMPAIRED SYSTEM TO NORMAL WORKING ORDER:
      i. CONDUCT NECESSARY INSPECTIONS AND TEST TO VERIFY THAT THE AFFECTED SYSTEMS ARE OPERATIONAL.
      ii. GIVE NOTIFICATION TO THE FDNY.
      iii. NOTIFY THE BUILDING OWNER, CENTRAL STATION PROVIDER, INSURANCE CARRIER AND THE OCCUPANTS OF THE AFFECTED AREAS.
      iv. REMOVE THE OUT OF SERVICE TAGS.

FILING NOTES

THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES. THIS DRAWING FILED FOR FIRE PROTECTION SYSTEM ONLY.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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LOT: 1 BLOCK: 8138

DRAWING TITLE:
SPRINKLER SYMBOLS, ABBREVIATIONS AND NOTES (SHEET 1 OF 3)

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH FITZPATRICK — 074116 — PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	MO
CHECKED BY:	MO
DRAWING NUMBER:	SP-001.00

Plotted: 9/27/2019 8:28:46 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\SP-001.00_DDC33000.DWG - ksimpson

NEW YORK CITY SPRINKLER NOTES

1. AUTOMATIC SPRINKLER SYSTEM SHALL COMPLY WITH NYC BUILDING CODE SECTION 903 & MODIFIED BY APPENDIX Q OF NYC BUILDING CODE AND NFPA 13-2007.
2. CONSTRUCTION DOCUMENTS FOR SPRINKLER SYSTEM SHALL CONTAIN PLANS THAT INCLUDE THE INFORMATION AND DATA LISTED IN SECTION 903.1.2 OF NYC BUILDING CODE.
3. APPROVED AUTOMATIC SPRINKLER SYSTEM IN NEW BUILDINGS AND STRUCTURES SHALL BE PROVIDED IN THE LOCATIONS DESCRIBED IN SEC. 903.2 OF NYC BUILDING CODE.
4. AUTOMATIC SPRINKLER SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH SEC. 903.2.1 THROUGH 903.5 OF NYC BUILDING CODE.
5. WHERE THE PROVISIONS OF NYC BUILDING CODE REQUIRE THAT A BUILDING OR PORTION THEREOF BE EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SEC. 903.3.1.1, SPRINKLERS SHALL BE INSTALLED THROUGHOUT IN ACCORDANCE WITH NFPA 13-2007 AS MODIFIED IN APPENDIX Q, AND EXCEPT AS PROVIDED IN SEC. 903.3.1.1.1. AND 903.2 OF NYC BUILDING CODE.
6. AUTOMATIC SPRINKLERS SHALL NOT BE REQUIRED IN THE ROOMS OR AREAS WHICH ARE LISTED IN 903.3.1.1.1 OF NYC BUILDING CODE AS LONG AS AN APPROVED AUTOMATIC FIRE DETECTION SYSTEM IN ACCORDANCE WITH NYC BUILDING CODE SECTION 907.2 AND AN ALTERNATIVE EXTINGUISHING SYSTEM IN ACCORDANCE WITH NYC BUILDING CODE SECTION 904.
7. SPRINKLERS SHALL NOT BE OMITTED FROM ANY ROOM MERELY BECAUSE IT IS DAMP, OF FIRE-RESISTANCE-RATED CONSTRUCTION OR CONTAINS ELECTRICAL EQUIPMENT AS PER SEC. 903.3.1.1.1 OF THE NYC BUILDING CODE.
8. WHERE ALLOWED IN BUILDINGS OF GROUP R, UP TO AND INCLUDING SIX STORIES IN HEIGHT, AUTOMATIC SPRINKLER SYSTEM SHALL BE INSTALLED THROUGHOUT IN ACCORDANCE WITH NFPA 13R AS MODIFIED IN APPENDIX Q OF NYC BUILDING CODE, AS PER SEC. 903.3.1.2.
9. WHERE AUTOMATIC SPRINKLER SYSTEM ARE REQUIRED BY NYC BUILDING CODE, QUICK-RESPONSE AUTOMATIC SPRINKLERS SHALL BE INSTALLED IN THE AREAS LISTED, AS PER SECTION 903.3.2 OF NYC BUILDING CODE.
10. AUTOMATIC SPRINKLERS SHALL BE INSTALLED WITH DUE REGARD TO OBSTRUCTIONS THAT WILL DELAY ACTIVATION OR OBSTRUCT THE WATER DISTRIBUTION PATTERN. AUTOMATIC SPRINKLERS SHALL BE INSTALLED IN OR UNDER COVERED KIOSKS, DISPLAYS, BOOTH, CONCESSION STANDS, OR EQUIPMENT THAT EXCEEDS 4 FEET IN WIDTH. NOT LESS THAN A 3 FOOT CLEARANCE SHALL BE MAINTAINED BETWEEN AUTOMATIC SPRINKLERS AND TOP OF PILES OF COMBUSTIBLE FIBERS, AS PER SEC. 903.3.3. OF NYC BUILDING CODE.
11. WATER SUPPLIES FOR AUTOMATIC SPRINKLER SYSTEM SHALL COMPLY WITH SEC. 903.3.5 OF NYC BUILDING CODE AND SEC. 903.3.1. THE POTABLE WATER SUPPLY SHALL BE PROTECTED AGAINST BACK FLOW IN ACCORDANCE WITH THE REQUIREMENTS OF SEC. 903.3.5 THE NYC PLUMBING CODE, AND RULES OF THE NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION.
12. A SECONDARY ON-SITE WATER SUPPLY EQUAL TO THE HYDRAULICALLY CALCULATED SPRINKLER DEMAND, INCLUDING THE HOSE STREAM REQUIREMENT, SHALL BE PROVIDED FOR HIGH-RISE BUILDINGS IN SEISMIC DESIGN CATEGORY "C" OR "D" AS DETERMINED BY THIS CODE, AND IN ANY HIGH-RISE BUILDING WITH OCCUPIED FLOORS LOCATED MORE THAN 300 FEET ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS. THE SECONDARY WATER SUPPLY SHALL HAVE A DURATION NOT LESS THAN 30 MINUTES AS DETERMINED BY THE OCCUPANCY HAZARD CLASSIFICATION IN ACCORDANCE WITH NFPA 13-2007 AS PER SEC 903.3.5.2 OF THE NYC BUILDING CODE.
13. FIRE HOSE THREADS AND FITTINGS USED IN CONNECTION WITH AUTOMATIC SPRINKLER SYSTEMS SHALL BE APPROVED AND COMPATIBLE WITH FIRE DEPARTMENT HOSE THREADS AS PER NYC BUILDING CODE SEC 903.3.6.
14. ALL VALVES CONTROLLING THE WATER SUPPLY FOR AUTOMATIC SPRINKLER SYSTEMS, PUMPS, TANKS, WATER LEVELS AND TEMPERATURES, CRITICAL AIR PRESSURES AND WATER-FLOW SWITCHES ON ALL SPRINKLER SYSTEMS SHALL BE ELECTRICALLY SUPERVISED BY THE FIRE ALARM WHERE A FIRE ALARM SYSTEM IS REQUIRED BY NYC BUILDING CODE SECTION 907, AS PER NYC BUILDING CODE SECTION 903.4.
15. APPROVED SUPERVISED INDICATING CONTROL VALVES SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE RISER ON EACH FLOOR IN HIGH-RISE BUILDINGS AS PER SEC. 903.4.3 OF THE NYC BUILDING CODE.
16. THE DOCUMENTS OR PORTIONS THERE OF LISTED IN CHAPTER 2 OF NFPA 13-2007 ARE REFERENCED WITHIN NFPA-13 AND SHALL BE CONSIDERED PART OF THE REQUIREMENTS OF THIS DOCUMENT.
17. OCCUPANCY CLASSIFICATION SHALL COMPLY WITH CHAPTER 5 OF NFPA 13-2007 AND CHAPTER 3 OF NYBC 2014.
18. PROTECTION REQUIREMENTS FOR MIXED COMMODITIES SHALL BE ACCORDANCE WITH SEC. 5.6.1.2 OF NFPA 13-2007.
19. REQUIREMENTS FOR CORRECT USE OF SPRINKLER SYSTEM COMPONENTS SHALL COMPLY WITH CHAPTER 6 OF NFPA 13-2007.
20. THE K-FACTOR, RELATIVE DISCHARGE, AND MARKING IDENTIFICATION FOR SPRINKLERS HAVING DIFFERENT ORIFICE SIZES SHALL BE IN ACCORDANCE WITH TABLE 6.2.3.1 OF NFPA 13-2007.
21. LARGE DROP AND ESFR SPRINKLERS SHALL HAVE A MINIMUM NOMINAL K-FACTOR OF 11.2 WITH SEC. 6.2.3.5 OF NFPA 13-2007.
22. AUTOMATIC SPRINKLERS SHALL HAVE THEIR FRAME ARMS, DEFLECTOR, COATING MATERIAL, OR LIQUID BULB COLORED IN ACCORDANCE WITH THE REQUIREMENTS OF TABLE 6.2.5.1, 6.2.5.2, 6.2.5.3, 6.2.5.4 OR 6.2.5.5 OF NFPA 13-2007.
23. LISTED CORROSION RESISTANT SPRINKLER SHALL BE INSTALLED IN LOCATIONS WHERE CHEMICALS, MOISTURE, OR OTHER CORROSIVE VAPORS SUFFICIENT TO CAUSE CORROSION OF SUCH DEVICES EXIST WITH SEC. 6.2.6.1. OF NFPA 13-2007.
24. ALL CONTROL, DRAIN, AND TEST CONNECTION VALVES SHALL BE PROVIDED WITH PERMANENTLY MARKED WEATHERPROOF METAL OR RIGID PLASTIC IDENTIFICATION SIGNS, AS PER SEC. 6.7.4.1 OF NFPA 13-2007.

NEW YORK CITY SPRINKLER NOTES CONTINUED

25. FIRE DEPARTMENT CONNECTIONS SHALL BE EQUIPPED WITH LISTED PLUGS OR CAPS, PROPERLY SECURED AND ARRANGED FOR EASY REMOVAL BY FIRE DEPARTMENTS, AS PER SEC. 6.8.2 OF NFPA 13-2007.
26. REQUIREMENTS OF DRY PIPE SYSTEM INSTALLATION SHALL COMPLY WITH SEC. 7.2 OF NFPA 13-2007.
27. REQUIREMENTS OF PREACTION & DELUGE SYSTEM INSTALLATION SHALL COMPLY WITH SEC. 7.3 OF NFPA 13-2007.
28. OUTSIDE SPRINKLERS FOR PROTECTION AGAINST EXPOSURE FIRE SHALL COMPLY WITH SEC. 7.8 OF NFPA 13-2007.
29. THE MAXIMUM FLOOR AREA OR ANY ONE FLOOR TO BE PROTECTED BY SPRINKLERS SUPPLIED BY ANY ONE SPRINKLER SYSTEM RISER OR COMBINED SYSTEM RISER SHALL COMPLY WITH SEC. 8.2.1 OF NFPA 13-2007.
30. WHERE THERE ARE NO LISTED QUICK-RESPONSE SPRINKLERS IN THE TEMPERATURE RANGE REQUIRED, STANDARD RESPONSE SPRINKLERS SHALL BE PERMITTED TO BE USED, PER SEC. 8.3.3.3 OF NFPA 13-2007.
31. WHEN EXISTING LIGHT HAZARD SYSTEMS ARE CONVERTED TO USE QUICK-RESPONSE OR RESIDENTIAL SPRINKLERS, ALL SPRINKLERS IN A COMPARTMENTED SPACE SHALL BE CHANGED IN ACCORDANCE WITH THE REQUIREMENTS OF SEC. 8.3.3.4 OF NFPA 13-2007.
32. SPRINKLERS OF INTERMEDIATE AND HIGH TEMPERATURE RATINGS SHALL BE INSTALLED IN SPECIFIC LOCATIONS AS REQUIRED BY SECTION 8.3.2.5 OF NFPA 13-2007 SEC. 8.3.2.4.
33. SPRINKLERS SHALL BE LOCATED, SPACED AND POSITIONED IN ACCORDANCE WITH THE REQUIREMENTS OF SEC. 8.5 OF NFPA 13-2007.
34. PROTECTION AREAS AND MAXIMUM SPACING FOR EACH HAZARD SHALL COMPLY WITH TABLE 8.6.2.2.1 (a) (b) (c) (d) OF NFPA 13-2007.
35. REQUIREMENTS OF DWELLING UNITS PROTECTION SHALL COMPLY WITH SEC. 8.15.8 OF NFPA 13-2007.
36. REQUIREMENTS OF STAGE AREA PROTECTION SHALL COMPLY WITH SEC. 8.15.16 OF NFPA 13-2007.
37. DRAIN CONNECTIONS FOR SYSTEMS SUPPLY RISERS AND MAINS SHALL BE SIZED AS SHOWN IN TABLE 8.16.2.4.2 OF APPENDIX Q OF NYC BUILDING CODE.
38. TYPES OF HANGERS SHALL BE ACCORDANCE WITH THE REQUIREMENT OF SEC. 9.1. OF NFPA 13-2007.
39. MAXIMUM DISTANCE BETWEEN HANGERS SHALL COMPLY WITH TABLE 9.2.2.1 OF NFPA 13-2007.
40. THE WATER SUPPLY FOR SPRINKLERS SHALL BE DETERMINED BY DENSITY/AREA CURVE, FIGURE 11.2.3.1.1 OF NFPA 13-2007.
41. HYDRAULIC DESIGN AREA REDUCTION FOR QUICK RESPONSE SPRINKLERS SHALL COMPLY WITH FIGURE 11.2.3.2.3.1 OF NFPA 13-2007.
42. CALCULATIONS FOR DRY SYSTEM WATER DELIVERY SHALL BE BASED ON THE HAZARD SHOWN IN TABLE 7.2.3.6.1 OF NFPA 13-2007.
43. DESIGN CRITERIA OF WATER CURTAIN SHALL COMPLY WITH SEC. 11.3.3 OF NFPA 13-2007.
44. TYPE OF SPRINKLER HEAD IN GENERAL STORAGE SHALL COMPLY WITH SEC. 12.6.2 OR 12.6.3 OF NFPA 13-2007.
45. MINIMUM OPERATING PRESSURE OF ANY SPRINKLER SHALL COMPLY WITH SEC. 22.4.4.10.1 OF NFPA 13-2007.
46. NUMBER OF WATER SUPPLIES FOR SPRINKLER SYSTEM SHALL COMPLY WITH SEC. 18.3 OF NFPA 13-2007 AND APPENDIX Q OF NYC.
47. SPRINKLER SYSTEM PIPING AND VALVE HANDLES SERVING SPRINKLER SYSTEM SHALL BE PAINTED IN ACCORDANCE WITH THE NYC LOCAL LAW 58 OF 2009 AND THE NYC BUILDINGS BULLETIN 2010-014.

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY EXISTING PIPING RUNS AND CONDITIONS WITH THE NEW WORK PRIOR TO START.
2. CONTRACTOR SHALL OBTAIN ALL PERMITS AND FILE ALL WORK INCLUDING HYDRAULIC CALCULATION WITH THE AUTHORITY HAVING JURISDICTION AND OWNERS INSURANCE CARRIER.
3. COORDINATE ALL WORK WITH OTHER TRADES PRIOR TO START OF WORK.
4. SPRINKLER HEAD LOCATIONS SHALL BE COORDINATED WITH ARCHITECTURAL REFLECTED CEILING PLANS.
5. ALL SPRINKLER HEADS SHALL BE INSTALLED AT CENTER OF CEILING TILES.
6. SCHEDULE DRAINDOWN OF EXISTING SPRINKLER SYSTEM WITH OWNER PRIOR TO START OF WORK.
7. SPRINKLER HEADS AS PER B.S. & A. NO. 587-75-SA.
8. TESTING OF SPRINKLER AND STANDPIPE SYSTEM IN ACCORDANCE WITH NFPA AND LOCAL CITY BUILDING CODE.
9. CONTRACTOR SHALL FILE AN APPLICATION FOR A "LETTER OF NO OBJECTION" WITH CITY FIRE DEPARTMENT FOR THE ALTERATION WORK INDICATING DETAILED SCOPE OF WORK, DATE AND TIME AND THE DURATION OF DISCONNECTION, AND TEMPORARY FIRE PROTECTION MEASURES TO BE PROVIDED IN THE AFFECTED AREA.

CONTRACTOR NOTES:

1. CONTRACTOR SHALL BE TRAINED ON THE USE AND INSTALLATION OF THE SYSTEMS BY MANUFACTURER'S REPRESENTATIVE.
2. BEFORE STARTING ANY WORK, THE CONTRACTOR SHALL EXAMINE THE COMPLETE SET OF DRAWINGS FOR ALL TRADES, INCLUDING BUT NOT LIMITED TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL. VERIFY ALL DIMENSIONS, SPACE REQUIREMENTS, AND POINTS OF CONNECTION TO ALL EQUIPMENT. MAKE ANY MINOR ADJUSTMENTS NECESSARY TO AVOID CONFLICTS WITH THE BUILDING STRUCTURE AND THE WORK OF OTHER TRADES.
3. REVIEW DOCUMENTS, VERIFY DIMENSIONS AND FIELD CONDITIONS AND CONFIRM THAT WORK IS BUILDABLE AS SHOWN. THE CONTRACTOR SHALL REPORT ANY CONFLICTS AND/OR OMISSIONS TO THE ENGINEER PRIOR TO PERFORMING ANY WORK IN QUESTION. OTHERWISE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS TO COMPLETE THE WORK STATED IN ON THE CONTRACT DOCUMENTS BASED UPTON THE OPTIMAL ESTABLISHED QUALITY STANDARD.
4. PROVIDE ONE COPY OF REPRODUCIBLE RECORD DRAWINGS AND AUTOCAD DISC (R204 OR HIGHER) TO PROPERTY MANAGER.

SPECIAL FLOOD HAZARD AREA NOTE:

THIS PROPERTY IS NOT IN SFHA.

FILING NOTES

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
SPRINKLER SPECIFICATIONS (SHEET 2 OF 3)

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH FITZSIMONS · 024116 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	XX
CHECKED BY:	XX
DRAWING NUMBER:	SP-002.00

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SPECIAL INSPECTION NOTES

INSPECTIONS, PROGRESS INSPECTIONS, SPECIAL
INSPECTIONS AND TESTING OF FIRE PROTECTION SYSTEMS

1. THE FOLLOWING INSPECTIONS, TESTS, PROGRESS INSPECTIONS AND SPECIAL INSPECTIONS SHALL BE CONSIDERED PART OF THE CONTRACT WORK.

2. UPON COMPLETION OR PARTIAL COMPLETION OF THE PERMITTED FIRE PROTECTION WORK, INSPECTIONS, PROGRESS INSPECTIONS, SPECIAL INSPECTIONS AND TESTS SHALL BE CONDUCTED BY APPROVED AGENCIES OR SPECIAL INSPECTORS QUALIFIED TO CONDUCT SUCH INSPECTIONS AND TESTS. INSPECTIONS AND PROGRESS INSPECTIONS SHALL BE PERFORMED IN COMPLIANCE WITH SECTION BC 109 OF THE NEW YORK CITY BUILDING CODE. SPECIAL INSPECTIONS SHALL BE PERFORMED IN COMPLIANCE WITH SECTIONS BC 1704 AND BC 1707 OF THE NEW YORK CITY BUILDING CODE FOR ALL FIRE PROTECTION SYSTEMS REGULATED BY THE NEW YORK CITY FIRE CODE, SECTIONS FC 901, AND 904. REFER TO ARTICLE 116 OF CHAPTER 1 OF TITLE 28 OF THE ADMINISTRATIVE CODE FOR ADDITIONAL PROVISIONS RELATED TO INSPECTIONS.

3. SPECIAL INSPECTIONS OF FIRE PROTECTION SYSTEMS SHALL INCLUDE THE FOLLOWING AS APPLICABLE TO THE SYSTEM:

   A. VISUAL CERTIFICATION THAT REQUIRED COMPONENTS OF SUCH SYSTEMS ARE COMPLETE IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION GUIDELINES AND THE APPROVED CONSTRUCTION DOCUMENTS.

   B. SUPPORTS, HANGERS, SEISMIC BRACING, AND VIBRATION ISOLATION EQUIPMENT ARE PROPERLY SPACED AND ANCHORED TO SUPPORTING STRUCTURE.

   C. INSTALLATION OF REQUIRED SIGNAGE AND SAFETY INSTRUCTIONS.

   D. ELECTRICAL COMPONENTS ARE INSTALLED AND ELECTRICAL SIGN- OFF ISSUED.

   E. REQUIRED LABELING, OPERATIONAL INSTRUCTIONS AND SAFETY SIGNAGE PROPERLY POSTED.

   F. ALL RELATED SPECIAL INSPECTIONS FOR SUCH SYSTEMS ARE COMPLETE.

4. PROGRESS INSPECTIONS OF FIRE PROTECTION SYSTEMS SHALL INCLUDE THE FOLLOWING AS APPLICABLE TO THE SYSTEM:

   A. THROUGH-PENETRATION FIRE STOPPING.

5. TESTS OF FIRE PROTECTION SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING NEW YORK CITY BUILDING CODE AND NEW YORK CITY FIRE CODE SECTIONS:

GENERAL ACCEPTANCE TESTS	BC 901.5
SYSTEM ACCEPTANCE	BC Q102
WATER SUPPLY TEST	BC Q105
SYSTEM ACCEPTANCE	BC Q105
WATER SUPPLY TEST	FC 508.4
GENERAL INSTALLATION ACCEPTANCE TESTING	FC 901.5
FIRE EXTINGUISHING SYSTEMS INSTALLATION ACCEPTANCE TESTING	FC 904.1.1, 904.4

6. THE FOLLOWING IS A LIST OF ALL REQUIRED SPECIAL INSPECTIONS:

SPECIAL INSPECTION ITEM	CODE/SECTION
SPRINKLER SYSTEM SPECIAL INSPECTION	BC 1704.23
FIRE-RESISTANT PENETRATIONS AND JOINTS	BC 1704.27
SEISMIC ISOLATION SYSTEMS	BC 1707.8

7. THE FOLLOWING IS A LIST OF ALL REQUIRED PROGRESS INSPECTIONS:

PROGRESS INSPECTION ITEM	CODE/SECTION
FIRE-RESISTIVE RATED CONSTRUCTION	BC 110.3.4

FILING NOTES

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DOB BSCAN STICKER

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REVISIONS:

NUMBER	DESCRIPTION	DATE
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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
GENERAL NOTES (SHEET 3 OF 3)

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH TITTEL — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: XX
CHECKED BY: XX
DRAWING NUMBER:
SP-003.00

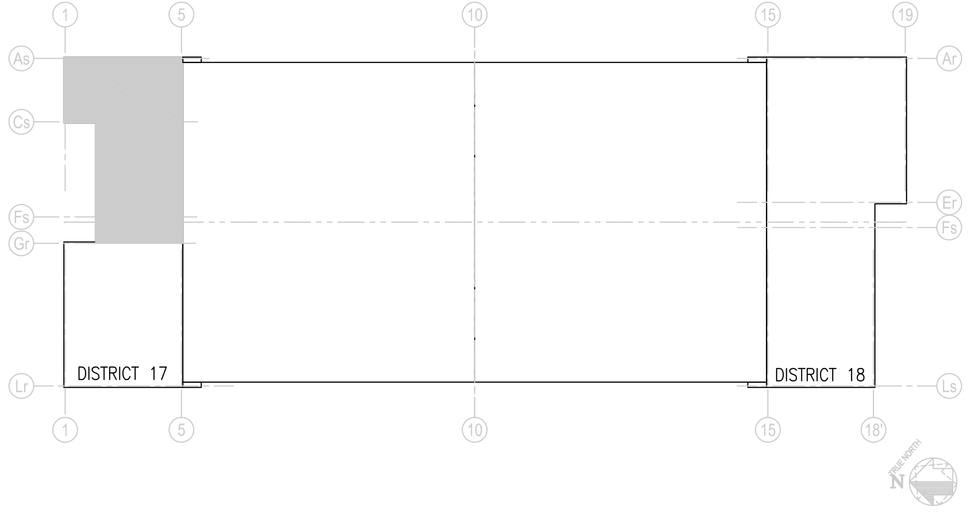
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1 1ST FL SPRINKLER FLOOR PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. CONTRACTOR TO FIELD VERIFY SIZE AND LOCATION OF EXISTING SPRINKLER PIPING. 2. CONTRACTOR TO ALLOW FOR 2 ADDITIONAL SPRINKLER HEADS FOR IN FIELD COORDINATION. QUANTITY IN ADDITION TO WHAT IS INDICATED ON DRAWINGS. 3. ELECTRICAL ROOM SHALL BE WITHIN 2-HOUR FIRE-RATED ENCLOSURE WITH SMOKE DETECTOR.	1. NEW 2" SPRINKLER PIPE TO BE CONNECTED TO EXISTING ACTIVE SPRINKLER MAIN.

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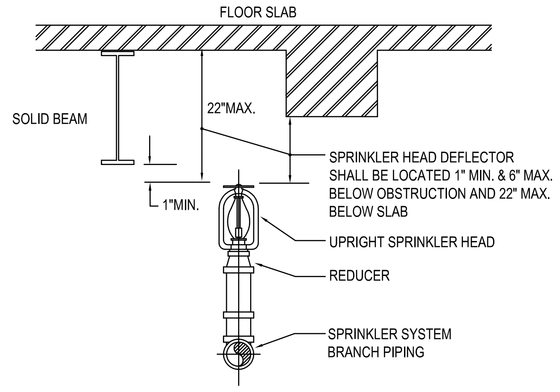
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DRAWING TITLE:
SPRINKLER GROUND FLOOR PLAN - DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · SETH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

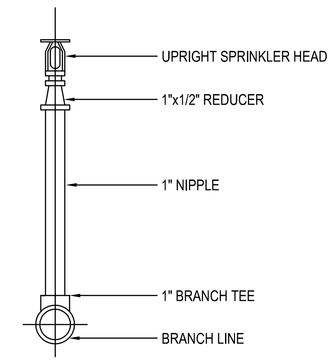
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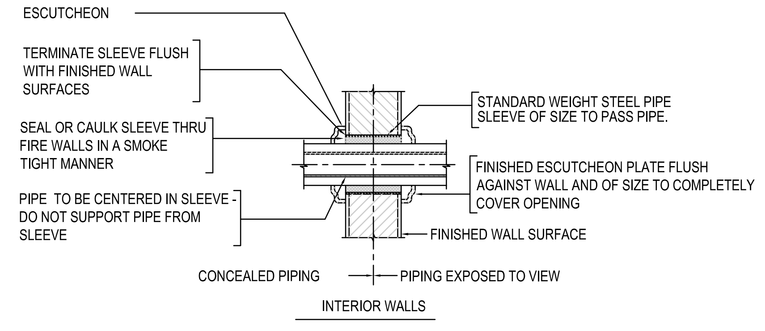
5 UPRIGHT SPRINKLER DETAIL



UPRIGHT

SCALE: NONE

2 SPRINKLER CONNECTION



INTERIOR WALLS

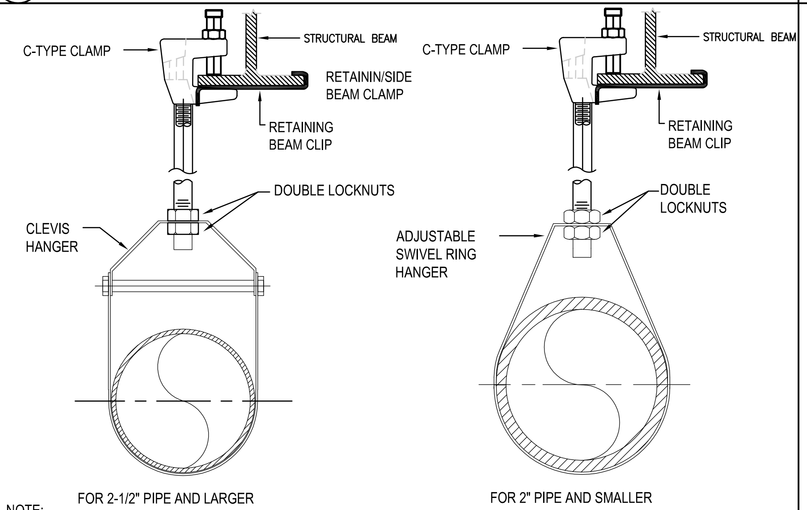
SCALE: NONE

4 PIPE SLEEVE THRU WALL

UP TO 2" FOR 2 1/2" PIPE AND LARGER

SCALE: NONE

1 TYPICAL FIRE PROTECTION PIPE SUPPORT



NOTE:
CONTRACTOR IS RESPONSIBLE FOR REPAIRING DAMAGE TO THE FIRE PROOFING DURING INSTALLATION TO MAINTAIN FIRE RATING.

SCALE: NONE

3 TYPICAL PIPE SUPPORT FROM BEAM CLAMPS

FILING NOTES

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

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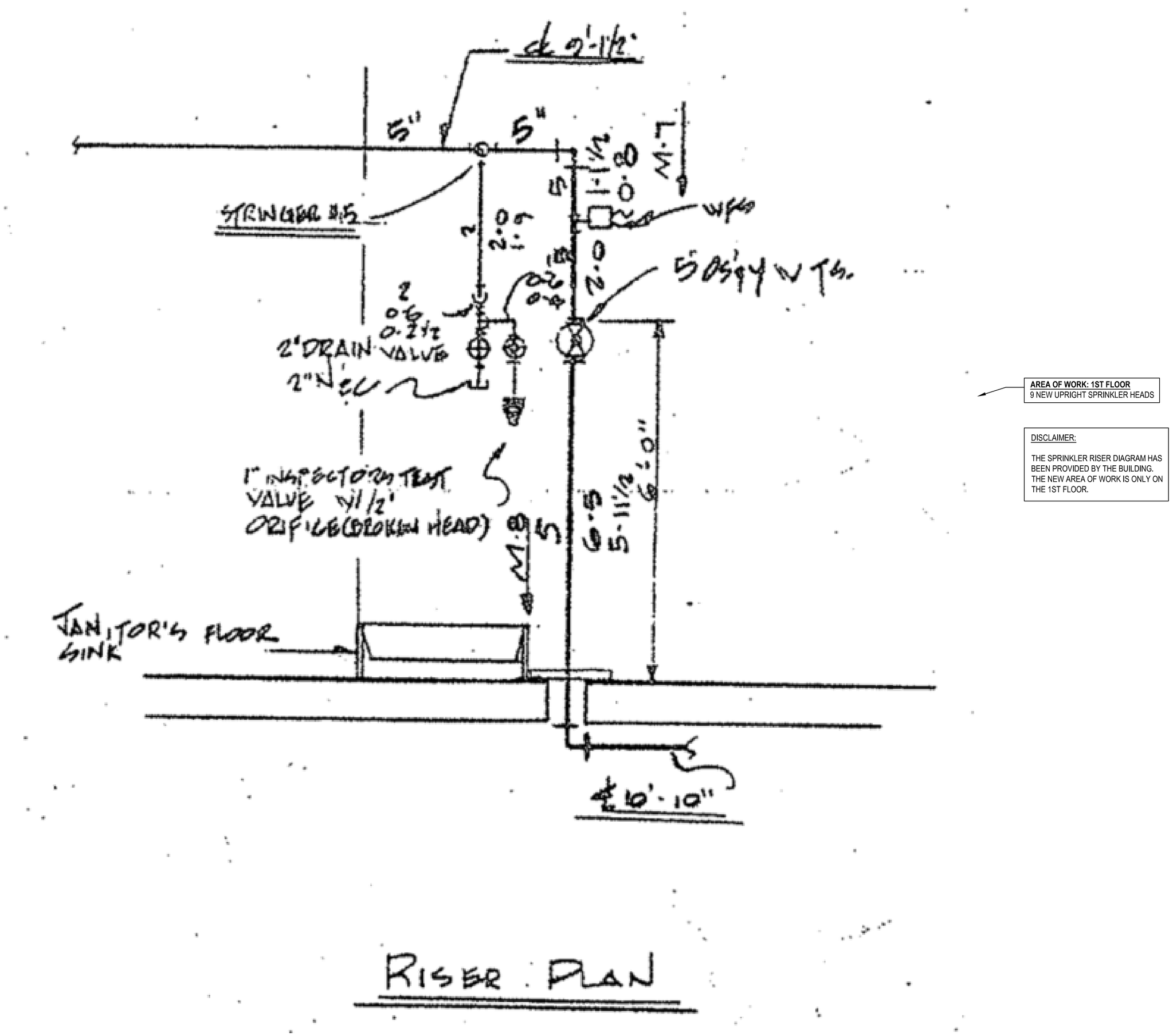
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SPRINKLER DETAILS

SEAL & SIGNATURE

STATE OF NEW YORK — KEITH TITTEL — 074116 — LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
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RISER PLAN

AREA OF WORK: 1ST FLOOR
9 NEW UPRIGHT SPRINKLER HEADS

DISCLAIMER:

THE SPRINKLER RISER DIAGRAM HAS BEEN PROVIDED BY THE BUILDING. THE NEW AREA OF WORK IS ONLY ON THE 1ST FLOOR.

FILING NOTES

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BROOKLYN, NY 11236
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LOT: 1 BLOCK: 8138

DRAWING TITLE:
SPRINKLER RISER DIAGRAM

SEAL & SIGNATURE

STATE OF NEW YORK — JUSTIN FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

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ABBREVIATIONS

-C-		-N-	
CW	COLD WATER	N	NEW
-D-		-U-	
D	DEMO	UGND	UNDERGROUND
-E-			
E	EXISTING TO REMAIN		

SYMBOLS LEGEND

END CAP

POINT OF DISCONNECTION

ELBOW DOWN

ELBOW UP

1 SHEET KEYNOTE

1 REVISION CLOUD (DELTA 1)

EXISTING NATURAL GAS PIPE (E)

DEMO NATURAL GAS PIPE (D)

NEW NATURAL GAS PIPE (N)

GENERAL NOTES

1. PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2014 CITY OF NEW YORK BUILDING CODE, THE 2014 CITY OF NEW YORK PLUMBING CODE AND SHALL CONFORM TO ALL OTHER APPLICABLE DIRECTIVES, RULES, REGULATIONS AND AUTHORITIES HAVING JURISDICTION.

2. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION SHALL BE COORDINATED WITH ALL TRADES, THE STRUCTURAL DRAWINGS, ARCHITECTURAL DRAWINGS, AND/OR GENERAL CONTRACTOR AND CONSTRUCTION MANAGER.

3. LOCATION AND SIZES OF EXISTING PIPING ARE APPROXIMATE. VERIFY THE LOCATIONS AND SIZES OF EXISTING PIPING IN THE FIELD. IF ANY DISCREPANCIES OCCUR WITH THE CONTRACT DRAWINGS, NOTIFY THE ARCHITECT AND/OR THE ENGINEER PRIOR TO COMMENCEMENT OF NEW WORK.

4. ALL EXPOSED PIPING PENETRATIONS THROUGH WALLS OR CEILINGS SHALL BE PROVIDED WITH APPROPRIATE FIRE RETARDANT SEALANT AND ESCUTCHEONS.

5. SEAL OPENINGS AROUND PLUMBING WORK AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH NON-COMBUSTIBLE MATERIAL AND ESCUTCHEONS.

6. SUBMISSION OF A PROPOSAL SHALL BE EVIDENCE THAT A CAREFUL EXAMINATION OF THE SITE, DRAWINGS & SPECIFICATIONS HAVE BEEN MADE AND THE CONTRACTOR IS FAMILIAR WITH THOSE ITEMS AND AREAS THAT WILL PRESENT DIFFICULTY TO THE PERFORMANCE OF THIS CONTRACT. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT, ETC. NECESSARY TO COMPLETE ALL WORK AS A RESULT OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN.
   - A. CONTRACTOR TO VERIFY THE EXISTING CONDITIONS BEFORE CONSTRUCTION; CONFIRMING SIZES AND LOCATIONS OF ALL EXISTING PIPING PRIOR TO START OF WORK.
   - B. ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR AT THE SITE BEFORE PROCEEDING WITH ANY WORK.
   - C. PRIOR TO STARTING DEMOLITION, DETERMINE LOCATIONS AND EXISTING CONDITIONS.

7. THIS CONTRACTOR SHALL PAY FEES, GIVE NOTICE, FILE NECESSARY DRAWINGS AND OBTAIN PERMITS AND CERTIFICATES OF APPROVAL REQUIRED IN CONNECTION WITH WORK UNDER THIS CONTRACT AND COMPLY WITH LOCAL LAWS AND ORDINANCES.

8. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT, AND SERVICES NECESSARY FOR A COMPLETE AND SAFE INSTALLATION OF MECHANICAL IN FULL CONFORMITY WITH REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION; ALL AS INDICATED ON DRAWINGS AND/OR HEREIN SPECIFIED FOR THE SYSTEMS INCLUDED. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER. INCLUDE ALL COSTS FOR PERMITS, LICENSES, CERTIFICATES, FILING AND INSPECTIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION.

9. UNDER NO CIRCUMSTANCES WILL THIS CONTRACTOR, OR HIS WORKMEN, BE PERMITTED TO USE ANY PART OF THE BUILDING AS A SHOP EXCEPT PARTS AS DESIGNATED FOR SUCH USE.

10. ALL EXISTING WATER PIPING WITHIN FIVE (5) FT. OF NEW CONNECTIONS SHALL BE PROVIDED WITH NEW INSULATION.

11. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL ADDITIONAL INFORMATION.

12. ALL WORK MUST BE COORDINATED AROUND THE OPERATION OF THE FACILITY.

13. STORE MATERIALS IN DESIGNATED SPACES.

14. UNNECESSARY NOISE SHALL BE AVOIDED AT ALL TIMES AND NECESSARY NOISE SHALL BE REDUCED TO A MINIMUM.

15. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE CONSTRUCTION DOCUMENTS AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

16. REMOVAL OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP WORK PROPOSAL.

17. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT, AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF SYSTEM.

18. THE CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED DURING CONSTRUCTION TO THEIR ORIGINAL STATE.

19. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

20. ALL EXISTING MATERIAL AND EQUIPMENT TO BE REMOVED UNDER THIS CONTRACT WILL REMAIN THE PROPERTY OF THE OWNER OR SHALL BE DISPOSED OF BY THIS CONTRACTOR AS DIRECTED BY THE OWNER.

21. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PHASED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE OPERATION OF THE BUILDING.

22. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF ACCEPTANCE BY OWNER. THIS WORK SHALL BE DONE AS DIRECTED BY THE DATE OF ACCEPTANCE BY OWNER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

23. ALL REQUIRED TEMPORARY SHUTDOWNS IN BUILDING SERVICES SHALL BE MINIMIZED AND SHALL BE APPROVED BY AND COORDINATED WITH THE OWNER A MINIMUM OF 2 WEEKS IN ADVANCE OF SHUTDOWN. ALL SERVICE CONNECTIONS TO EXISTING BUILDING SYSTEMS SHALL BE PERFORMED AFTER COORDINATION WITH OWNER & ENGINEER.

24. ALL STAGING AND MATERIAL STORAGE AREAS SHALL BE LIMITED TO DESIGNATED AREA.

25. THE CONTRACTOR SHALL INCLUDE ALL COSTS FOR REMOVALS IN THE CONTRACT. THESE COSTS SHALL INCLUDE WORK DESCRIBED IN THE SPECIFICATIONS AND SHOWN ON THE DRAWINGS WITH ALLOWANCES FOR UNFORSEEN DIFFICULTIES.

26. CUT AND CAP ALL WASTE PIPING AND SANITARY PIPING AT FLOOR AND AT CEILING OF FLOOR BELOW TO "LIVE" BRANCH PIPING.

27. CUT AN CAP ALL WATER PIPING BACK TO "LIVE" BRANCH PIPING.

28. PROVIDE ALL NECESSARY PIPING OFFSETS AND CHANGES IN DIRECTION TO ACCOMPLISH A COMPLETE INSTALLATION.

29. PLUMBING CONTRACTOR SHALL COORDINATE ALL TIE-INS, PLUS REMOVALS WITH GENERAL CONTRACTOR.

30. NEW WORK AND EQUIPMENT SHALL BE THOROUGHLY CLEANED AND MADE READY FOR USE.

31. REFER TO DRAWINGS FOR AREA OF CONSTRUCTION.

32. SUPPORT ALL PLUMBING WORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER UTILIZING PIPE SUPPORTS ETC.. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OF SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL STEEL FRAMING.

33. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

34. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO AN ACCEPTABLE CONDITION TO THE ENGINEER.

35. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED.

36. ALL EQUIPMENT AND CONCRETE PADS SHALL BE COORDINATED WITH EQUIPMENT PURCHASED AND AS SPECIFIED OR INDICATED ON THE DRAWINGS.

37. CONTRACTOR SHALL PROVIDE ALL OTHER SUPPLEMENTARY STEEL REQUIRED FOR SUPPORTING PIPING.

38. DIMENSIONS SHOWN ON DRAWINGS ARE BASED ON PRELIMINARY DATA. CONTRACTOR TO COORDINATE ALL DIMENSIONS, ELEVATIONS AND CONNECTION REQUIREMENTS FOR FINAL CONNECTIONS UNLESS OTHERWISE NOTED.

39. ALL PIPING SHALL BE DELIVERED AND STORED AT THE SITE WITH END CAPS ON THE PIPES TO KEEP ANY MATERIAL OUT OF THE INSIDE OF THE PIPE UNTIL THE POINT OF INSTALLATION.

GENERAL PLUMBING NOTES FOR DEMOLITION

1. PLUMBING DEMOLITION WORK SHALL BE IN ACCORDANCE WITH THE 2014 NEW YORK CITY BUILDING CODE, THE 2014 CITY OF NEW YORK PLUMBING CODE AND SHALL CONFORM TO ALL OTHER APPLICABLE DIRECTIVES, RULES, REGULATIONS AND AUTHORITIES HAVING JURISDICTION.

2. EXISTING EQUIPMENT, PIPING, PLUMBING FIXTURES, ETC., IN AREA OF WORK SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE DIRECTED. THEY SHALL NOT BE REMOVED FROM THE PREMISES WITHOUT APPROVAL.

3. PIPING FROM FIXTURES TO BE REMOVED SHALL BE PROPERLY PLUGGED OR CAPPED AT RISERS OR MAINS SO THAT UPON COMPLETION OF NEW WORK, NO ABANDONED PIPING IS CONCEALED IN FINISHED AREAS.

4. NO DEAD ENDS SHALL BE LEFT ON ANY PIPING UPON COMPLETION OF JOB.

5. EXISTING REMOVED EXPOSED PIPING SHALL NOT BE REUSED AND WHERE NOT SPECIFICALLY NOTED OR SHOWN ON DRAWING TO BE ABANDONED, AFFECTED PIPING AND APPURTENANCES SHALL BE COMPLETELY REMOVED.

6. THE EXISTING SYSTEM TO REMAIN SHALL BE LEFT IN PERFECT WORKING ORDER AT COMPLETION OF DEMOLITION WORK.

7. LOCATIONS AND SIZES OF EXISTING PIPING ARE APPROXIMATE. EXACT SIZES AND LOCATIONS OF ALL EXISTING PIPING SHALL BE VERIFIED IN THE FIELD.

8. ALL EXISTING EXPOSED, UNNECESSARY PIPING RELATED TO WORK BEING REMOVED SHALL BE COMPLETELY REMOVED, UNLESS OTHERWISE NOTED.

9. DO NOT INTERRUPT ANY OF THE SERVICES OF THE EXISTING BUILDING, OR INTERFERE WITH THE SERVICES IN ANY WAY WITHOUT THE BUILDING ENGINEERS' PERMISSION. SUCH INTERRUPTIONS AND INTERFERENCE SHALL BE MADE AS BRIEF AS POSSIBLE AND ONLY AT APPROVED DESIGNATED TIMES.

10. WHEN DEMOLITION WORK REQUIRES THE SHUTDOWN OF EXISTING OPERATING SYSTEMS, THE DEMOLITION WORK SHALL BE PERFORMED ONLY AFTER NOTIFYING THE OWNER AT LEAST 2 WEEKS BEFORE START AND AFTER OBTAINING WRITTEN AUTHORIZATION.

11. REMOVE AND REROUTE ALL EXISTING PIPING EXPOSED TO VIEW WHERE NECESSARY TO AVOID NEW WORK AS REQUIRED BY THE PROPOSED ALTERATIONS.

12. CONTRACTOR SHALL RELOCATE ALL PIPING (THAT IS ACTIVE) FROM WALLS OR CHASES THAT ARE TO BE REMOVED TO NEW LOCATIONS. CONTRACTOR SHALL COORDINATE THESE LOCATIONS WITH THE GENERAL CONTRACTOR.

13. PIPING REMOVAL SHALL INCLUDE REMOVAL OF APPURTENANCES CONTAINED THEREIN SUCH AS VALVES, HANGERS, SUPPORTS, ETC.

14. PLUGS AND CAPS SHALL BE INSTALLED AT ALL OPEN ENDS OF PIPING TO REMAIN AND SHALL BE OF SAME MATERIAL AND PRESSURE RATING AS EXISTING.

15. REMOVE EXISTING PIPING AS INDICATED ON DRAWING OR AS MAY BY REQUIRED.

16. REMOVE RUBBISH FROM PREMISES AND SITE AT THE END OF EACH WORK DAY AS DIRECTED.

17. ROUGH PATCHING AND REPAIR ALL DISTURBED WALLS WHERE WORK IS REQUIRED.

18. DAMAGES INCURRED TO THE BUILDING OR BUILDING'S SYSTEM UNDER THIS CONTRACT SHALL BE COMPLETELY REPAIRED BY THIS PLUMBING CONTRACTOR.

19. ALL BUILDING SYSTEMS TAKEN OFF-LINE MUST BE PUT BACK ON-LINE BEFORE THIS CONTRACTOR LEAVES THE JOB SITE.

20. ALL ABANDONED PIPING SHALL BE REMOVED ALL THE WAY BACK TO THE POINT OF ORIGIN AND VALVED, CAPPED OR PLUGGED.

21. PROTECTION OF ALL FIXTURES TO REMAIN SHALL BE REQUIRED BEFORE DEMOLITION AND MUST BE INTACT UNTIL COMPLETION OF CONSTRUCTION.

22. PRIOR TO DEMOLITION, SAFE-OFF ANY SERVICE THAT COULD BE AFFECTED.

23. TORCH CUTTING: BEFORE PROCEEDING WITH WORK, SUBMIT CERTIFICATE OF COMPLIANCE AND NOTIFY THE BUILDING ENGINEER OR FIRE WARDEN.

NYC BUILDING DEPARTMENT NOTE

1. TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.

SHEET INDEX

NO.	TITLE	SCALE
P-001.00	PLUMBING SYMBOLS, ABBREVIATIONS, AND NOTES	NONE
DP-101.00	PLUMBING GROUND FLOOR DEMOLITION FLOOR PLAN - DISTRICT 17	3/32" = 1'-0"
P-101.00	PLUMBING GROUND FLOOR PLAN - DISTRICT 17	3/32" = 1'-0"
P-102.00	PLUMBING GROUND FLOOR PLAN - DISTRICT 17	3/32" = 1'-0"
P-103.00	PLUMBING GROUND FLOOR PLAN - DISTRICT 18	3/32" = 1'-0"
P-104.00	PLUMBING GROUND FLOOR PLAN - DISTRICT 18	3/32" = 1'-0"
P-105.00	PLUMBING 2ND FLOOR PLAN - DISTRICT 17	3/32" = 1'-0"
P-106.00	PLUMBING 2ND FLOOR PLAN - DISTRICT 18	3/32" = 1'-0"
P-107.00	PLUMBING ROOF PLAN	3/32" = 1'-0"
P-108.00	PLUMBING ROOF PLAN	3/32" = 1'-0"
P-109.00	PLUMBING ROOF PLAN	3/32" = 1'-0"
P-110.00	PLUMBING ROOF PLAN	3/32" = 1'-0"
P-501.00	PLUMBING DETAILS	NONE

NEW YORK CITY BUILDING DEPARTMENT NOTES

1. PLUMBING SYSTEMS (SANITARY, VENT, WATER DISTRIBUTION AND GAS, ETC.) AND ALL ASSOCIATED EQUIPMENT SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2014 NEW YORK CITY BUILDING, PLUMBING CODE, FUEL GAS CODE AND CURRENT REVISIONS.

2. ALL PLUMBING WORK SHALL COMPLY WITH CHAPTERS 1 THROUGH 13 AND APPENDICES A THROUGH G OF THE NEW YORK CITY PLUMBING CODE.

3. SANITARY DRAINAGE SYSTEM SHALL BE IN ACCORDANCE WITH GENERAL PROVISIONS PC305.

4. THE MATERIALS USED IN THE PLUMBING AND GAS SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC303.

5. THE INSTALLATION OF PLUMBING FIXTURES, FAUCETS AND FIXTURE FITTINGS SHALL BE IN ACCORDANCE WITH SECTIONS PC401 THROUGH PC427.

6. PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH SECTION PC308.

7. CLEANOUTS SHALL BE IN ACCORDANCE WITH SECTION PC708.

8. TRAPS FOR FIXTURES AND DRAIN LINES SHALL BE IN ACCORDANCE WITH SECTION PC1002.

9. WATER SUPPLY SYSTEMS SHALL BE IN ACCORDANCE WITH PC601 THROUGH PC613.

10. WATER SUPPLY VALVES SHALL BE IN ACCORDANCE WITH SECTION PC606.

11. SANITARY DRAINAGE SYSTEMS SHALL BE IN ACCORDANCE WITH SECTIONS PC701 THROUGH PC715.

12. VENT PIPING SHALL BE IN ACCORDANCE WITH SECTIONS PC901 THROUGH PC919.

13. SANITARY TEES AND QUARTER BENDS SHALL BE USED IN DRAINAGE LINES ONLY WHERE THE DIRECTION OF FLOW IS FROM THE HORIZONTAL TO THE VERTICAL.

14. SHORT SWEEPS SHALL BE PERMITTED IN DRAINAGE PIPING 3 INCHES IN DIAMETER OR LARGER FOR OFFSETS EITHER HORIZONTAL OR VERTICAL.

15. SPECIAL AND STORAGE SYSTEMS PIPING SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS PC1201 THROUGH PC1204.

16. STORM DRAINAGE SYSTEMS SHALL BE IN ACCORDANCE WITH SECTIONS PC1101 THROUGH PC1114.

17. GAS PIPING AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH SECTIONS FGC401 THROUGH FGC416 AND IN ACCORDANCE WITH NFPA #54 2015.

18. TOILETS FACILITIES FOR CONSTRUCTION WORKERS SHALL BE IN ACCORDANCE WITH SECTION PC311.

19. THE POTABLE WATER SUPPLY SHALL BE PROTECTED AGAINST BACKFLOW IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC608 AND RULES OF THE NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION.

SCOPE OF WORK

1. EXISTING TRUCK WASH PLUMBING IS TO BE DEMOLISHED.
2. EXISTING GAS PIPING TO BE REUSED. GAS CONNECTION TO BE MADE TO NEW MECHANICAL EQUIPMENT.
3. A NEW 1" GAS PIPE IS TO BE CONNECTED TO THE NEW RTU-2.
4. EXISTING VENTS TO ROOF ARE TO BE EXTENDED FOR THE NEW HEIGHT OF THE ROOF.
5. EXISTING ROOF DRAINS ARE TO BE RAISED WITH THE NEW HEIGHT OF THE ROOF.
6. EXISTING GAS VENTS FOR UNIT HEATERS IN THE GARAGE ARE TO BE RAISED WITH THE NEW HEIGHT OF THE ROOF.

FILING NOTES

THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES. THIS DRAWING FILED FOR PLUMBING SYSTEM ONLY.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
PLUMBING SYMBOLS, ABBREVIATIONS AND NOTES

SEAL & SIGNATURE

STATE OF NEW YORK — KEITH FITZGERALD — 074116 — LICENSED PROFESSIONAL ENGINEER

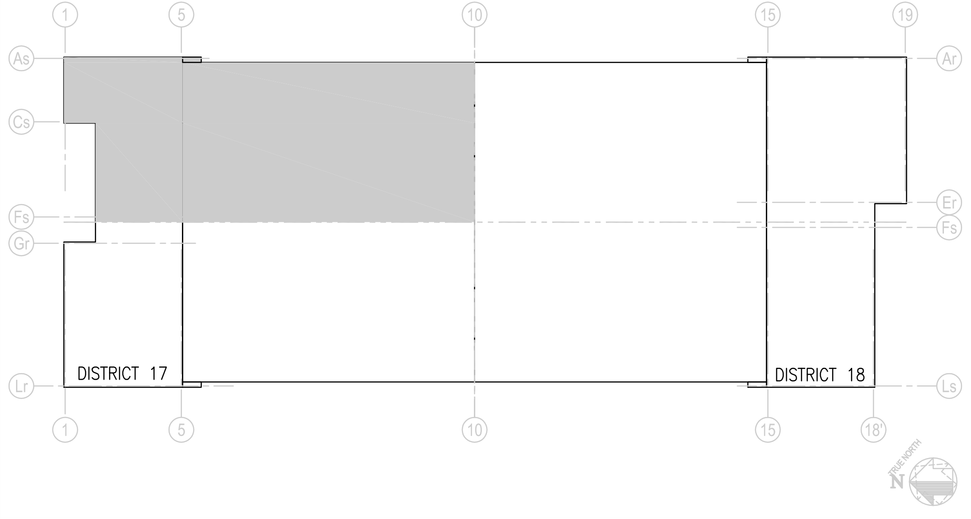
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1 1ST FL PLUMBING DEMOLITION FLOOR PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
1. CONTRACTOR TO FIELD VERIFY SIZE AND LOCATION OF PLUMBING PIPING AND FIXTURES.	1. EXISTING 2" NATURAL GAS LINE TO BE DEMOLISHED BACKTO GAS MAIN. CUT AND CAP.
2. CONTRACTOR TO COORDINATE ALL BASE BUILDING SHUTDOWNS WITH BUILDING ENGINEER PRIOR TO PERFORMING ANY WORK.	2. EXISTING 3" COLD WATER LINE TO TRUCK WASH TO BE DEMOLISHED BACK TO MAIN SOURCE. CUT AND CAP.
3. CONTRACTOR TO TRACE ALL UNDERGROUND PIPING BACK TO ACTIVE MAINS.	
4. PLUMBING CONTRACTOR TO COORDINATE ALL DEMOLITION WORK IN TRUCK WASH WITH CIVIL ENGINEER.	

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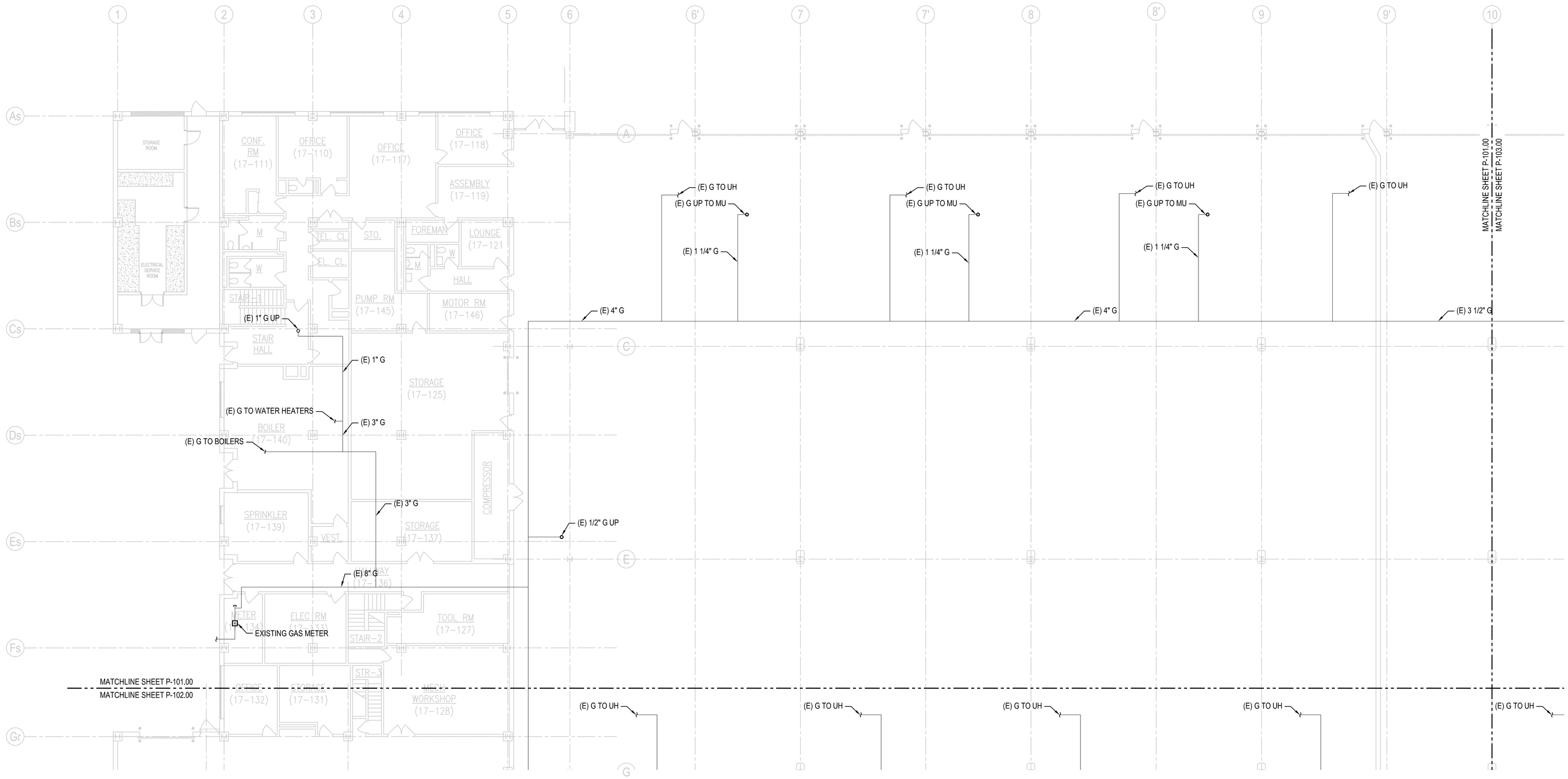
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DRAWING TITLE:
PLUMBING GROUND FLOOR DEMOLITION FLOOR PLAN - DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

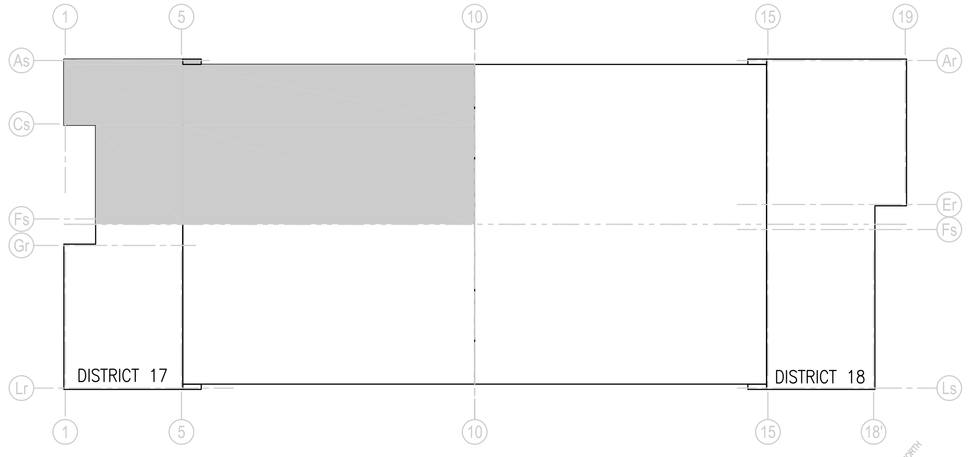
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1 1ST FL PLUMBING PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL PLUMBING PIPING IN THE FIELD.
2. EXISTING GAS PIPING TO REMAIN UNLESS INDICATED TO BE DEMOLISHED.
3. PLUMBING CONTRACTOR TO COORDINATE CONNECTING EXISTING GAS PIPING TO NEW MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR
4. PLUMBING CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR GAS PIPING WORK.
5. CONTRACTOR TO CAP EXISTING PIPING AFTER DEMOLITION OF EXISTING MECHANICAL EQUIPMENT. NEW MECHANICAL EQUIPMENT TO BE CONNECTED TO EXISTING PIPING, ALLOW FOR 5 FT. OF NEW GAS PIPING PER MECHANICAL UNIT.

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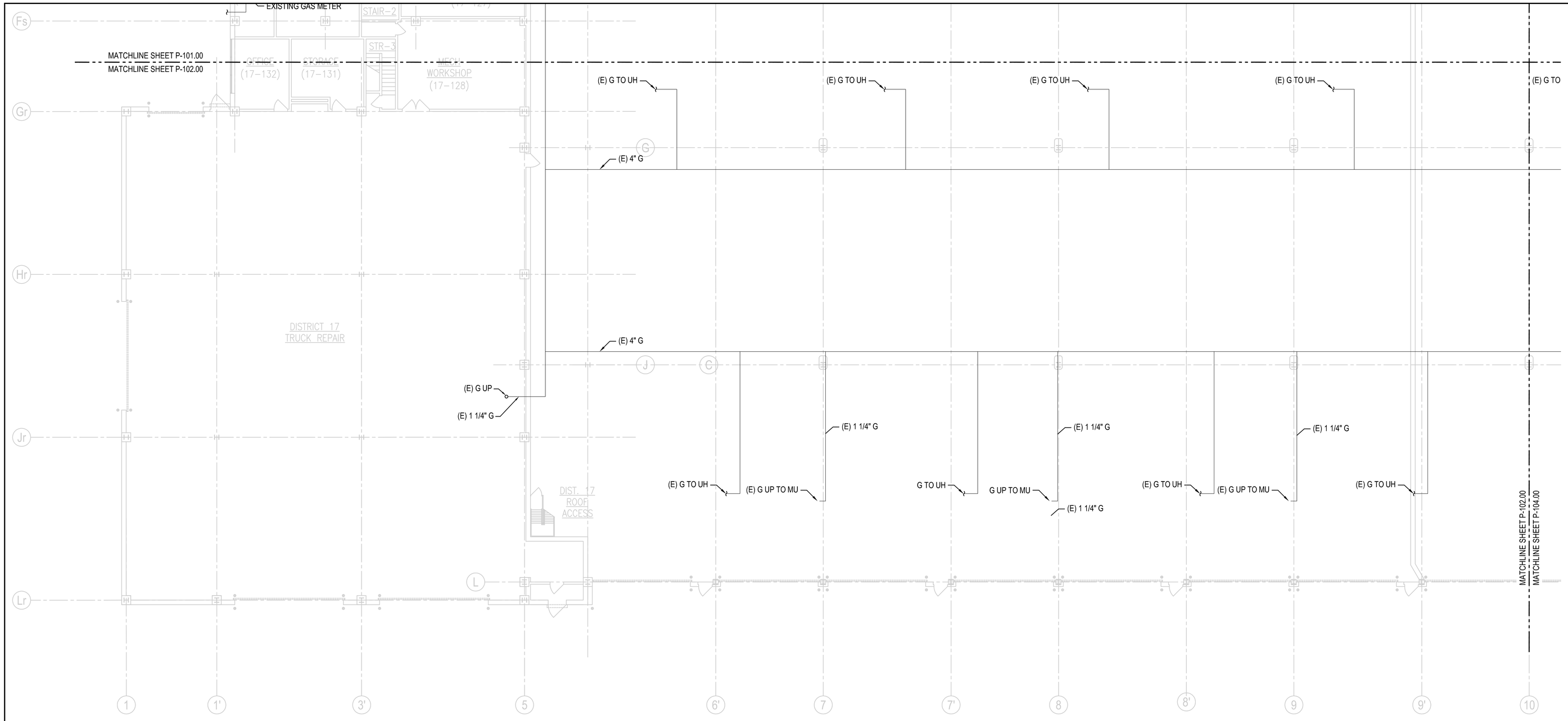
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DRAWING TITLE:
PLUMBING GROUND FLOOR PLAN - DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · HEITH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

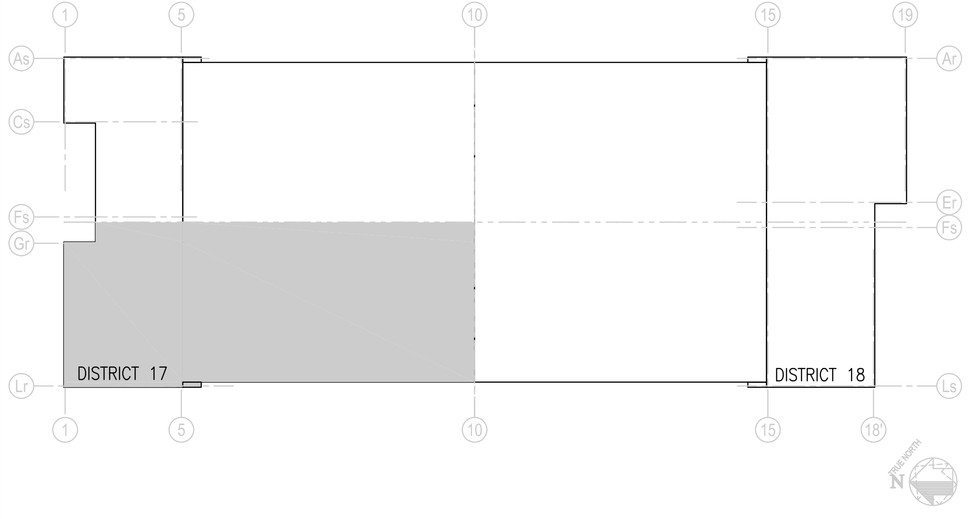
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1 1ST FL PLUMBING PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL PLUMBING PIPING IN THE FIELD.
2. EXISTING GAS PIPING TO REMAIN UNLESS INDICATED TO BE DEMOLISHED.
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4. PLUMBING CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR GAS PIPING WORK.
5. CONTRACTOR TO CAP EXISTING PIPING AFTER DEMOLITION OF EXISTING MECHANICAL EQUIPMENT. NEW MECHANICAL EQUIPMENT TO BE CONNECTED TO EXISTING PIPING. ALLOW FOR 5 FT. OF NEW GAS PIPING PER MECHANICAL UNIT.

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

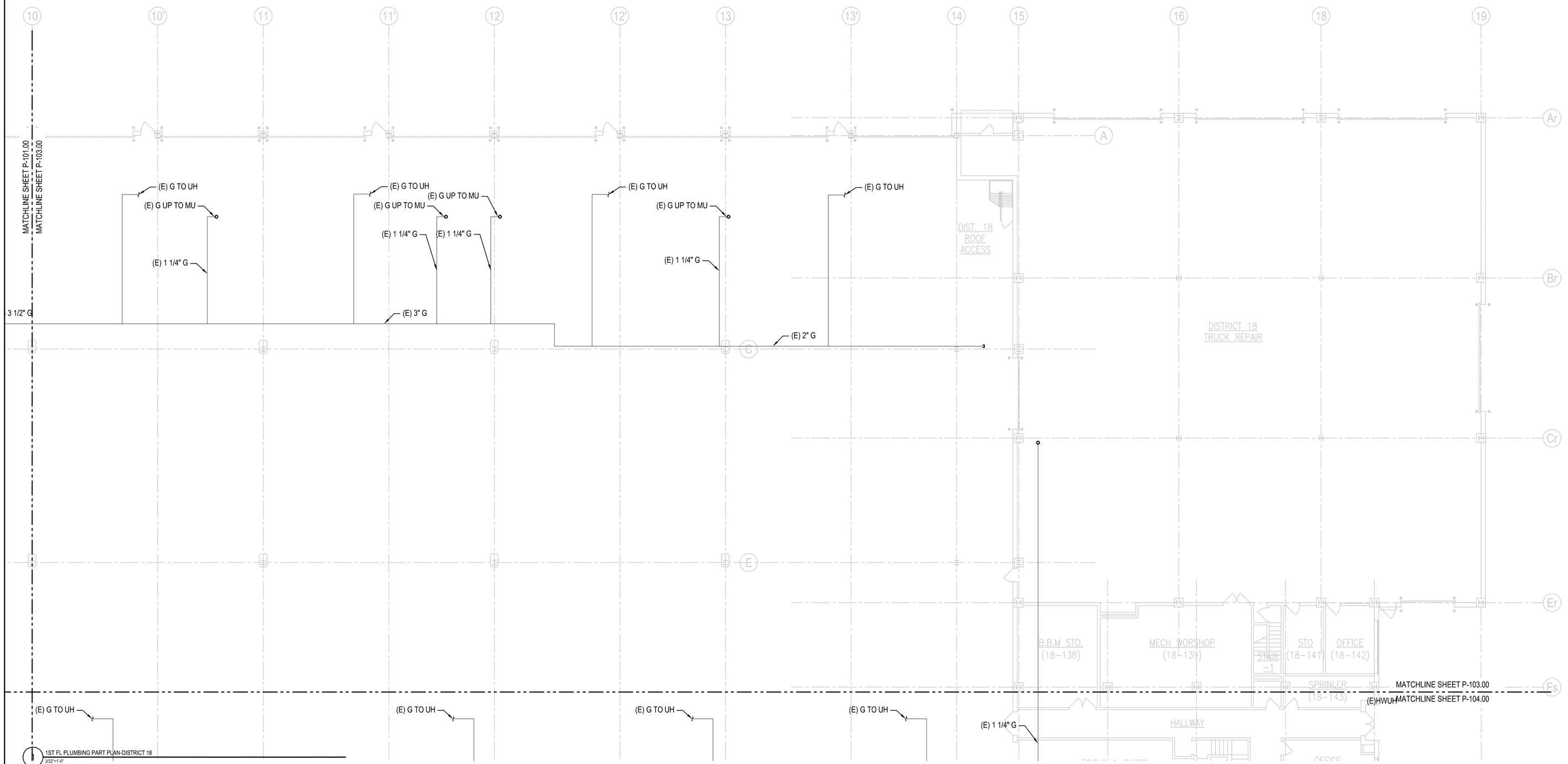
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SEAL & SIGNATURE

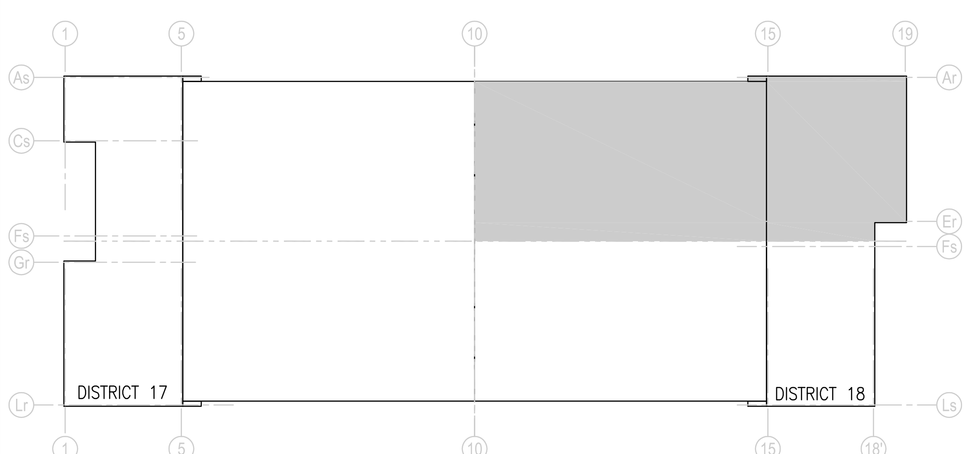


DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	P-102.00

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KEY PLAN



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL PLUMBING PIPING IN THE FIELD.
2. EXISTING GAS PIPING TO REMAIN UNLESS INDICATED TO BE DEMOLISHED.
3. PLUMBING CONTRACTOR TO COORDINATE CONNECTING EXISTING GAS PIPING TO NEW MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR
4. PLUMBING CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR GAS PIPING WORK.
5. CONTRACTOR TO CAP EXISTING PIPING AFTER DEMOLITION OF EXISTING MECHANICAL EQUIPMENT. NEW MECHANICAL EQUIPMENT TO BE CONNECTED TO EXISTING PIPING. ALLOW FOR 5 FT. OF NEW GAS PIPING PER MECHANICAL UNIT.

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CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

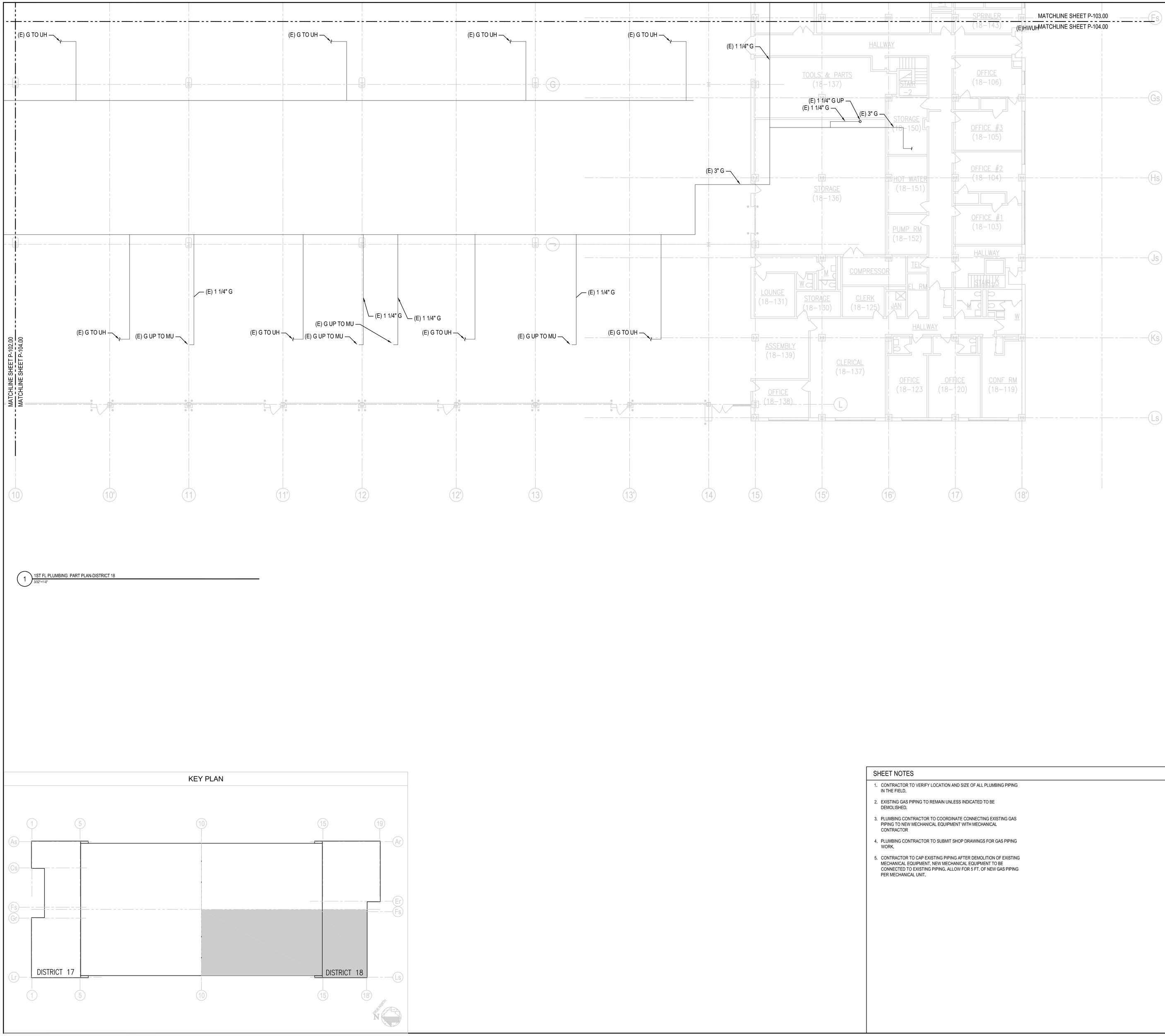
DRAWING TITLE:
PLUMBING GROUND FLOOR PLAN - DISTRICT 18

SEAL & SIGNATURE

STATE OF NEW YORK · KEITH FITZPATRICK · LICENSED PROFESSIONAL ENGINEER · 074116

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: HG
CHECKED BY: HG
DRAWING NUMBER:
P-103.00

Plotted: 9/27/2019 8:27:05 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\P-103.00_DDC33000.DWG - momeara



1 1ST FL PLUMBING PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN

SHEET NOTES

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BROOKLYN, NY 11236
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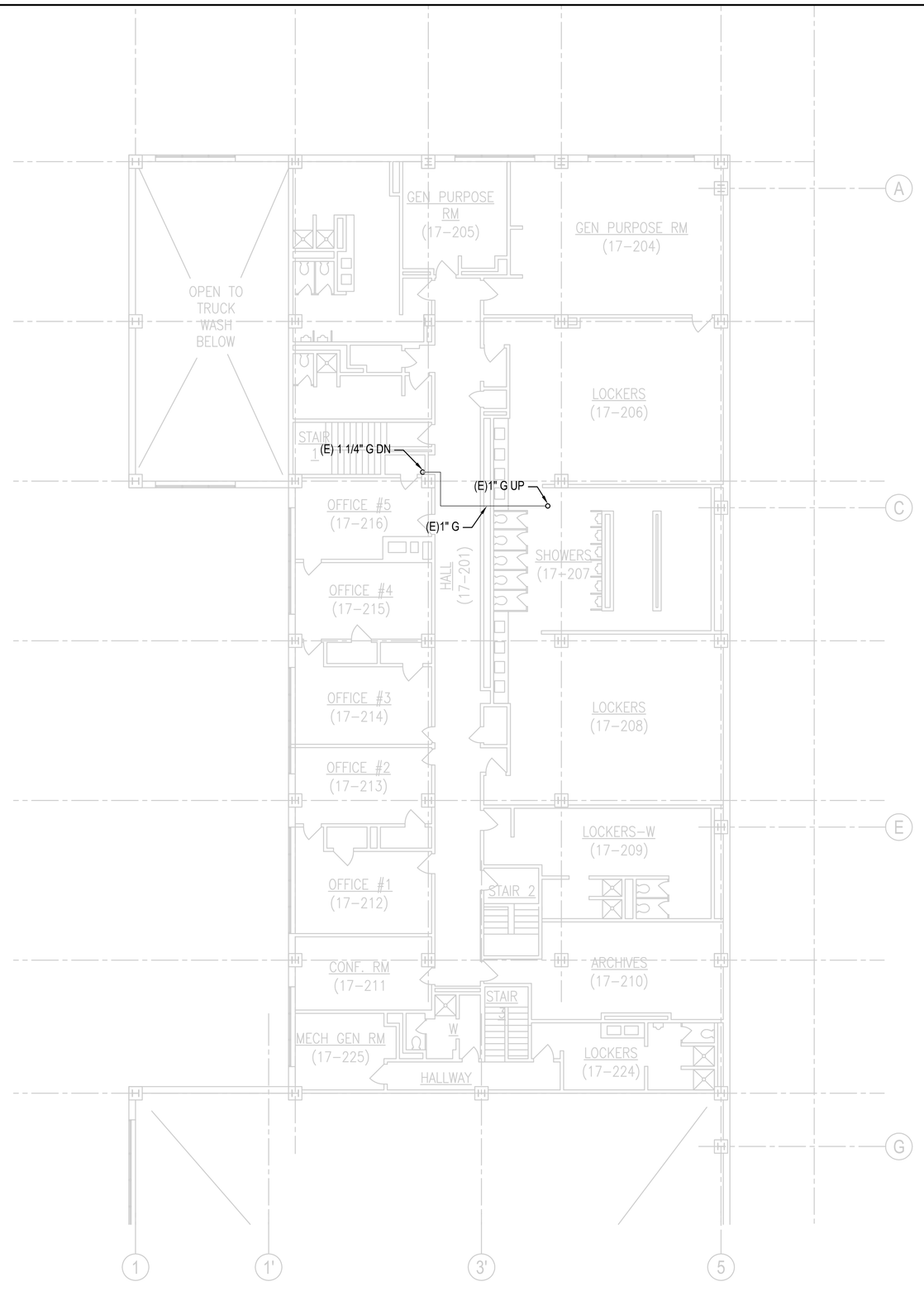
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PLUMBING GROUND FLOOR PLAN - DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

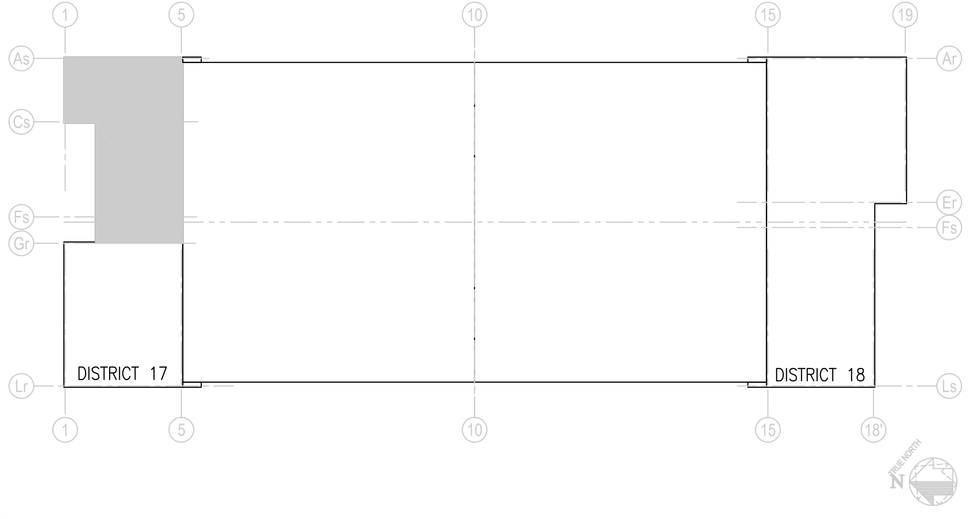
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1 2ND FL PLUMBING PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



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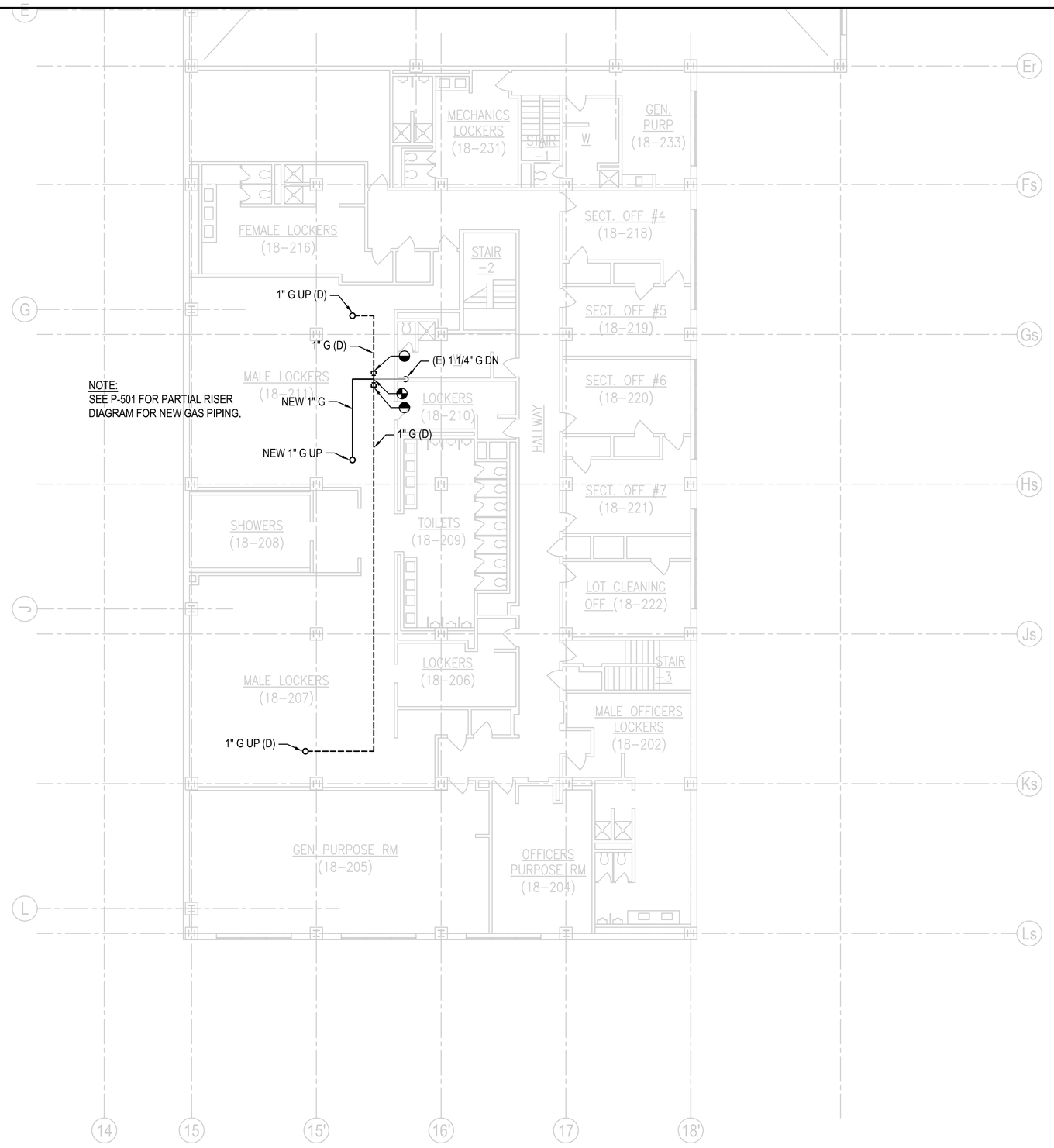
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PLUMBING 2ND FLOOR PLAN - DISTRICT 17

SEAL & SIGNATURE

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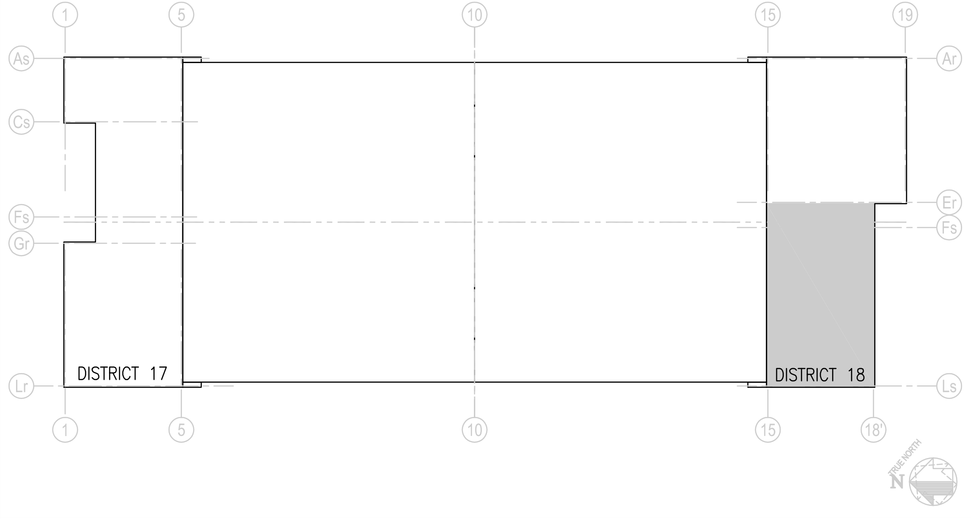
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1 2ND FL PLUMBING PART PLAN-DISTRICT 18
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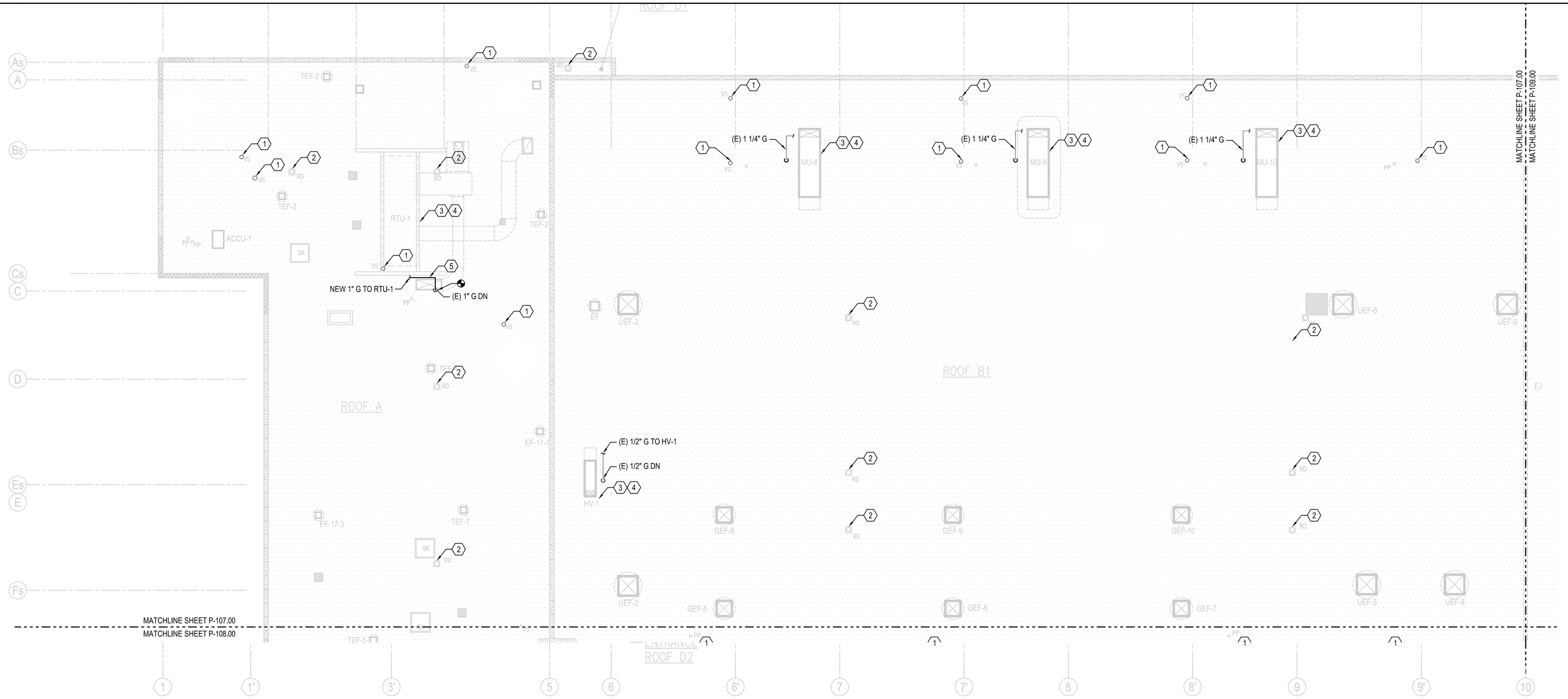
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DRAWING TITLE:
PLUMBING 2ND FLOOR PLAN - DISTRICT 18

SEAL & SIGNATURE
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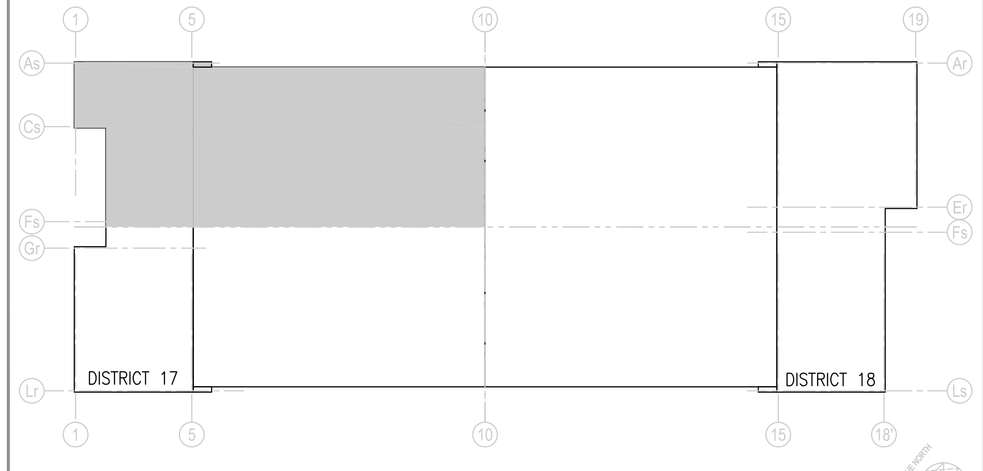
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1 PLUMBING ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL EXISTING PIPING IN THE FIELD.
2. EXISTING GAS VENTS TO BE RAISED WITH NEW ROOF.

SHEET KEYNOTES

1. EXISTING BENT TO ROOF TO BE RAISED WITH NEW ROOF TO MAINTAIN CLEARANCE.
2. ROOF DRAIN TO BE RAISED WITH NEW ROOF.
3. PLUMBING CONTRACTOR TO COORDINATE NATURAL GAS CONNECTION TO MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR.
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5. REROUTE GAS PIPING TO NEW RTU-1 UNIT.

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10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

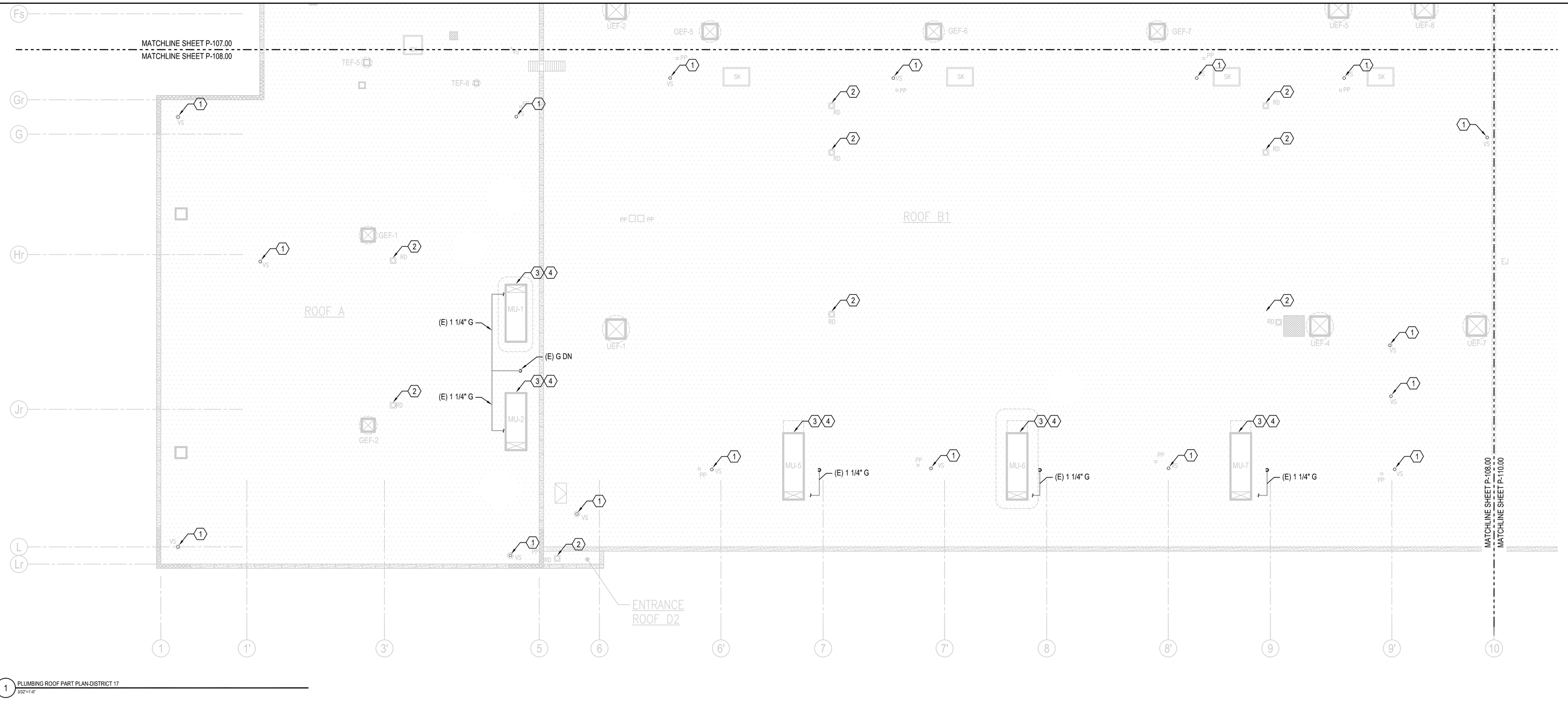
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PLUMBING ROOF PLAN

SEAL & SIGNATURE

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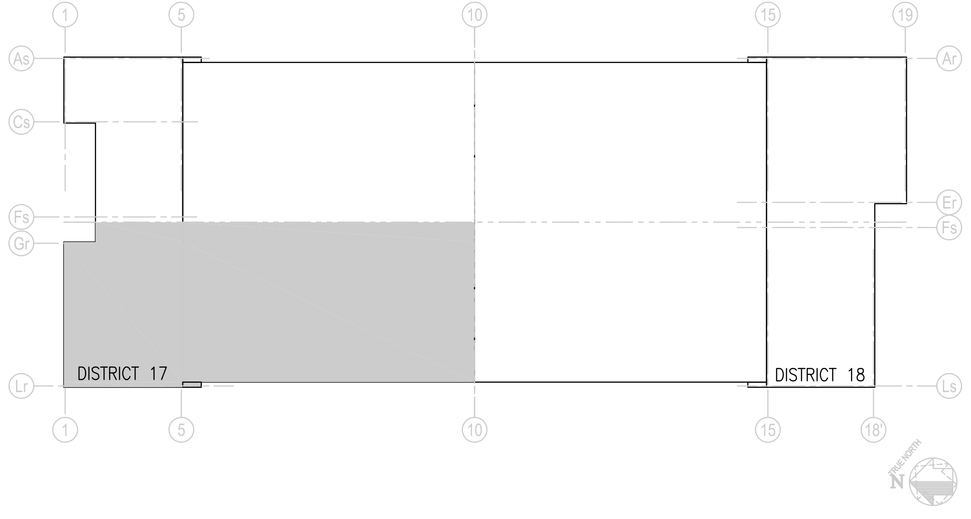
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PROJECT NO:	DDC33000
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CHECKED BY:	HG
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1 PLUMBING ROOF PART PLAN-DISTRICT 17
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL EXISTING PIPING IN THE FIELD.
2. EXISTING GAS VENTS TO BE RAISED WITH NEW ROOF.

SHEET KEYNOTES

1. EXISTING VENT TO ROOF TO BE RAISED WITH NEW ROOF TO MAINTAIN CLEARANCE.
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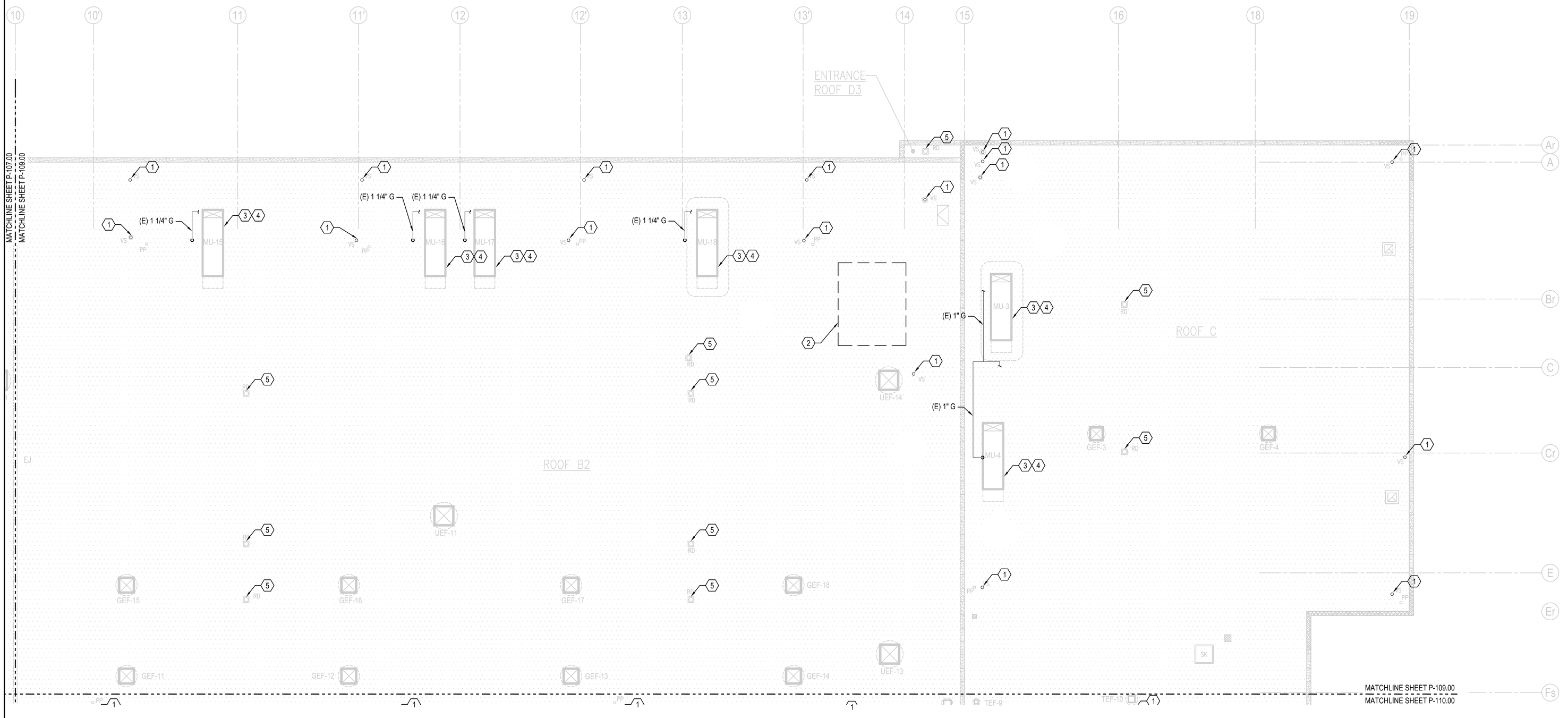
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DRAWING TITLE:
PLUMBING ROOF PLAN

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STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

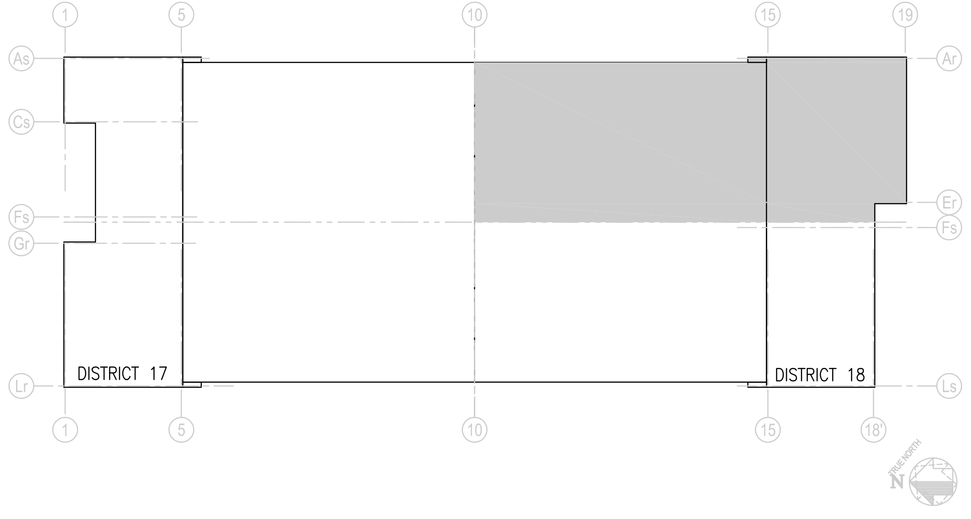
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PROJECT NO:	DDC33000
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CHECKED BY:	HG
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1 PLUMBING ROOF PART PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES

1. CONTRACTOR TO VERIFY LOCATION AND SIZE OF ALL EXISTING PIPING IN THE FIELD.
2. EXISTING GAS VENTS TO BE RAISED WITH NEW ROOF.

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1. EXISTING VENT TO ROOF TO BE RAISED WITH NEW ROOF TO MAINTAIN CLEARANCE.
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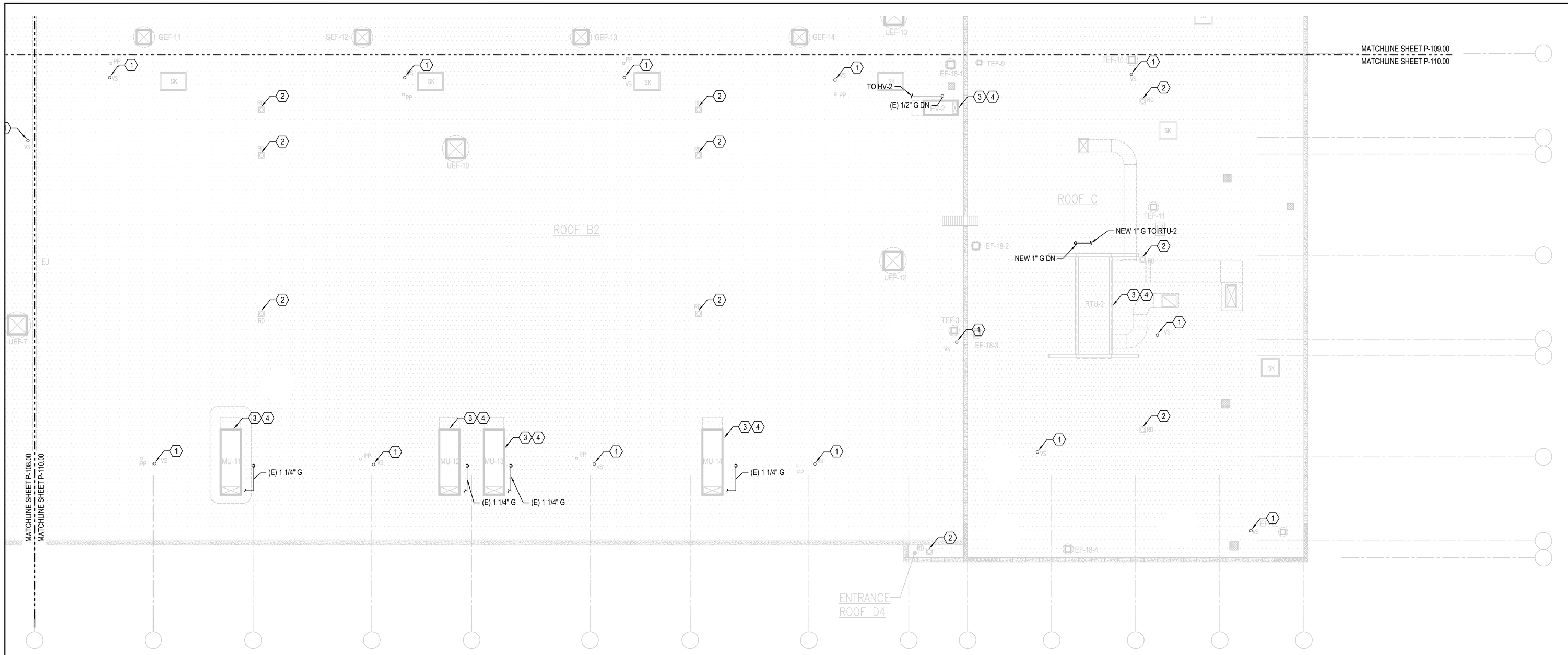
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PLUMBING ROOF PLAN

SEAL & SIGNATURE
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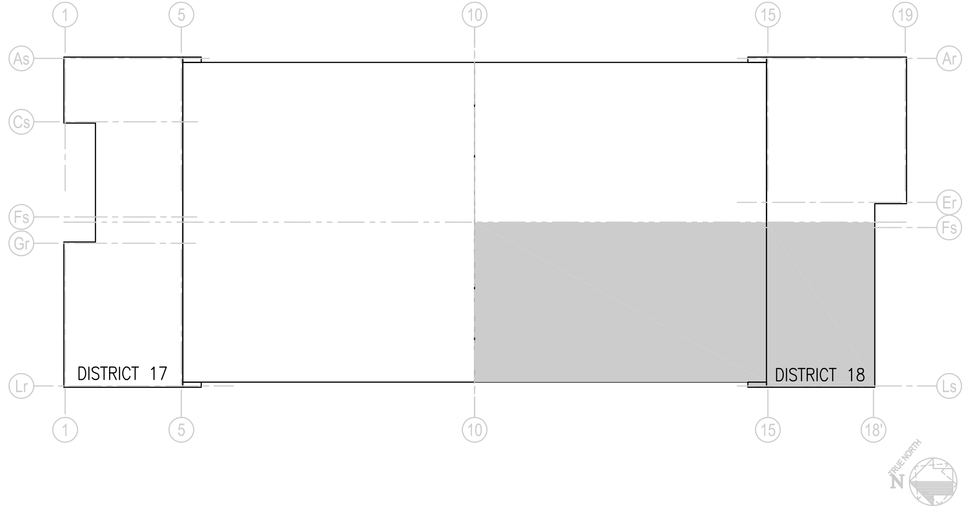
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1 PLUMBING ROOF PART PLAN-DISTRICT 18
3/32" = 1'-0"

KEY PLAN



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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

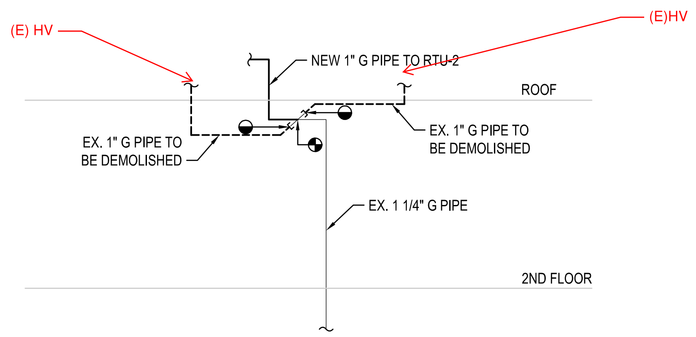
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DRAWING TITLE:
PLUMBING ROOF PLAN

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

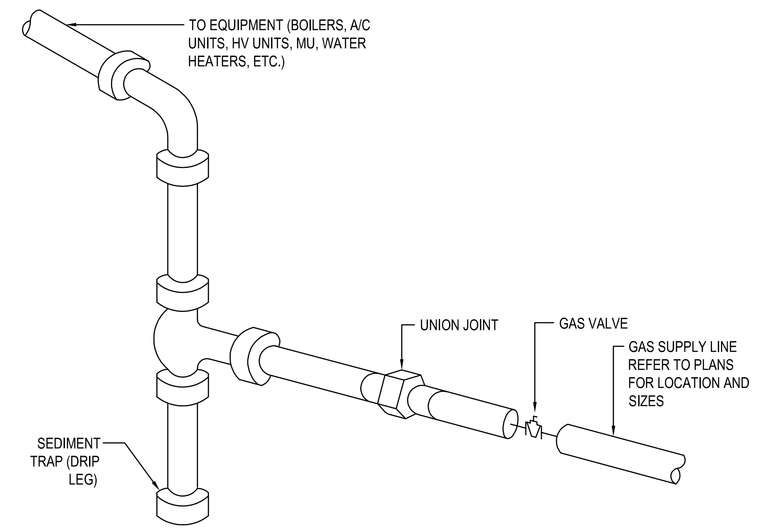
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	HG
CHECKED BY:	HG
DRAWING NUMBER:	P-110.00

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SCALE: NONE

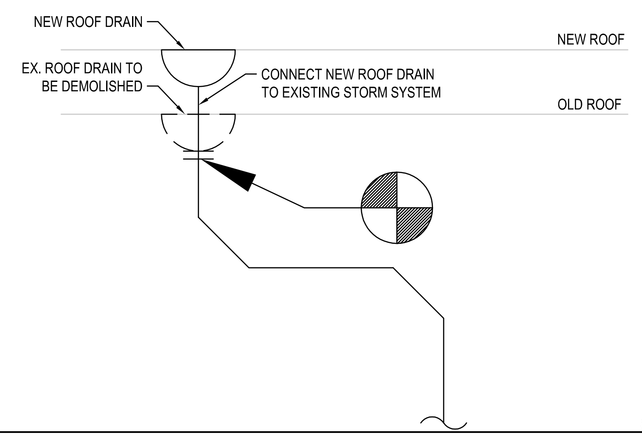
8 PARTIAL NATURAL GAS RISER DIAGRAM



SCALE: NONE

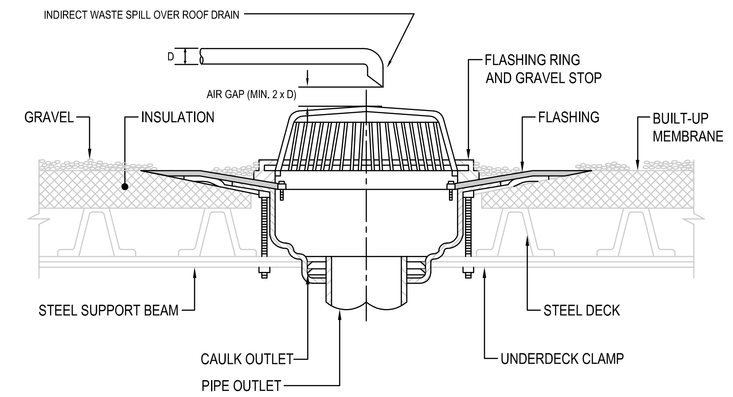
4 GAS EQUIPMENT CONNECTION

NOTES:
DEMOLISH EXISTING ROOF DRAIN AND REPLACE IN KIND. INSTALL NEW ROOF DRAIN AT NEW ROOF LEVEL.



SCALE: NONE

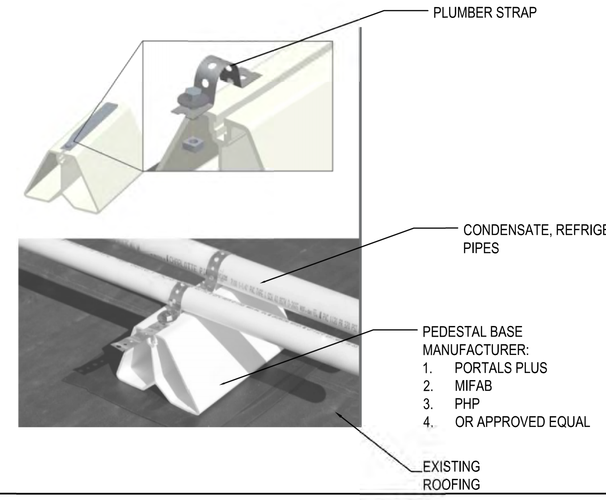
7 PARTIAL STORM RISER DIAGRAM (TYP.)



NOTE :
PIPE OUTLET SHALL BE CAULKED OR NO-HUB.

SCALE: NONE

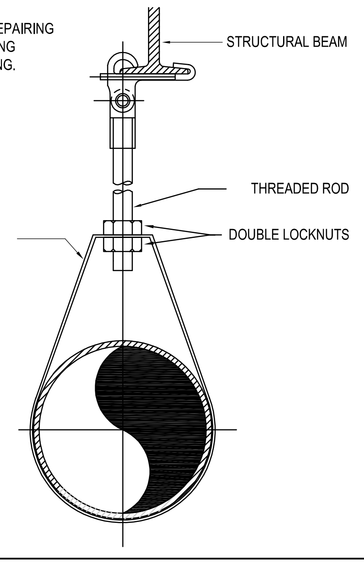
3 ROOF DRAIN (STEEL DECK WITH INSULATION SLOPED)



SCALE: NONE

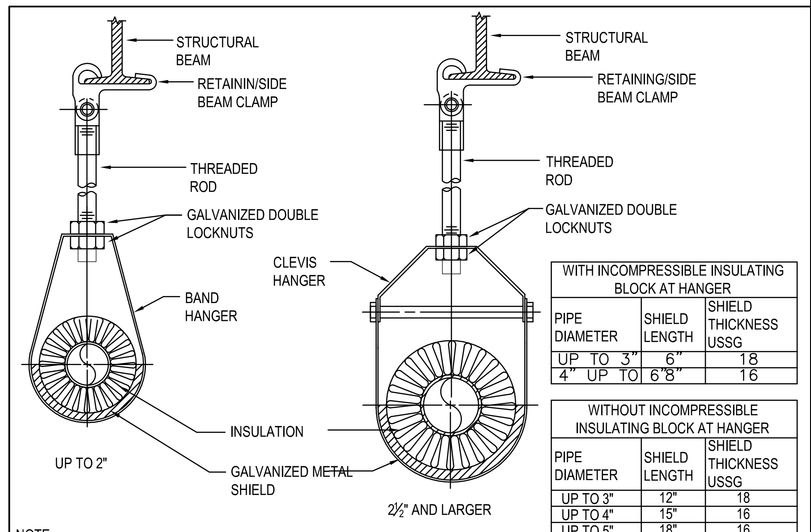
6 PIPING SUPPORT ON ROOF

NOTE:
CONTRACTOR IS RESPONSIBLE FOR REPAIRING DAMAGE TO THE FIRE PROOFING DURING INSTALLATION TO MAINTAIN FIRE RATING.



SCALE: NONE

2 UNINSULATED PIPE SUPPORT



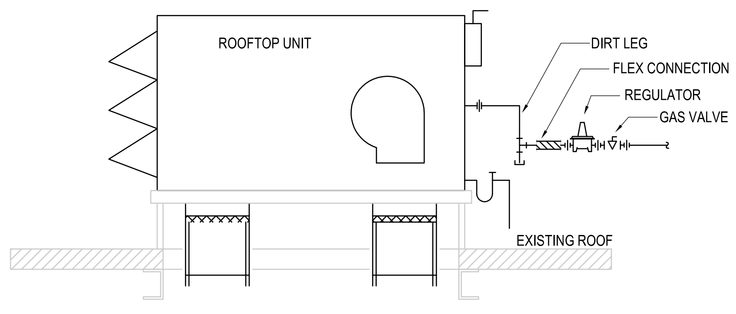
WITH INCOMPRESSIBLE INSULATING BLOCK AT HANGER		
PIPE DIAMETER	SHIELD LENGTH	SHIELD THICKNESS USSG
UP TO 3"	6"	18
4" UP TO 6"	8"	16

WITHOUT INCOMPRESSIBLE INSULATING BLOCK AT HANGER		
PIPE DIAMETER	SHIELD LENGTH	SHIELD THICKNESS USSG
UP TO 3"	12"	18
UP TO 4"	15"	16
UP TO 5"	18"	16
UP TO 6"	21"	16

NOTE:
CONTRACTOR IS RESPONSIBLE FOR REPAIRING DAMAGE TO THE FIRE PROOFING DURING INSTALLATION TO MAINTAIN FIRE RATING.

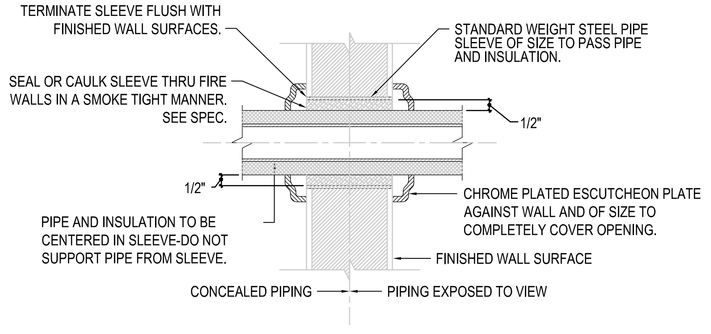
SCALE: NONE

9 TYPICAL INSULATED PIPE SUPPORT - BEAM MOUNTED



SCALE: NONE

5 ROOFTOP UNIT GAS INSTALLATION



INTERIOR WALL

SCALE: NONE

1 PIPE SLEEVE THRU FIRE RATED WALL (NYC)

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96 Morton Street, NY, New York 10014-3309

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Engineers ■ Land Surveyors ■ Construction Managers
120 West John Street Hicksville, NY 11801
Tel: 516-248-1010 Fax: 516-248-9018
www.hiranigroup.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
PLUMBING DETAILS

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · PROFESSIONAL ENGINEER

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ABBREVIATIONS

ADDR.	ADDRESSABLE
AFF	ABOVE FINISHED FLOOR
C.	CONDUIT
CL.	CLOSET
CM.	CONSTRUCTION MANAGER
COND.	CONDUCTOR
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DWG.	DRAWING
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRIC
EMR	ELEVATOR MACHINE ROOM
E	EXISTING
EOLR	END OF LINE RESISTOR
FAC	FIRE ALARM CONTRACTOR
FAP	FIRE ALARM PANEL
FCVA	FLOOR CONTROL VALVE ASSEMBLY
FCC	FIRE COMMAND CENTER
FAS	FIRE ALARM SYSTEM
FL.	FLOOR
FP	FIRE PROTECTION
FT.	FEET
MECH.	MECHANICAL
NYC	NEW YORK CITY
NYCBC	NEW YORK CITY BUILDING CODE
N.I.C.	NOT IN CONTRACT
PR.	PAIR
PRV.	PRESSURE REDUCING VALVE STATION
R	REMOVE
RCV	RISER CONTROL VALVE
RDGP	REMOTE DATA GATHERING PANEL
T.P.	TWISTED PAIR
T.S.P.	TWISTED SHIELDED PAIR S.P. SHIELDED PAIR

SYMBOLS

- CONDUIT OR EQUIPMENT
- CONDUIT OR EQUIPMENT TO BE DEMOLISHED
- CONDUIT UP
- CONDUIT DOWN
- F — ADDRESSABLE MANUAL PULL STATION
- SD — ADDRESSABLE AREA SMOKE DETECTOR
- SD — ADDRESSABLE ELEVATOR RECALL LOBBY AREA SMOKE DETECTOR W/RED LED
- SD$_V$
- HD — ADDRESSABLE AREA HEAT DETECTOR
- FD — AREA FLAME DETECTOR
- WF — WATERFLOW ALARM DEVICE PROVIDED & INSTALLED BY FIRE PROTECTION CONTRACTOR
- TS — VALVE TAMPER SWITCH PROVIDED & INSTALLED BY FIRE PROTECTION CONTRACTOR
- HA — HIGH AIR PRESSURE SWITCH PROVIDED & INSTALLED BY FIRE PROTECTION CONTRACTOR
- LA — LOW AIR PRESSURE SWITCH PROVIDED & INSTALLED BY FIRE PROTECTION CONTRACTOR
- ST$_{XX}$ — WALL MOUNTED HORN/STROBE UNIT (X/X = SPEAKER/ STROBE CIRCUIT)
- SS$_{X/X}$ — NEW CEILING MOUNTED HORN/STROBE UNIT (X/X = SPEAKER/ STROBE CIRCUIT)
- ST$_X$ — CEILING MOUNTED STROBE UNIT (X = STROBE CIRCUIT)
- G — FIRE ALARM SYSTEM GONG
- ST$_X$ — WALL MOUNTED STROBE UNIT (X = STROBE CIRCUIT)
- S — WALL MOUNTED STAIRWAY SPEAKER
- DH — 120 VAC MAGNETIC DOOR HOLDER
- MM — ADDRESSABLE INTERFACE MONITOR MODULE
- CM$_{X/X}$ — ADDRESSABLE INTERFACE MONITOR MODULE (I/O) = INPUT/OUTPUT MODULE
- R$_X$ — AUXILIARY INTERFACE CONTROL RELAY (DPDT = DOUBLE-POLE DOUBLE THROW INTERPOSING RELAY)
- TB — TERMINAL BOX WITH TERMINAL STRIP
- WS — WARDEN STATION
- RL — REMOTE ALARM LAMP
- FACP — FIRE ALARM CONTROL PANEL
- RDGP — FIRE ALARM SYSTEM REMOTE DATA GATHERING PANEL (TRANSPONDER)
- STRB — FIRE ALARM SYSTEM BOOSTER POWER SUPPLY
- ANN — FIRE ALARM SYSTEM ANNUCIATOR PANEL
- RAN — FIRE ALARM SYSTEM REMOTE ANNUCIATOR PANEL
- DACT — FIRE ALARM SYSTEM DIGITAL ALARM TRANSMITTER (CENTRAL STATION)
- PB — PULL BOX
- RTS — REMOTE TEST SWITCH WITH LIGHT INDICATOR

SYMBOL NOTES:

1. ANY SYMBOL WITH THE SUBSCRIPT x# THE # PROVIDED IS THE QUANTITY OF THE SYMBOL.

SHEET INDEX

NO.	TITLE	SCALE
FA-001.00	FIRE ALARM SYMBOLS, ABBREVIATIONS, AND NOTES	NTS
FA-002.00	FIRE ALARM SPECIFICATIONS	NTS
DFA-101.00	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17	3/32" = 1'-0"
DFA-102.00	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17	3/32" = 1'-0"
DFA-103.00	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 18	3/32" = 1'-0"
DFA-104.00	FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 18	3/32" = 1'-0"
DFA-105.00	FIRE ALARM 2ND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17	3/32" = 1'-0"
DFA-106.00	FIRE ALARM 2ND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 18	3/32" = 1'-0"
DFA-107.00	FIRE ALARM ROOF DEMOLITION PLAN	3/32" = 1'-0"
DFA-108.00	FIRE ALARM ROOF DEMOLITION PLAN	3/32" = 1'-0"
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FA-110.00	FIRE ALARM ROOF PLAN	3/32" = 1'-0"
FA-501.00	FIRE ALARM DETAILS	NTS
FA-601.00	FIRE ALARM RISER DIAGRAM	NTS

GENERAL NOTES

1. THESE DRAWINGS ARE THE CONSTRUCTION DOCUMENTS FOR THE BROOKLYN 17/18 SANITATION GARAGE FIRE ALARM SYSTEM WITHIN THE EXISTING BUILDING LOCATED AT AVENUE D & 105TH STREET, NEW YORK, NY. ALL INSTALLATION WORK SHALL BE COMPLETED BY A LICENSED ELECTRICAL CONTRACTOR, WHO SHALL BE REFERRED TO AS "CONTRACTOR" WHERE REFERENCED ELSEWHERE WITHIN THESE DOCUMENTS. NEW FIRE ALARM DEVICES WILL BE INSTALL AND CONNECTED TO THE EXISTING FIRE ALARM SYSTEM LOCATED AT GARAGE 17. THE NEW FIRE ALARM SYSTEM SHALL FOLLOW THE REQUIREMENTS OF THE 2014 NEW YORK CITY BUILDING CODE (907.2.2, 907.2.4, 907.2.13, AND 911) AND THE 2011 NEW YORK CITY ELECTRICAL CODE (NYCEC). IN ADDITION TO THE STANDARDS LISTED IN THE SPECIFICATION, NAMELY THE 2010 EDITION OF NFPA 72 AS MODIFIED BY APPENDIX Q OF THE 2014 NEW YORK CITY BUILDING CODE (NYCBC)

2. THE SCOPE OF WORK IS FOR THE REPLACEMENT OF THE EXISTING FIRE ALARM DEVICES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL FIRE ALARM SYSTEM COMPONENTS & DEVICES, WIRING, CONDUIT, MOUNTING HARDWARE, SYSTEM TESTING AND INSTRUCTING THE CITY OF NEW YORK TO THE OPERATION OF THE PANEL. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR SUBCONTRACTING WITH A CERTIFIED FIRE ALARM CONTRACTOR WHO SHALL REPRESENT THE SYSTEM MANUFACTURER TO ENSURE PROPER INSTALLATION, PROGRAMMING, OPERATION, FINAL PANEL WIRING AND MANUFACTURER SUPPORT.

3. THIS PROJECT SHALL INCLUDE THE INSTALLATION OF A NEW ADDRESSABLE FAS EQUIPPED WITH A FIRE ALARM CONTROL PANEL (FACP), REMOTE ANNUNCIATOR PANEL, ADDRESSABLE TRANSPONDERS, STROBE PANELS, ADDRESSABLE INITIATING DEVICES, AND NEW NOTIFICATION APPLIANCES AS SHOWN ON THE DRAWINGS AND INDICATED BELOW. IN ADDITION, THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH OTHER TRADES FOR INTERCONNECTION TO OTHER BUILDING SYSTEMS (IE: HVAC, AMCS, SECURITY, ELEVATOR, FIRE PROTECTION, ELECTRICAL, ETC.). TRANSPONDERS, DATA GATHERING PANELS, NODES, ETC. SHALL COMMUNICATE WITH THE CENTRAL PROCESSING UNIT (CPU) VIA A CLASS "X" SIGNALING LINE CIRCUIT (SLC) MEETING THE REQUIREMENTS AS DESCRIBED IN NFPA 72; ALL OTHER SIGNALING LINE CIRCUITS (SLC), INITIATING DEVICE CIRCUITS (IDC) AND NOTIFICATION APPLIANCE CIRCUITS (NAC) SHALL BE INSTALLED UTILIZING CLASS "B" PATHWAYS MEETING THE REQUIREMENTS AS DESCRIBED IN NFPA 72. PATHWAY SURVIVABILITY SHALL BE LEVEL 3 IN ACCORDANCE WITH SECTION 24.3.5.4.1 OF NFPA 72

4.THE CONDUIT RISER BACKBONE SHALL BE INSTALLED TO CONNECT ALL SYSTEM PANELS, TERMINAL BOXES AND POWER PANELS. THE RISER AND THE DEDICATED POWER RISER SHALL EMPLOY A PATHWAY SURVIVABILITY LEVEL 2, IN ACCORDANCE WITH NFPA-72.12.4.2(2010). WIRING SHALL BE PROVIDED IN THE RISER CONDUITS FOR RS-485 PRIMARY NETWORK COMMUNICATION, ADDRESSABLE, NOTIFICATION, REDUNDANT (STYLE 7) NETWORK COMMUNICATION, POWER AND SPARE CIRCUITS AS INDICATED ON DRAWINGS. ALL CONDUIT AND WIRING SHALL BE LABELED AS PER SPECIFICATIONS. ALL 120VAC POWER CONDUITS AND ALL RISER CONDUITS SHALL BE RIGID GALVANIZED STEEL OR IMC TYPE;AS PER CODE.

5. A CONDUIT RISER SYSTEM SHALL BE INSTALLED TO CONNECT ALL SYSTEM TRANSPONDERS AND TERMINAL BOXES. WIRING SHALL BE PROVIDED IN THE RISER CONDUITS FOR ADDRESSABLE CIRCUITS, AUDIBLE & VISUAL NOTIFICATION CIRCUITS AND SPARE CIRCUITS. ALL CONDUIT AND WIRING SHALL BE LABELED AS PER SPECIFICATIONS. ALL RISER CONDUITS SHALL BE RIGID GALVANIZED STEEL (RGS) TYPE. PROVIDE CONDUIT, PULL BOXES, SLEEVES AND CORE DRILLING AS REQUIRED. PROVIDE FIRE STOPPING FOR ALL FLOOR AND WALL PENETRATIONS TO MAINTAIN FIRE RATINGS.

6. TERMINAL BOXES SHALL BE NEMA 3R AND INSTALLED FOR EACH FLOOR/ZONE, AS INDICATED ON THE DRAWINGS. PROVIDE AND INSTALL TERMINAL STRIPS IN EACH TERMINAL BOX FOR TERMINATION OF ALL RISER CIRCUITS AND FOR THE HORIZONTAL DISTRIBUTION OF ALL INITIATING AND NOTIFICATION CIRCUITS SERVING EACH FLOOR, AS SHOWN ON DRAWINGS. TERMINAL STRIPS SHALL BE LABELED WITH THE APPROPRIATE CIRCUIT TYPE.

7. THE NEW ADDRESSABLE INITIATION DEVICES SHALL BE CONNECTED TO THE APPROPRIATE FAS CIRCUITS AT THE TERMINAL BOX SERVING EACH FLOOR. PROVIDE AND INSTALL END OF LINE DEVICES AS REQUIRED. INSTALL LINE ISOLATION MODULES FOR EVERY 30 DEVICES ON EACH ADDRESSABLE INITIATING CIRCUIT. EXACT LOCATIONS OF ISOLATION MODULES SHALL BE DETERMINED IN THE FIELD, DOCUMENTED AND LABELED AS SUCH.

8. ALL FIRE ALARM LOW VOLTAGE WIRING SHALL BE CERTIFIED TEFLON JACKETED FIRE ALARM CABLE WHICH MEETS THE REQUIREMENTS OF THE NEW YORK CITY ELECTRICAL CODE SECTION 760. FIRE ALARM CABLE MAY BE INSTALLED UNPROTECTED BY CONDUIT WHEN CONCEALED FROM VIEW, PROTECTED BY THE BUILDING CONSTRUCTION. PROVIDE APPROVED FIRE STOPPING MATERIAL FOR ALL FLOOR, WALL AND BARRIER PENETRATIONS TO MAINTAIN FIRE/SMOKE RATINGS. ALL FAS CONDULETS, JUNCTION BOXES AND TERMINAL BOXES SHALL BE PAINTED FIRE DEPARTMENT RED, IN ACCORDANCE WITH NYCEC.

9. THE BASE CONTRACT SHALL INCLUDE A CONCEALED CONDUIT & CABLE INSTALLATION. ALL FIRE ALARM DEVICES AND FIELD CIRCUITS IN OCCUPIED AREAS ON THE FLOORS, SHALL BE RECESSED AND CONCEALED. SURFACE MOUNTING OF DEVICES AND CONDUIT SHALL BE PERMITTED IN UN- OCCUPIED AREAS SUCH AS MACHINE ROOMS, SHAFT WAYS AND OTHER UNOCCUPIED AREAS. ALL SURFACE MOUNTED DEVICE BACK-BOXES SHALL BE THE FINISHED TYPE. REFER TO DETAIL SHEETS FOR FURTHER INFORMATION.

10. DURING INSTALLATION THE ELECTRICAL CONTRACTOR SHALL TEST ALL WIRING FOR INTEGRITY (CONDUCTOR TO CONDUCTOR/CONDUCTOR TO GROUND) AFTER EACH PHASE OF WORK AFTER ALL EQUIPMENT IS COMPLETELY INSTALLED, TESTED AND OPERATIONAL, THE FCS SHALL BE PROGRAMMED AND ALL TRANSPONDER PANELS SHALL BE TESTED AND THE WIRING RE-TESTED FOR INTEGRITY.

11. INSTALL NEW ADDRESSABLE DUCT MOUNTED SMOKE DETECTORS AT SUPPLY/RETURN FANS & RETURN DUCTS, INCLUDING ADDRESSABLE CONTROL MODULES & REMOTE RELAYS AT FAN UNITS, AS INDICATED ON THE DRAWINGS. FAN SHUTDOWN SHALL BE A FUNCTION OF THE SYSTEM, NOT THE DUCT DETECTOR. CONTRACTOR TO VERIFY FAN SHUTDOWN WIRING WITH BMS AND MECHANICAL CONTRACTORS. PROVIDE INTERPOSING RELAYS AS REQUIRED FOR INTERPOSING VOLTAGES AT THE FAN STARTER CIRCUITS OR MCC. ADDITIONAL ADDRESSABLE CONTROL MODULES SHALL BE PROVIDED AND INSTALLED (AS OUTPUTS) TO THE NEW AMCS FOR FIRE ALARM INDICATIONS AND ALSO FOR SEQUENTIAL FAN RESTART, UPON MANUAL COMMAND FROM THE FCS. DUCT MOUNTED SMOKE DETECTORS SHALL BE PROVIDED WITH REMOTE LED/TEST SWITCHES.

12. FAN UNITS THAT HAVE BEEN SHUTDOWN DURING AN ALARM CONDITION SHALL NOT AUTOMATICALLY RESTART UPON RESET OF THE FIRE ALARM SYSTEM, THEY SHALL ONLY BE RESTARTED MANUALLY. AFTER AN ALARM HAS BEEN CLEARED, THE MANUAL ACTIVATION OF A FAN RESTART ENABLE SWITCH SHALL BE REQUIRED TO ALLOW THE FANS TO RESUME NORMAL OPERATION.

13. INSTALL NEW ADDRESSABLE DUCT MOUNTED SMOKE DETECTORS WITHIN 5' OF SMOKE DAMPERS AS SHOWN ON THE CONTRACT DRAWINGS. WHERE REQUIRED TO COMPLY WITH SECTION 607.3.2 OF THE NEW YORK CITY MECHAINCAL CODE.

14. INSTALL ADDRESSABLE CONTROL MODULES AND RELAYS FOR THE CONTROL OF ALL COMBINATION FIRE / SMOKE DAMPERS AND SMOKE DAMPERS LOCATED ON THE FLOORS. SMOKE DAMPERS LOCATED WITHIN THE MECHANICAL ROOMS SERVING THE UNIT / MULTIPLE FLOORS SHALL BE DIRECTLY INTERLOCKED WITH THE FAN MOTOR CIRCUITS THEREFORE DO NOT REQUIRE DIRECT CONTROL FROM THE FIRE ALARM SYSTEM.

15. INSTALL ADDRESSABLE MONITOR MODULES FOR THE SUPERVISION OF ALL DAMPER END SWITCHES ON ALL COMBINATION FIRE / SMOKE DAMPERS AND SMOKE DAMPERS LOCATED ON THE FLOORS. END SWITCHES ON SMOKE DAMPERS LOCATED WITHIN THE MECHANICAL ROOMS SERVING THE UNIT / MULTIPLE FLOORS SHALL BE DIRECTLY INTERLOCKED WITH THE FAN MOTOR CIRCUITS THEREFORE DO NOT REQUIRE SUPERVISION BY THE FIRE ALARM SYSTEM. ALL MAIN SHAFT DAMPERS LOCATED ON THE FLOOR SHALL BE MONITORED FOR THEIR CLOSED POSITION. ALL SMOKE DAMPERS ALONG THE SMOKE WALL SHALL BE MONITORED FOR THEIR OPEN POSITION. REFER TO DIVISION 23 FOR LOCATIONS OF ALL DAMPERS. COORDINATE WITH HVAC AND BMS CONTRACTORS FOR ALL WIRING CONNECTIONS.

16. ALL DEVICES INSTALLED AS DESCRIBED ABOVE SHALL BE PROGRAMMED, TESTED AND MADE FULLY OPERATIONAL AT THE FCC TO IMPLEMENT THE FIRE MANAGEMENT SEQUENCE OF OPERATION AS DESCRIBED IN THE DRAWINGS AND SPECIFICATIONS. THE ENTIRE FIRE ALARM SYSTEM SHALL BE TESTED IN ACCORDANCE WITH NFPA-72 (CHAPTER 14) INSPECTION, TESTING AND MAINTENANCE. THE CONTRACTORS SHALL BE RESPONSIBLE FOR COMMISSIONING A PRE-TEST PRIOR TO FDNY INSPECTION. THE OWNER SHALL BE PERMITTED 3 COMPLETE SYSTEM REPROGRAMMINGS AS PART OF THIS CONTRACT.

17. THE FIRE ALARM CONTRACTOR SHALL PROVIDE ADEQUATE SIGNAGE DURING THE CONSTRUCTION OF ALL NEW FIRE ALARM EQUIPMENT, TO CLEARLY IDENTIFY WHICH FIRE ALARM DEVICES ARE IN SERVICE AN/OR OUT OF SERVICE. SIGNAGE SHALL REMAIN POSTED UNTIL THE NEW FIRE ALARM EQUIPMENT IS ACCEPTED.

18. THE FIRE ALARM CONTRACTOR SHALL FILE WITH DOB/FDNY APPROPRIATE A433 & B45 FORM FOR INSPECTION BY FDNY FIRE PREVENTION BUREAU ELECTRICAL UNIT. ALL FEES FOR THE FDNY INSPECTIONS TO BE PAID FOR BY THE ELECTRICAL TRADE MANAGER. EXPEDITING SERVICES SHALL BE PROVIDED BY THE CONSTRUCTION MANAGER.

19. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PATCHING OF SURFACES DAMAGED BY INSTALLATION OF NEW EQUIPMENT. ALL FLOOR AND WALL PENETRATIONS SHALL BE FILLED WITH AN APPROVED FIRE STOPPING MATERIAL. THE CONTRACTOR SHALL COORDINATE ALL PATCHING AND LOCATION OF EQUIPMENT WITH THE CM. THE CM SHALL SCHEDULE AND APPROVE ALL WORK.

20. ALL WORK, WIRING, CONDUIT AND EQUIPMENT INSTALLATIONS SHALL MEET ALL APPLICABLE CODES REFERENCED IN BID SPECIFICATIONS AND SHALL BE CONSISTENT WITH MANUFACTURER'S SPECIFICATIONS. ALL WIRING AND CONDUIT REQUIREMENTS SHALL BE VERIFIED WITH THE FIRE ALARM CONTRACTOR AND MANUFACTURER.

21. UPON COMPLETION OF THE ALL WORK, THE CONTRACTOR SHALL SUBMIT 'AS-BUILT' DRAWINGS AS PER DIVISION 1 SPECIFICATIONS OF THE NEW FIRE ALARM SYSTEM TO THE CM.

22. UPON REVIEW OF CONSTRUCTION DOCUMENTS AND PRIOR TO THE SUBMISSION OF PROPOSALS, THE CONTRACTORS SHALL INFORM THE CM OF ANY DISCREPANCIES OR REQUEST CLARIFICATIONS, IF NECESSARY, CONCERNING THE INTENT OF THE PLANS AND SPECIFICATIONS.

BUILDING DEPARTMENT APPROVAL NOTE:

THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

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DIVISION OF BUILDINGS

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PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

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FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

DRAWING TITLE:
FIRE ALARM SYMBOLS, ABBREVIATIONS ANDNOTES

SEAL & SIGNATURE

STATE OF NEW YORK — KEITH FITZPATRICK — 024116 — LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	JM
CHECKED BY:	JM
DRAWING NUMBER:	FA-001.00
NTS	136 of 169

Plotted: 9/27/2019 8:00:25 AM P:\NY\OM\EP_E\NPP\DDC33000\DRAWINGS\SHEETS\FA-001.00_DDC33000.DWG - khasan

SYSTEM INPUTS / INITIATING DEVICES	SYSTEM OUTPUTS / INDICATING APPLIANCES/CONTROL DEVICES	FACP ANNUNCIATION								NOTIFICATION				REQUIRED FIRE SAFETY CONTROL						
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P			
		ACTUATE COMMON ALARM SIGNAL INDICATOR ON LCD OF FACP & OUTLYING ANNUNCIATORS.	ACTUATE COMMON SUPERVISORY SIGNAL INDICATOR ON LCD OF FACP & OUTLYING ANNUNCIATORS.	ACTUATE COMMON TROUBLE SIGNAL INDICATOR ON LCD OF FACP & OUTLYING ANNUNCIATORS.	SOUND INTERNAL BUZZER AT FACP & OUTLYING ANNUNCIATORS.	TEXT DISPLAY OF ACTIVATED DEVICE TYPE & LOCATION ON LCD OF FACP & OUTLYING ANNUNCIATORS.	ACTIVATE ALL STROBES AND HORNS (EVACUATION TONE) THROUGHOUT BUILDING.	TRANSMIT ALARM SIGNAL TO CENTRAL STATION VIA TELEPHONE COMPANY LINES.	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	INITIATE FAN SHUT DOWN										
1	MANUAL STATION	●			●	●	●	●			●									
2	AREA SMOKE/HEAT DETECTOR	●			●	●	●	●			●									
3	DUCT SMOKE DETECTOR										●									
4	WATERFLOW SWITCH	●			●	●	●	●			●									
5	SPRINKLER CONTROL VALVE/ TAMPER SWITCH		●		●	●			●											
6	FIRE ALARM AC POWER FAILURE		●		●	●			●											
7	FIRE ALARM SYSTEM LOW BATTERY			●	●	●				●										
8	OPEN CIRCUIT			●	●	●				●										
9	GROUND CIRCUIT			●	●	●				●										
10	NOTIFICATION APPLIANCE CIRCUIT OPEN OR SHORT			●	●	●				●										

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

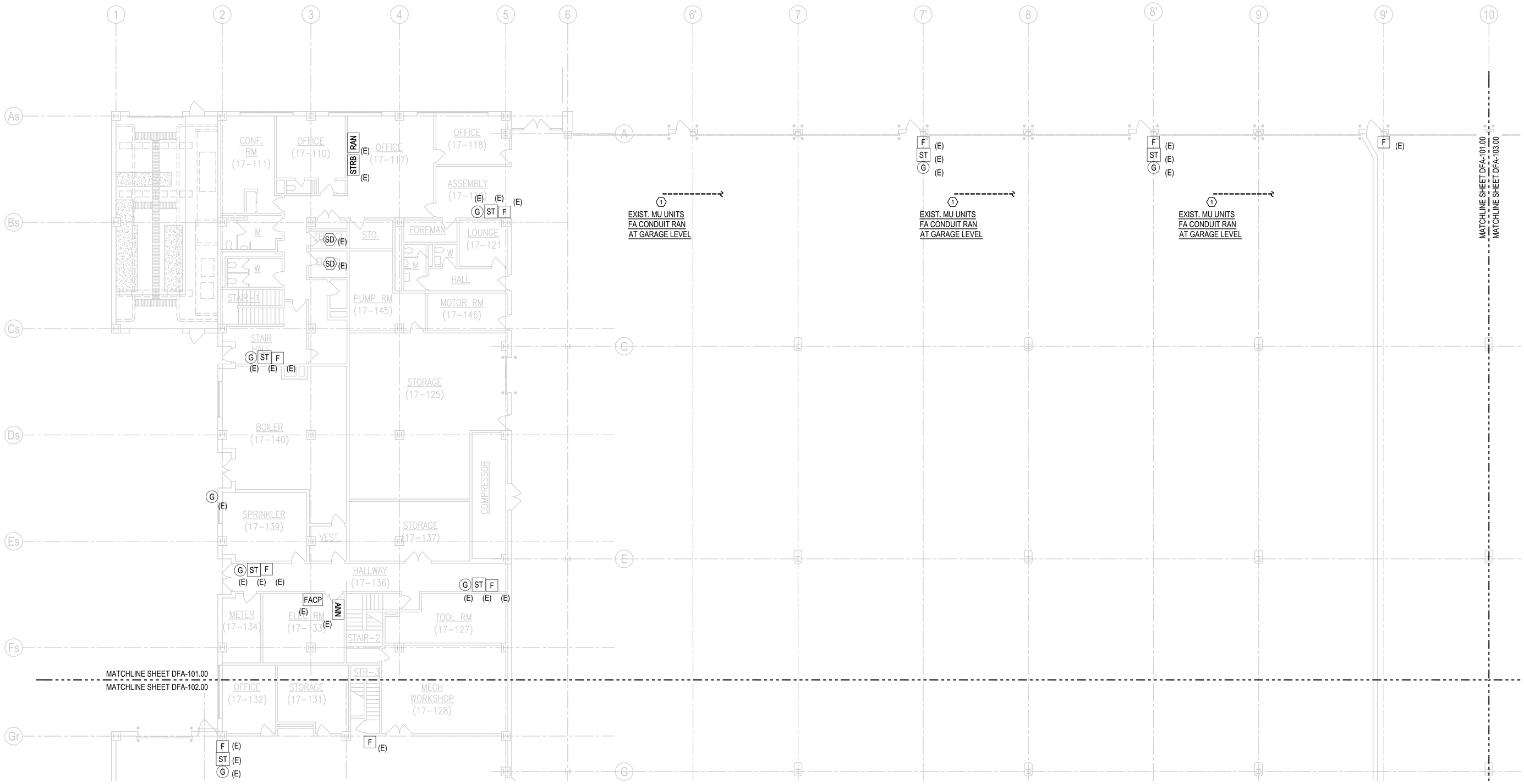
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DRAWING TITLE:
FIRE ALARM SPECIFICATIONS

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH TITTEL — 074116 — LICENSED PROFESSIONAL ENGINEER

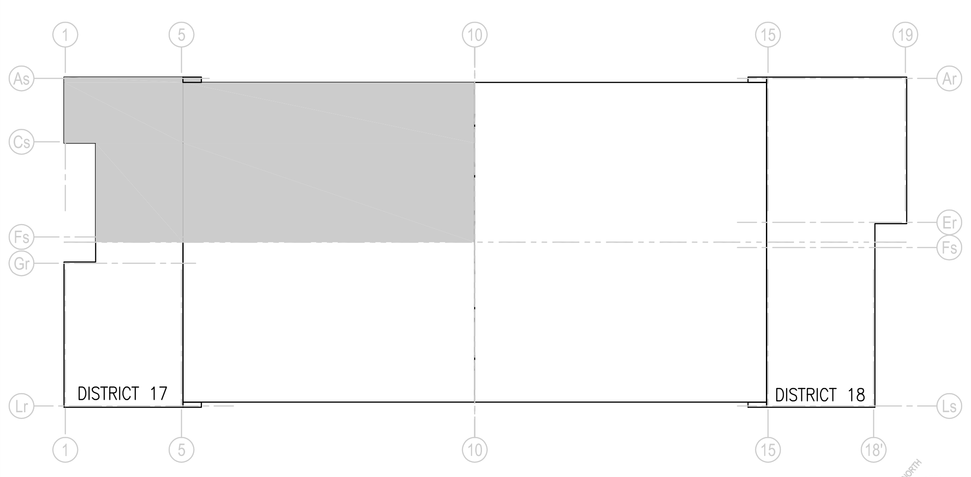
DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: JM
CHECKED BY: JM
DRAWING NUMBER:
FA-002.00
NTS

Plotted: 9/27/2019 8:00:17 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-002.00_DDC33000.DWG - ksimpson



1 1ST FL FIRE ALARM DEMOLITION FLOOR PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REMOVED

SHEET NOTES

1. THE FIRE ALARM CONTRACTOR SHALL CONNECT ALL NEW FIRE ALARM DEVICES TO THE EXISTING BUILDING FIRE ALARM CONTROL PANEL. THE FIRE ALARM CONTRACTOR SHALL REFER TO DRAWING FA-001.00 FOR ADDITIONAL INFORMATION.
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3. LOCATION & DIMENSIONS OF ALL DEVICES ETC. SHALL BE COORDINATED IN FIELD.
4. THE FIRE ALARM CONTRACTOR SHALL REVIEW & COORDINATE WITH OTHER TRADES DRAWINGS FOR THE EXACT LOCATION OF EQUIPMENT PRIOR TO CONNECTING & COMMENCING WORK.
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6. PROVIDE RIGID STEEL CONDUIT IN AREAS WHERE WIRING IS EXPOSED. FIRE ALARM CABLE MAY BE INSTALLED UN PROTECTED BY CONDUIT WHEN CONCEALED FROM VIEW, PROTECTED BY BUILDING CONSTRUCTION.
7. CONTRACTOR SHALL PROVIDE FIRE WATCH DURING CONSTRUCTION FOR ANY OCCUPIED AREA NOT COVERED BY THE FIRE ALARM SYSTEM.

SHEET KEYNOTES

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

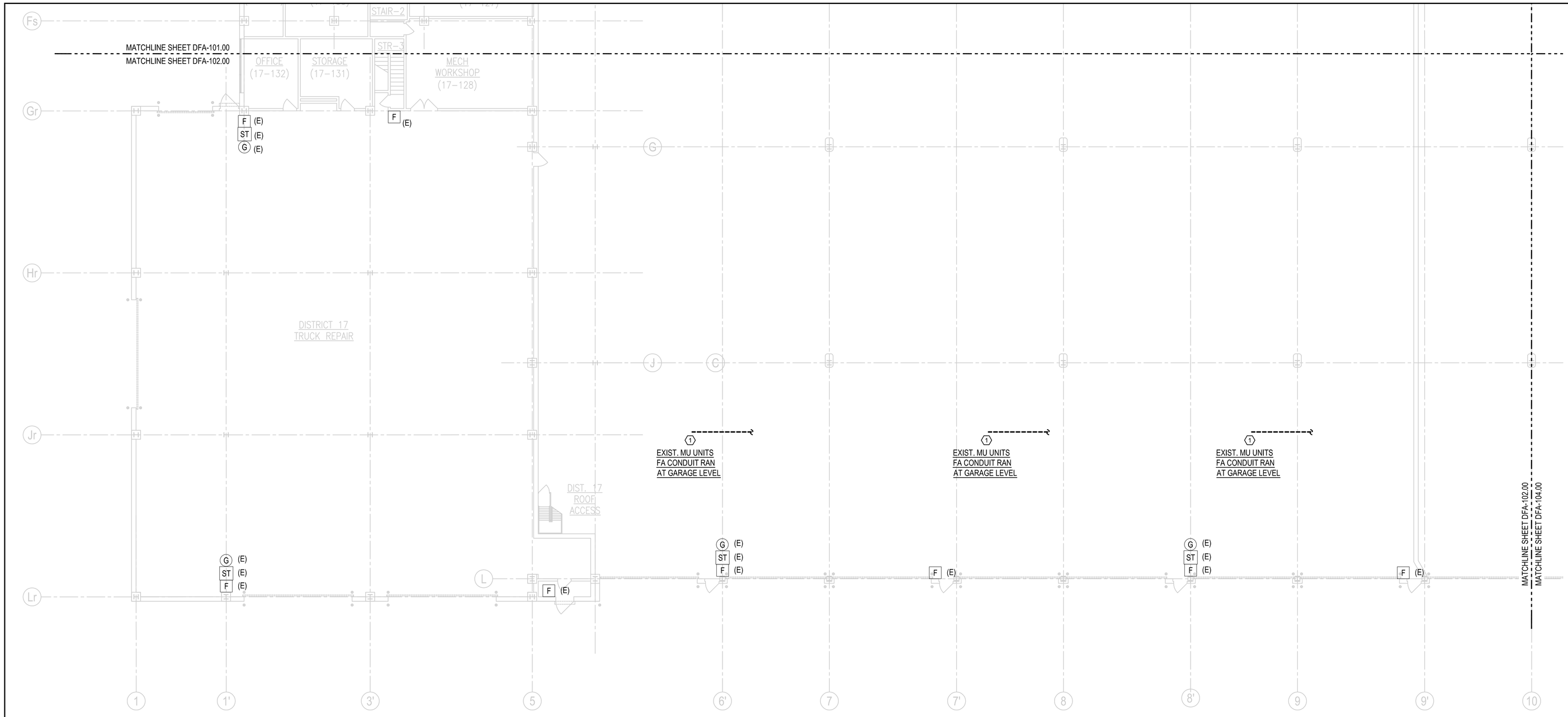
LOT: 1 BLOCK: 8138

DRAWING TITLE:
FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN- DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK — JUSTIN TITTLEBAUM — 074116 — LICENSED PROFESSIONAL ENGINEER

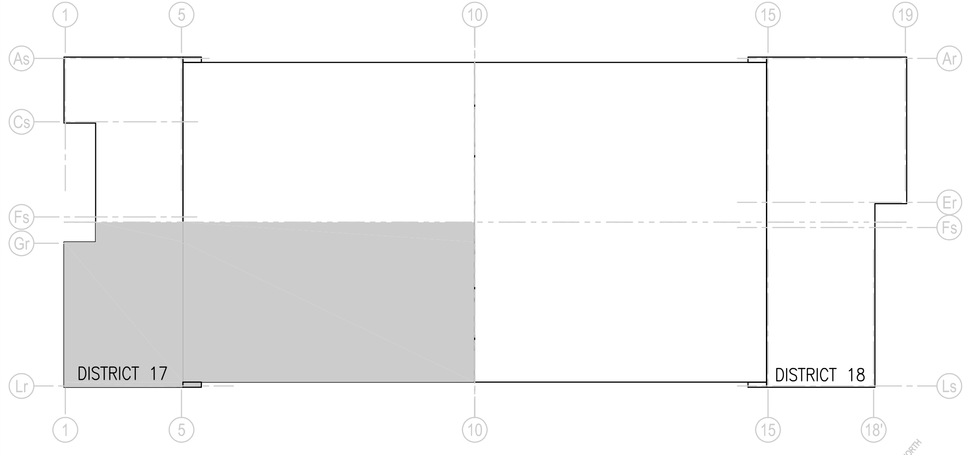
DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: JM
CHECKED BY: JM
DRAWING NUMBER: DFA-101.00
3/32" = 1'-0"

Plotted: 9/27/2019 8:22:55 AM P:\NYC\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\DFA-101.00_DDC33000.DWG - khasan



1 1ST FL FIRE ALARM DEMOLITION PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REMOVED

SHEET NOTES

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

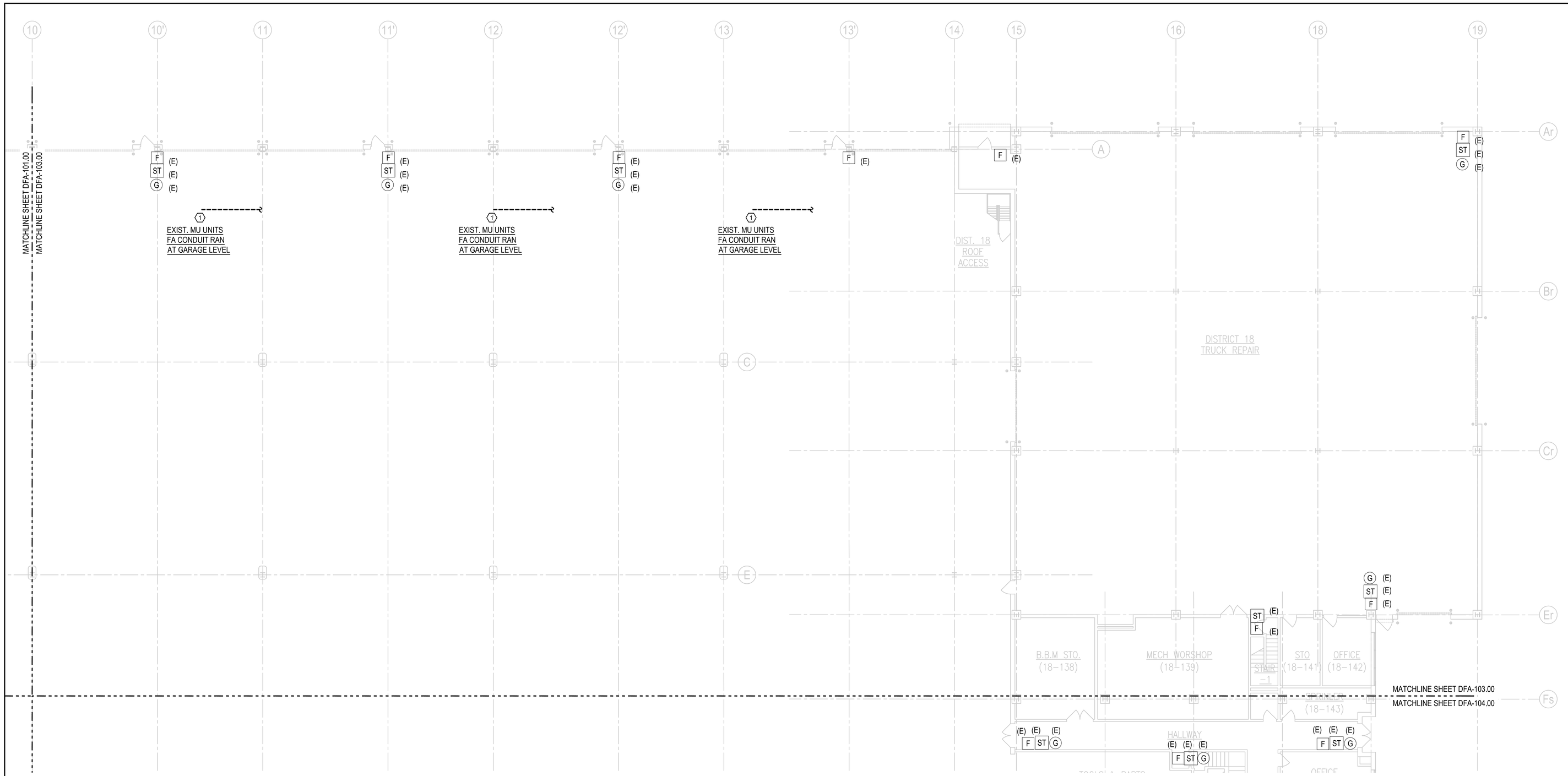
LOT: 1 BLOCK: 8138

DRAWING TITLE:
FIRE ALARM GROUND FLOOR DEMOLITION PLAN - DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

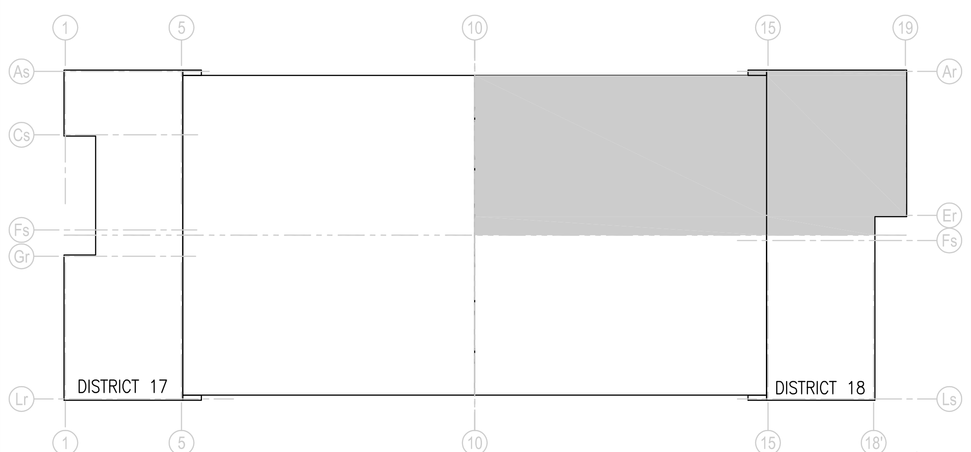
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	JM
CHECKED BY:	JM
DRAWING NUMBER:	DFA-102.00
3/32" = 1'-0"	139 of 169

Plotted: 9/27/2019 8:22:42 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\DFA-102.00_DDC33000.DWG - ksimpson



1 1ST FL. FIRE ALARM DEMOLITION FLOOR PLAN - DISTRICT 18
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN	———
EXISTING TO BE REMOVED	- - - - - - - -

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

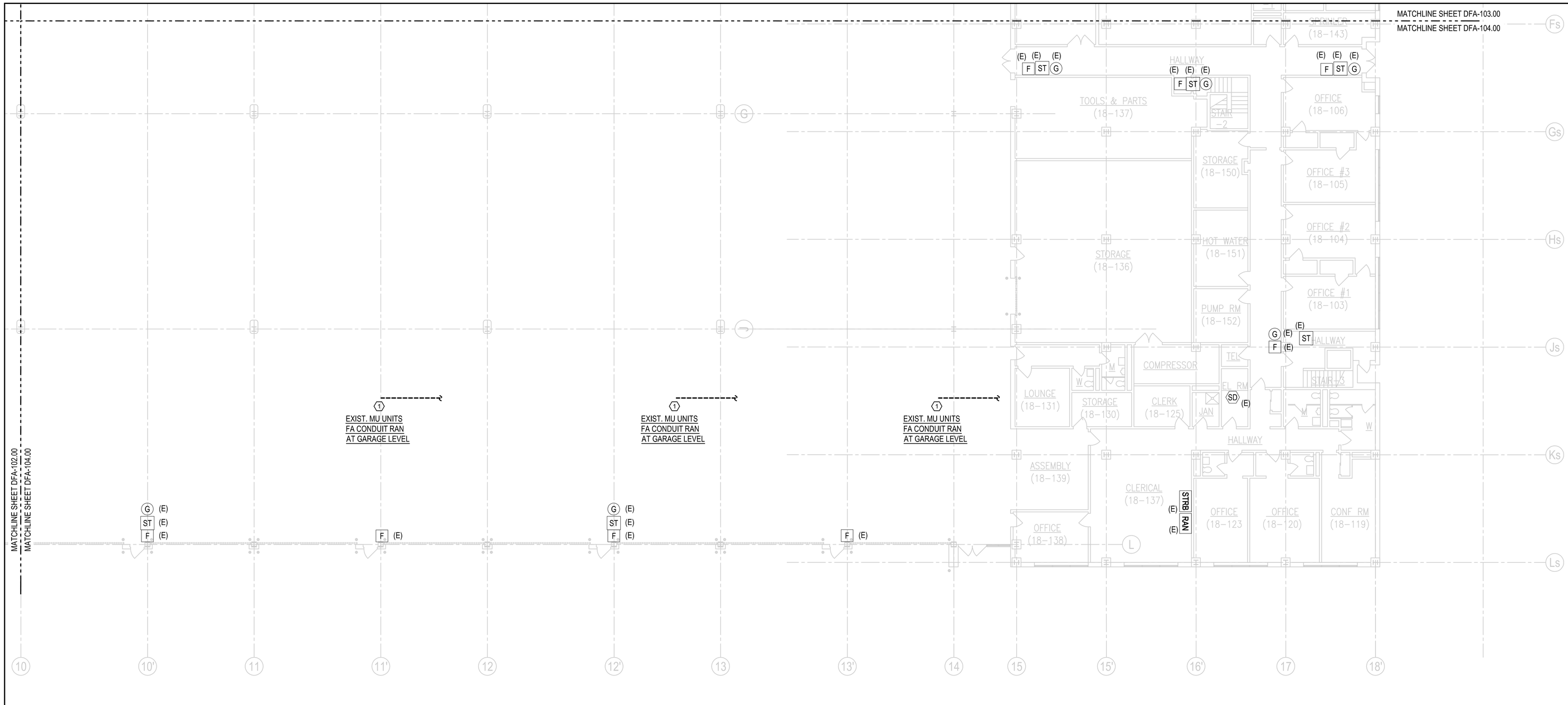
LOT: 1 BLOCK: 8138

DRAWING TITLE:
FIRE ALARM GROUND FLOOR DEMOLITION FLOOR PLAN - DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · JOSEPH FITZGERALD · 074116 · LICENSED PROFESSIONAL ENGINEER

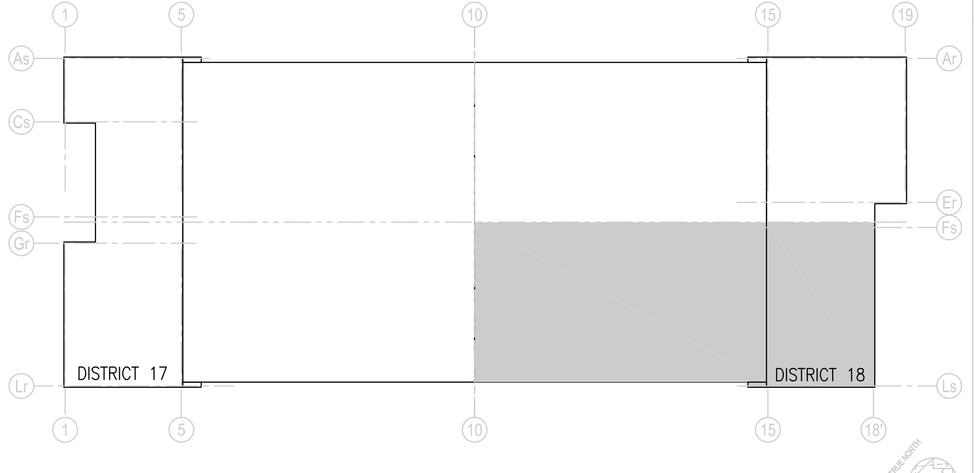
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	JM
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DRAWING NUMBER:	DFA-103.00
3/32" = 1'-0"	140 of 169

Plotted: 9/27/2019 8:22:28 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\DFA-103.00_DDC33000.DWG - ksimpson



1 1ST FL FIRE ALARM DEMOLITION PLAN - DISTRICT 18
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

EXISTING TO BE REMOVED

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

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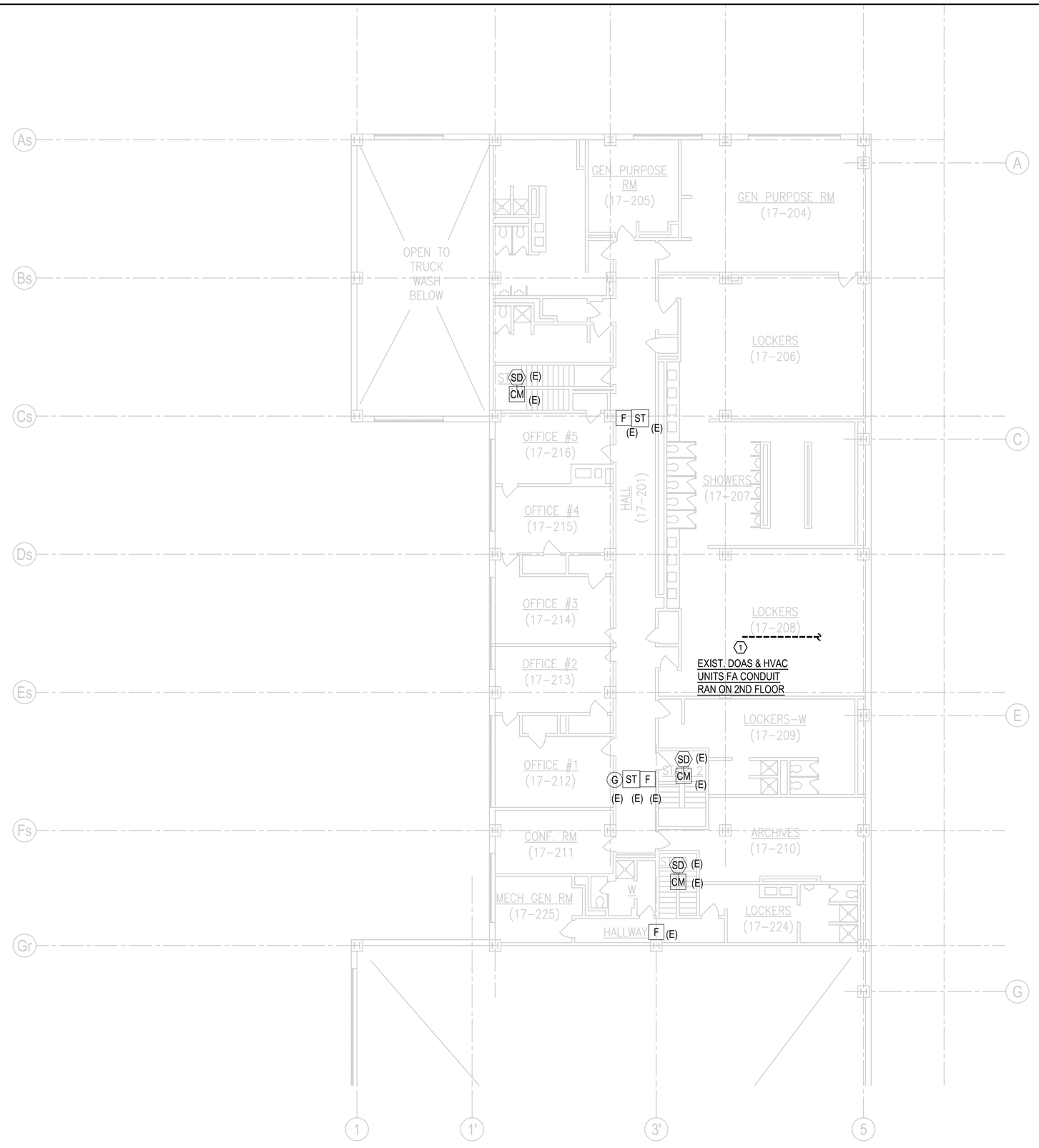
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DRAWING TITLE:
FIRE ALARM GROUND FLOOR DEMOLITION PLAN – DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · JUSTIN TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

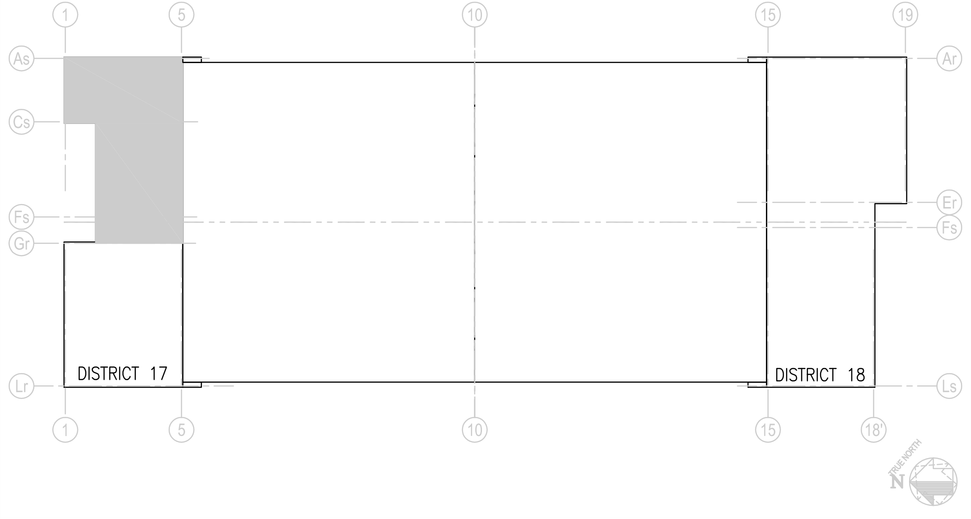
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1 2ND FL FIRE ALARM DEMOLITION FLOOR PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN	———
EXISTING TO BE REMOVED	- - - - - -

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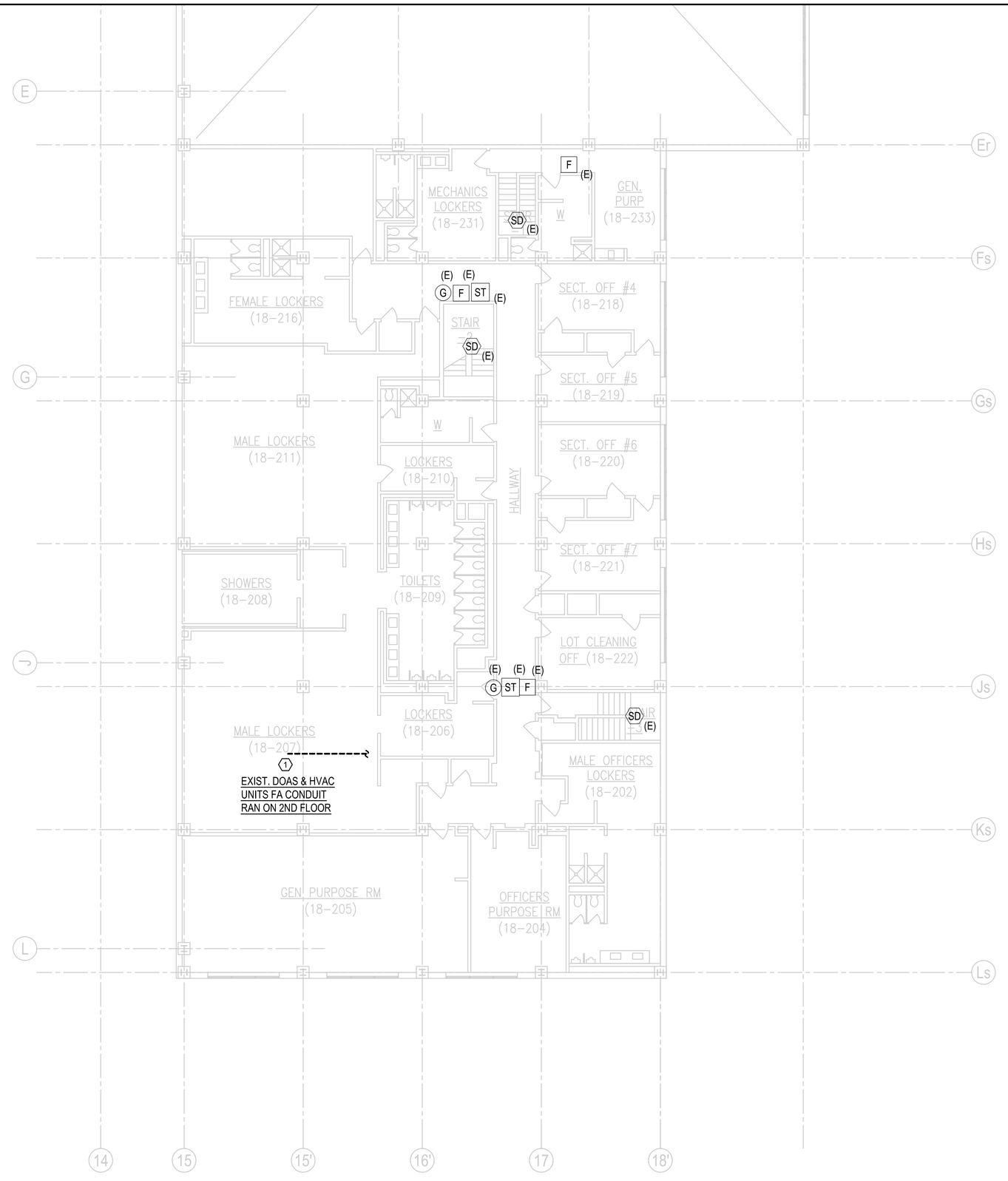
LOT: 1 BLOCK: 8138

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FIRE ALARM 2ND FLOOR DEMOLITION FLOOR PLAN - DISTRICT 17

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

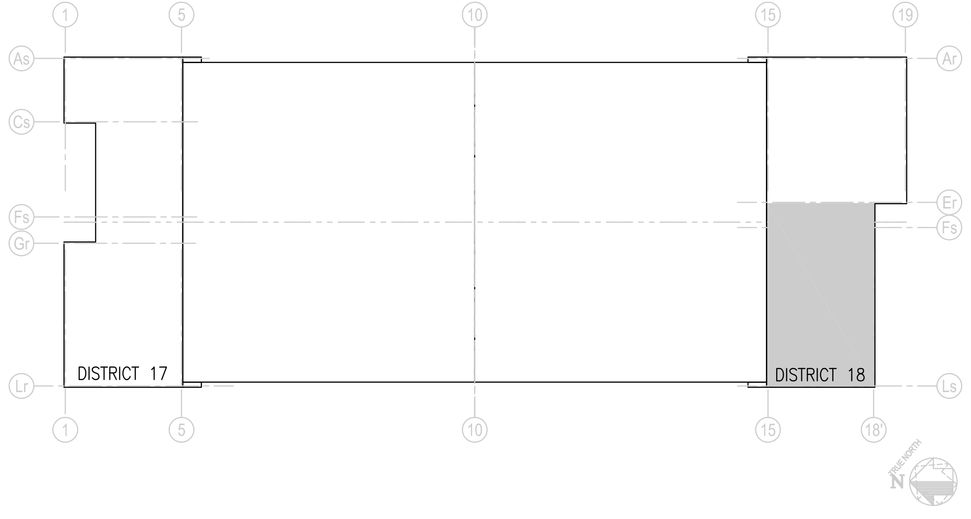
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	JM
CHECKED BY:	JM
DRAWING NUMBER:	DFA-105.00
3/32" = 1'-0"	142 of 169

Plotted: 9/27/2019 8:22:02 AM P:\NYO\MEP_E\NPP\DDC33000\DRAWINGS\SHEETS\DFA-105.00_DDC33000.DWG - khassan



1 2ND FL FIRE ALARM DEMOLITION FLOOR PLAN - DISTRICT 18
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN ————

EXISTING TO BE REMOVED - - - - - -

SHEET NOTES

1. THE FIRE ALARM CONTRACTOR SHALL CONNECT ALL NEW FIRE ALARM DEVICES TO THE EXISTING BUILDING FIRE ALARM CONTROL PANEL. THE FIRE ALARM CONTRACTOR SHALL REFER TO DRAWING FA-001.00 FOR ADDITIONAL INFORMATION.
2. ALL NEW WORK SHALL MATCH EXISTING BUILDING STANDARDS, & SHALL BE CARRIED OUT IN STRICT COMPLIANCE OF NFPA 72 2010 & N.E.C., FDNY FIRE CODE & NEW YORK CITY BUILDING DEPARTMENT.
3. LOCATION & DIMENSIONS OF ALL DEVICES ETC. SHALL BE COORDINATED IN FIELD.
4. THE FIRE ALARM CONTRACTOR SHALL REVIEW & COORDINATE WITH OTHER TRADES DRAWINGS FOR THE EXACT LOCATION OF EQUIPMENT PRIOR TO CONNECTING & COMMENCING WORK.
5. THE FIRE ALARM CONTRACTOR SHALL FURNISH & INSTALL FIRE PROOFING FOR ALL RATED WALL & SLABS PENETRATIONS AS REQUIRED BY CODE. THE FIRE ALARM CONTRACTOR SHALL VERIFY PARTITION CONSTRUCTION FOR EACH LOCATION & PROVIDE DETAIL / FIRE PROOF SYSTEM AS REQUIRED.
6. PROVIDE RIGID STEEL CONDUIT IN AREAS WHERE WIRING IS EXPOSED. FIRE ALARM CABLE MAY BE INSTALLED UN PROTECTED BY CONDUIT WHEN CONCEALED FROM VIEW, PROTECTED BY BUILDING CONSTRUCTION.
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SHEET KEYNOTES

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

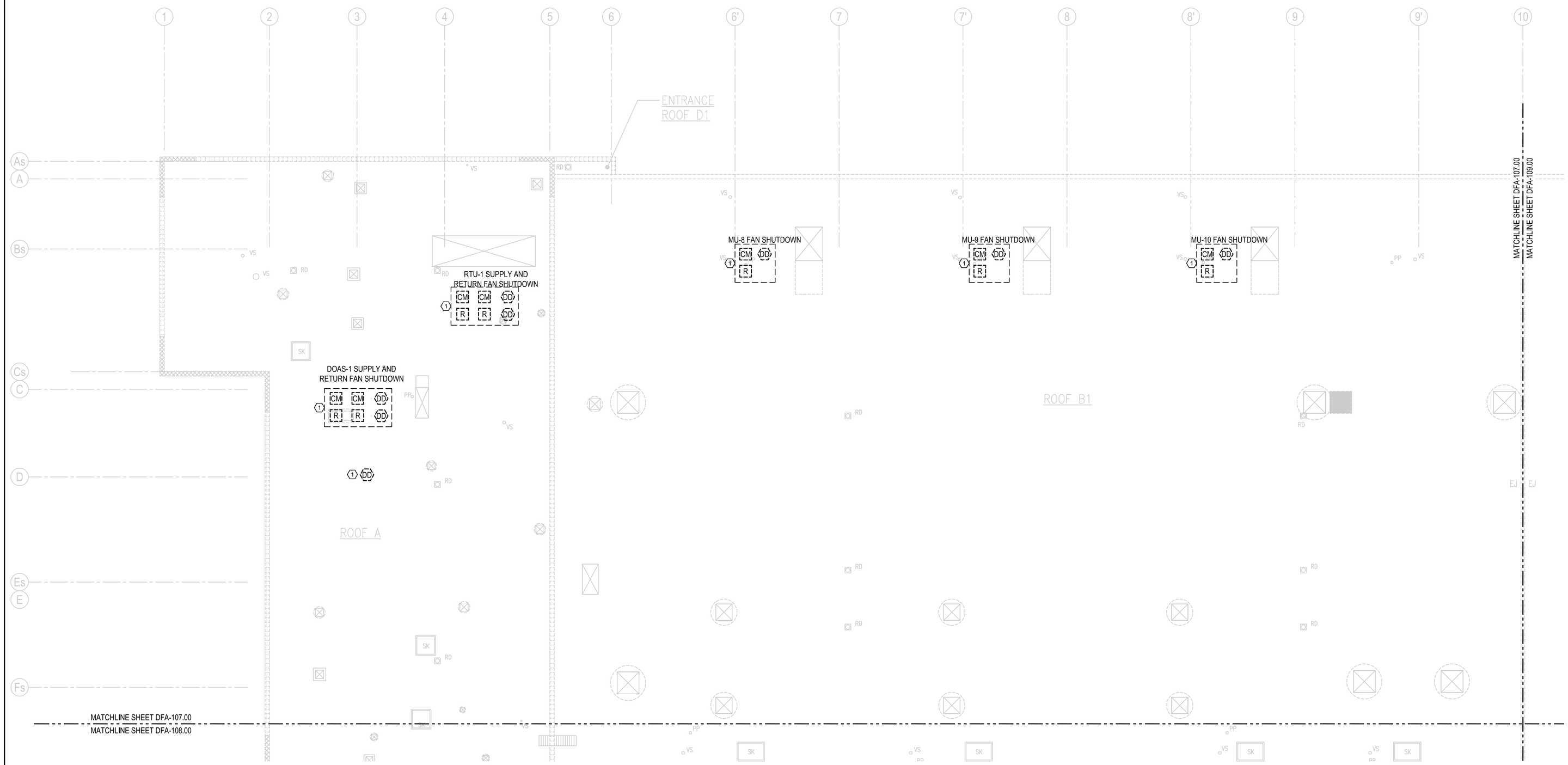
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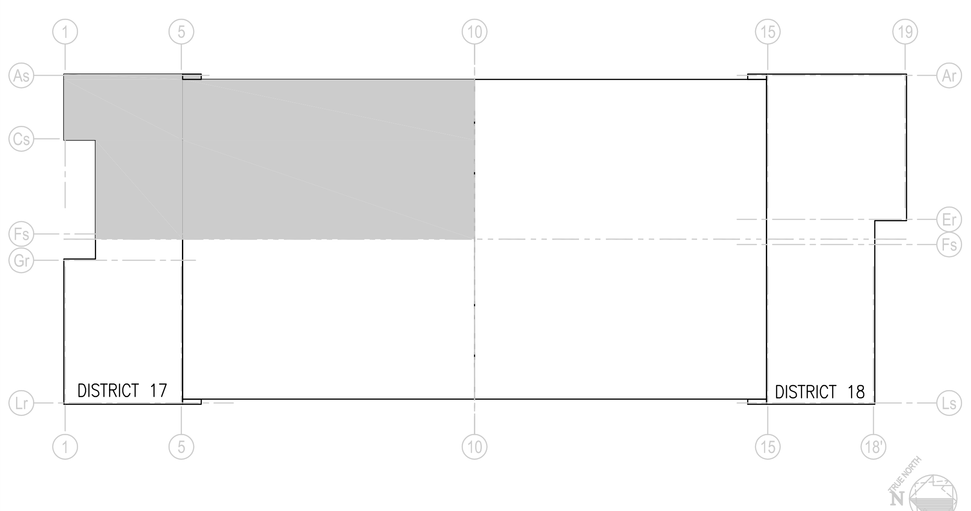
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1 FIRE ALARM ROOF DEMOLITION PLAN
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KEY PLAN



LINE LEGEND

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EXISTING TO BE REMOVED

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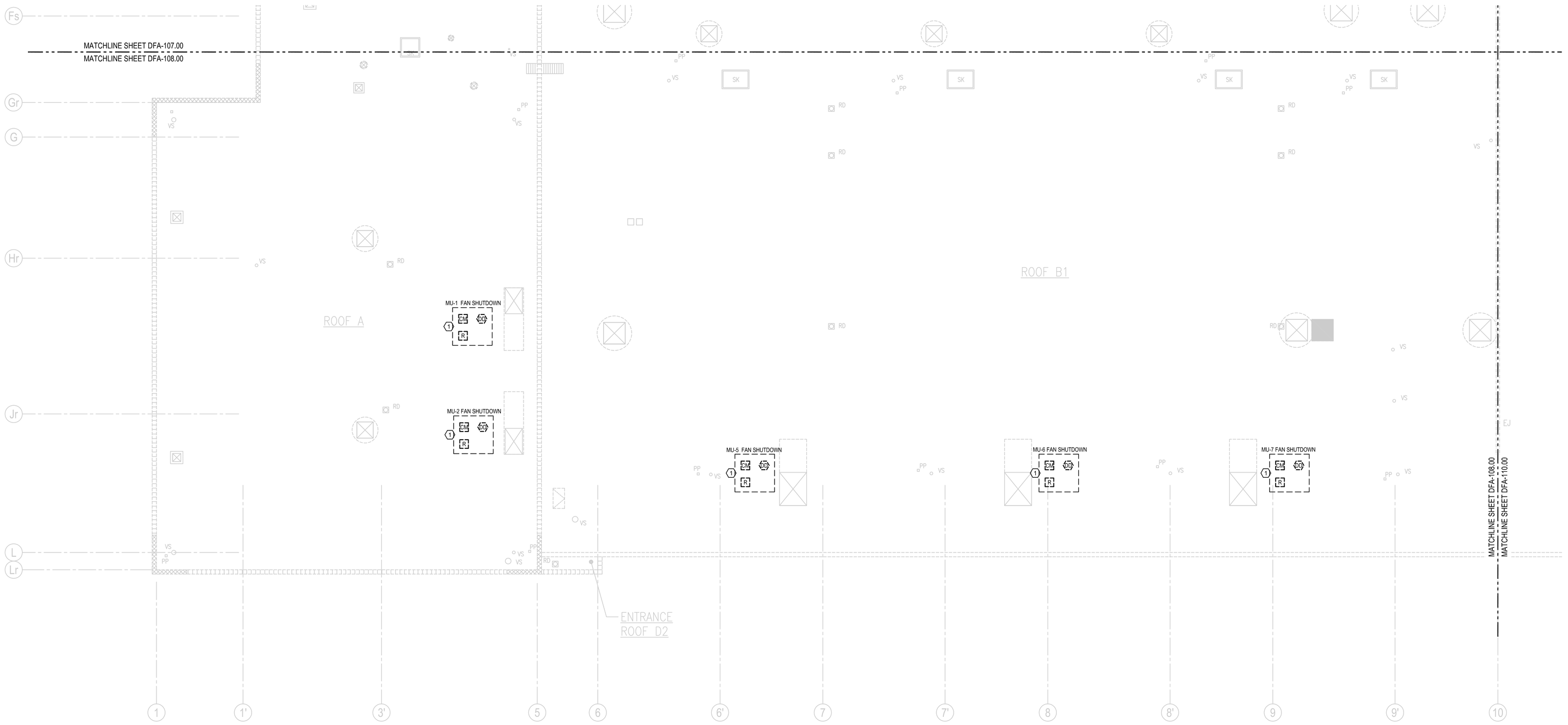
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FIRE ALARM ROOF DEMOLITION PLAN

SEAL & SIGNATURE
STATE OF NEW YORK JOSEPH MICHAEL FITZPATRICK 024116 LICENSED PROFESSIONAL ENGINEER

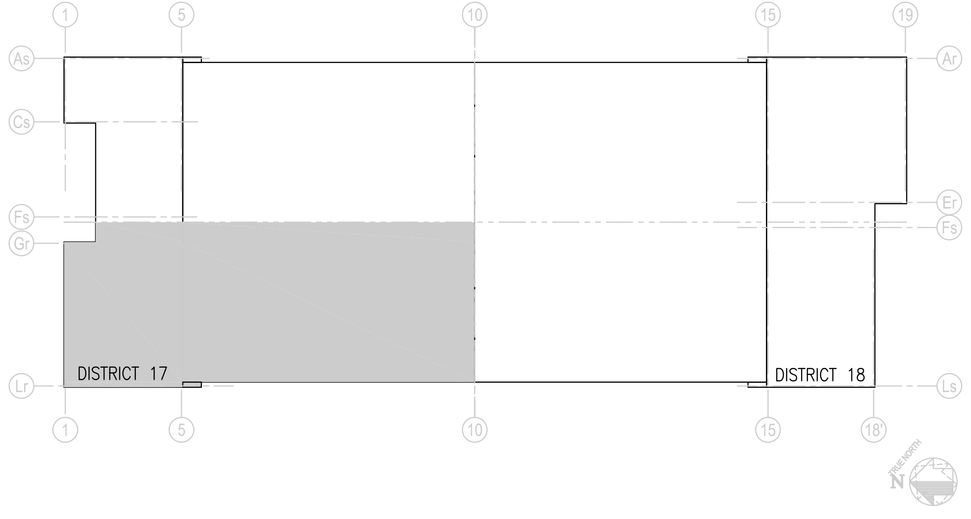
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3/32"=1'-0"

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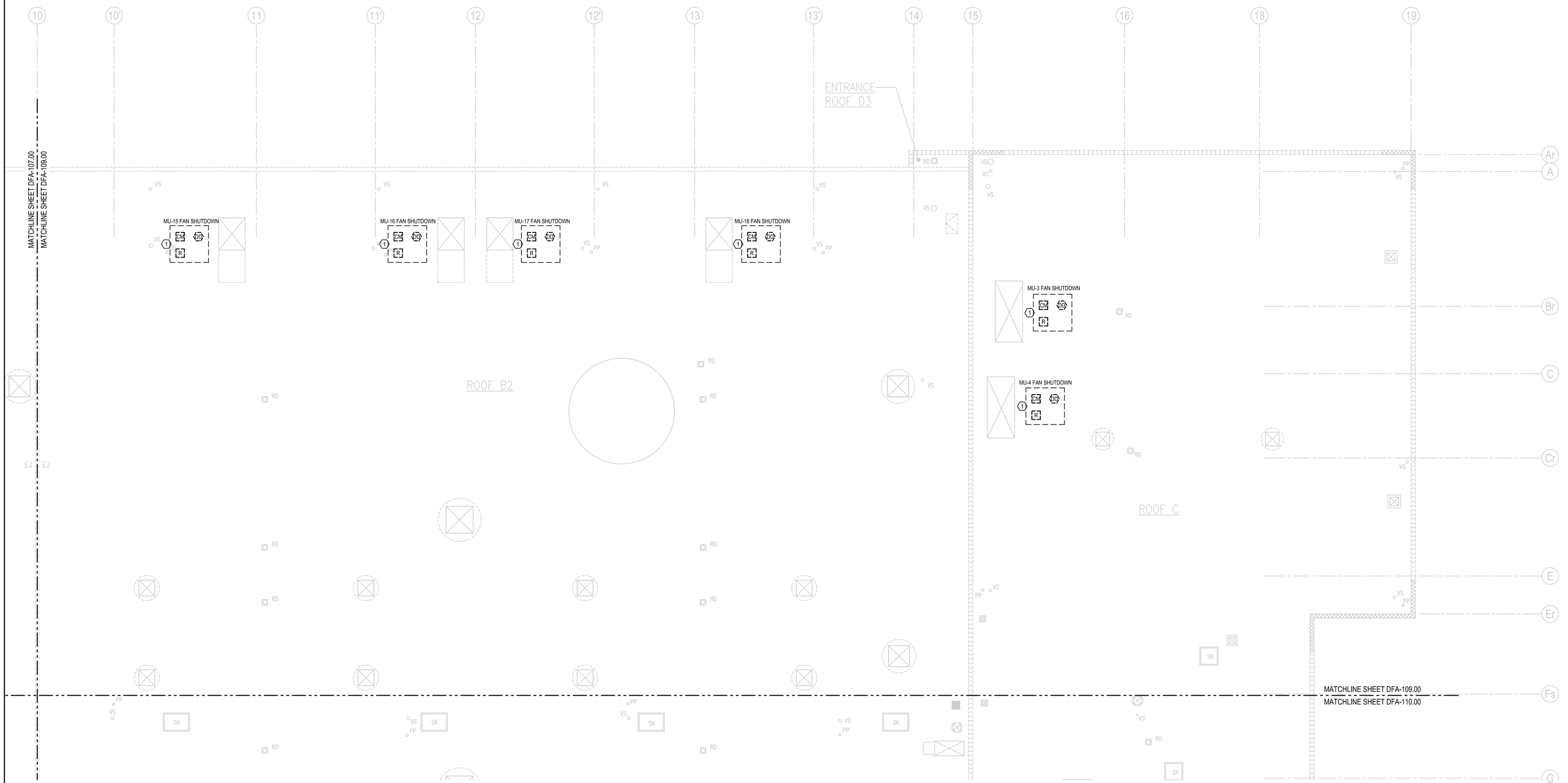
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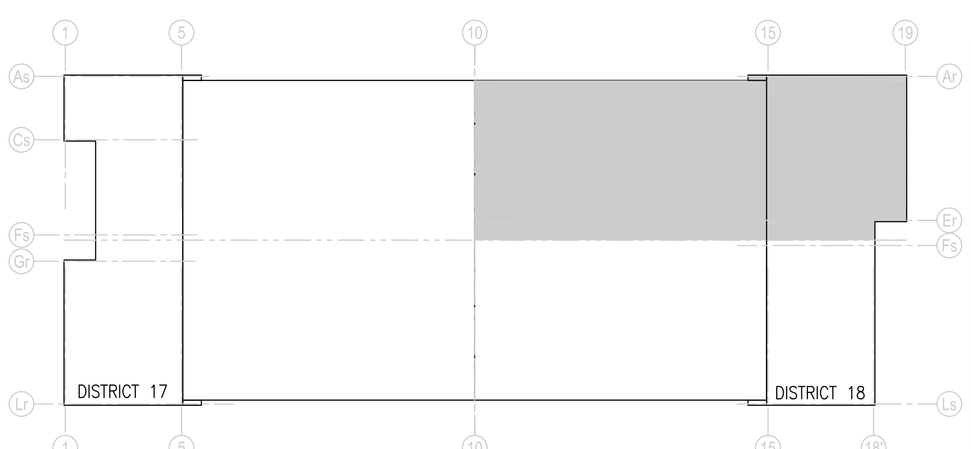
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3/32"=1'-0"

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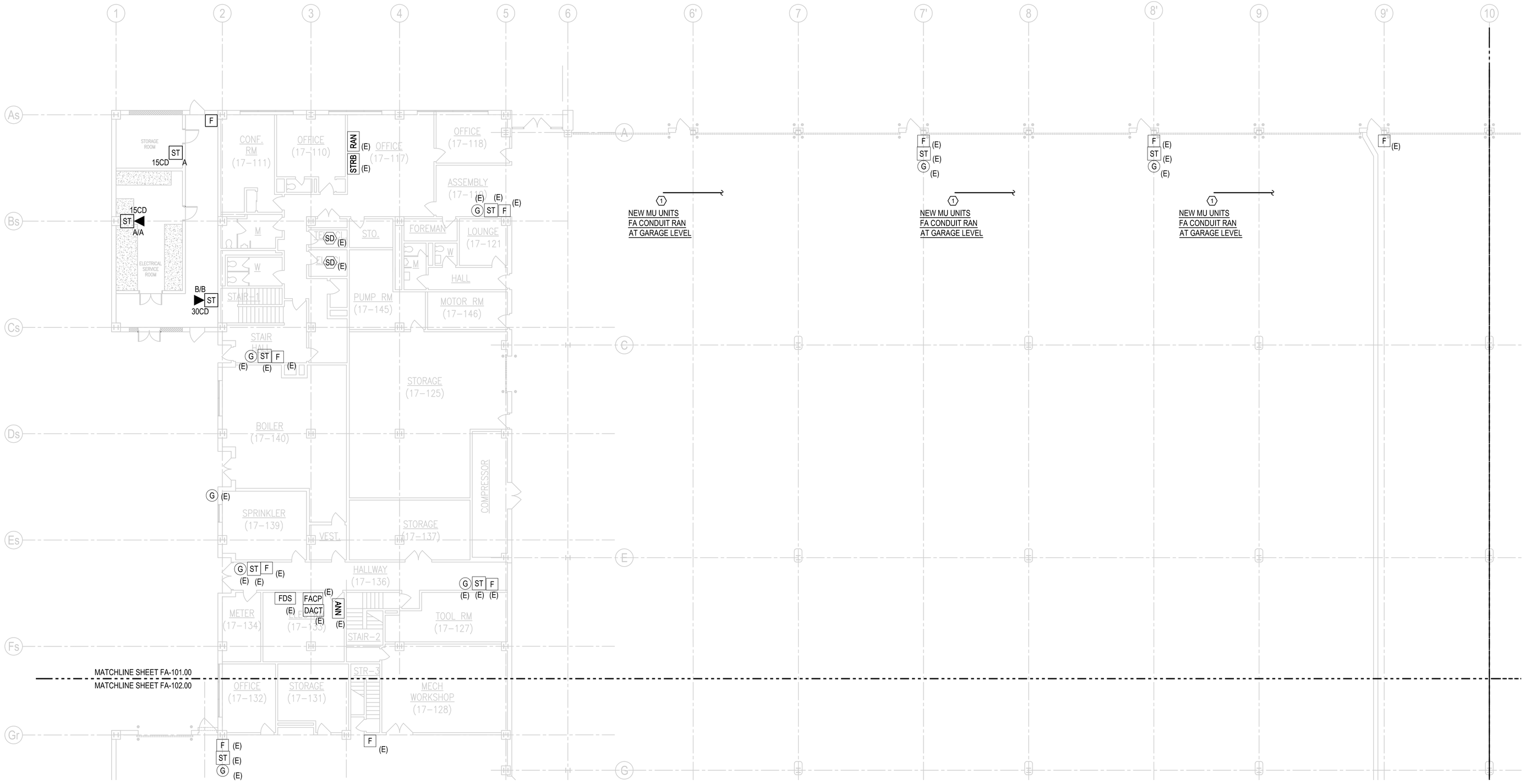
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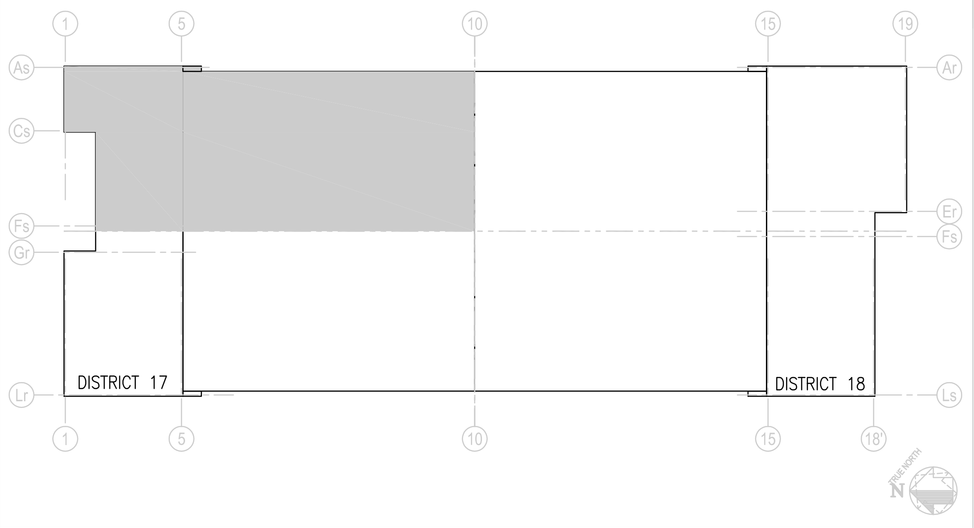
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1 1ST FL FIRE ALARM FLOOR PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



LINE LEGEND

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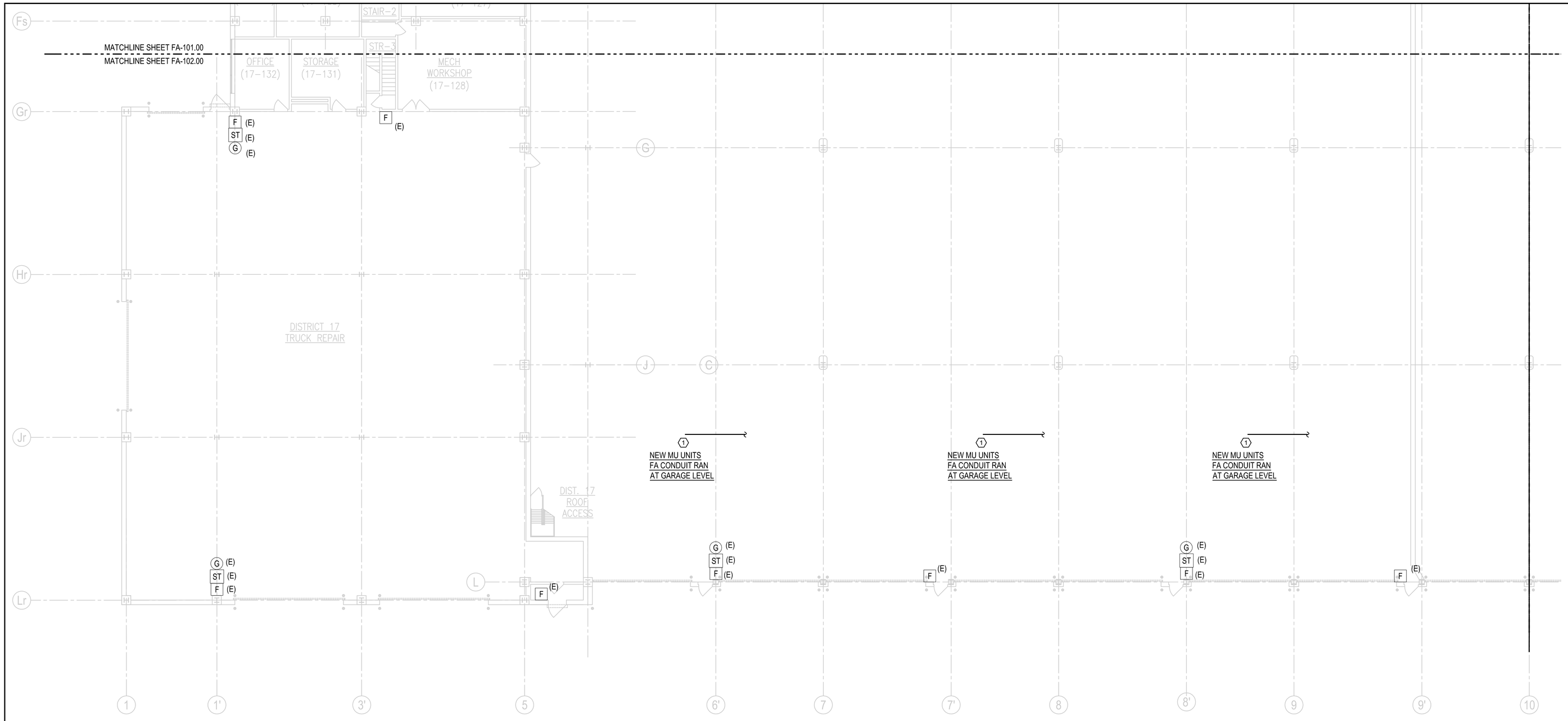
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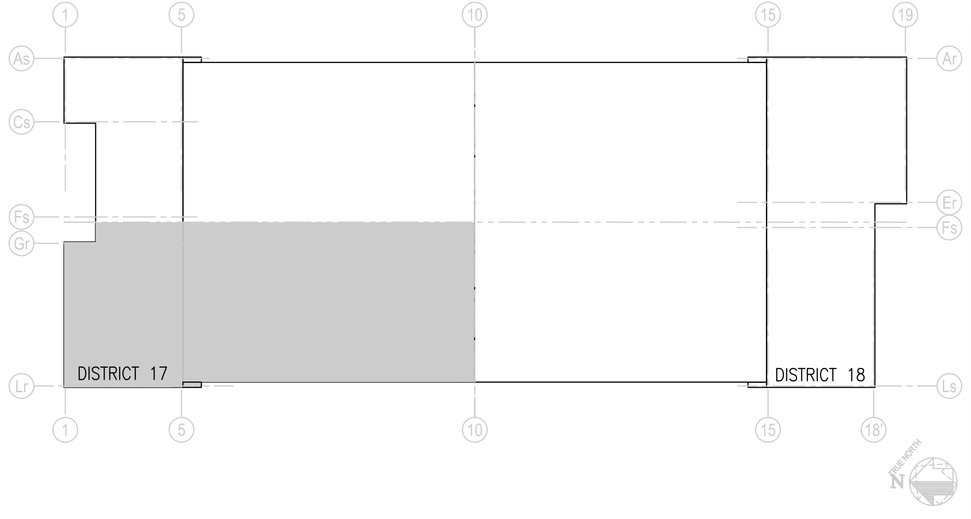
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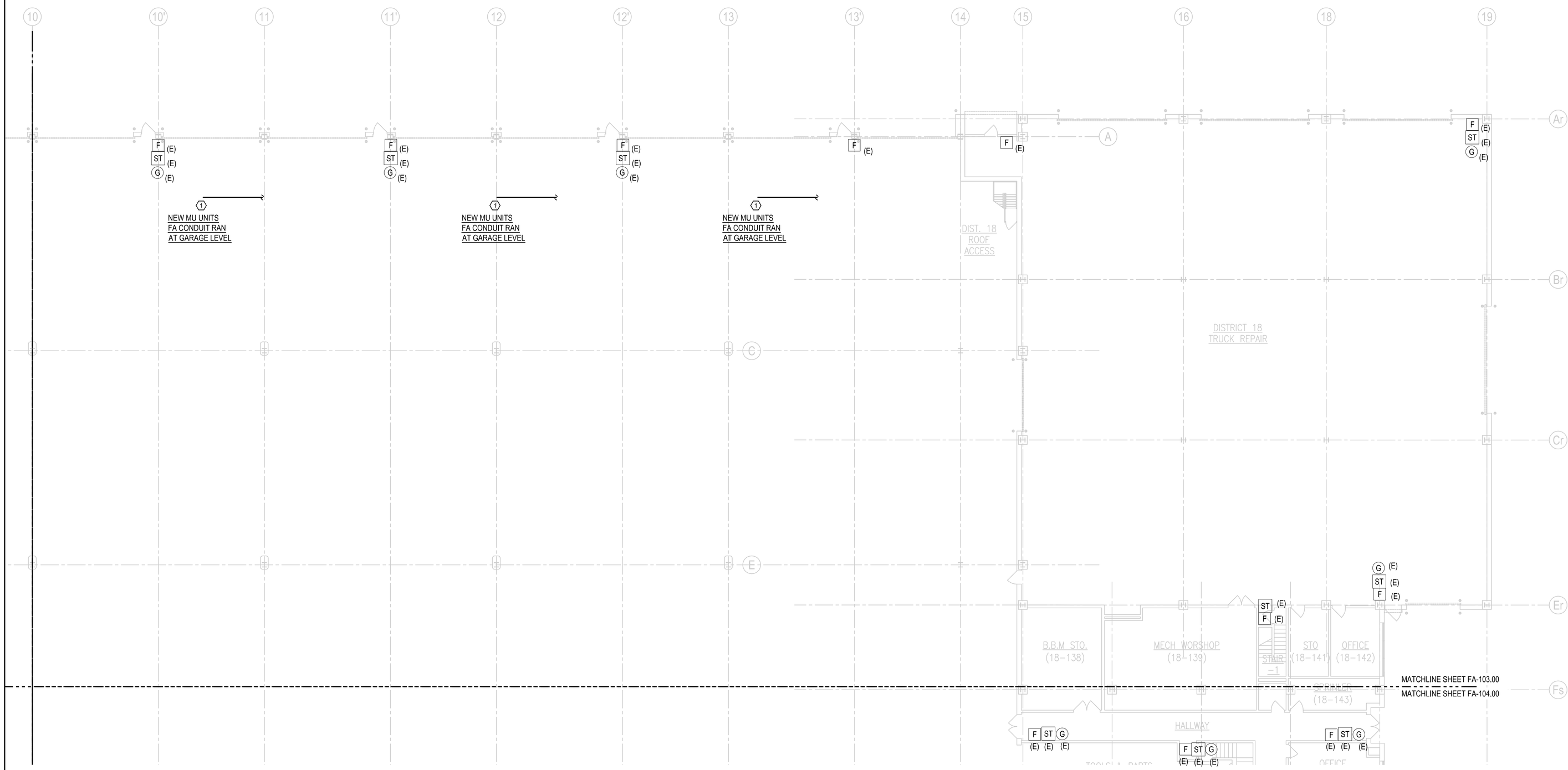
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SEAL & SIGNATURE

STATE OF NEW YORK · KEITH TITTA · 074116 · LICENSED PROFESSIONAL ENGINEER

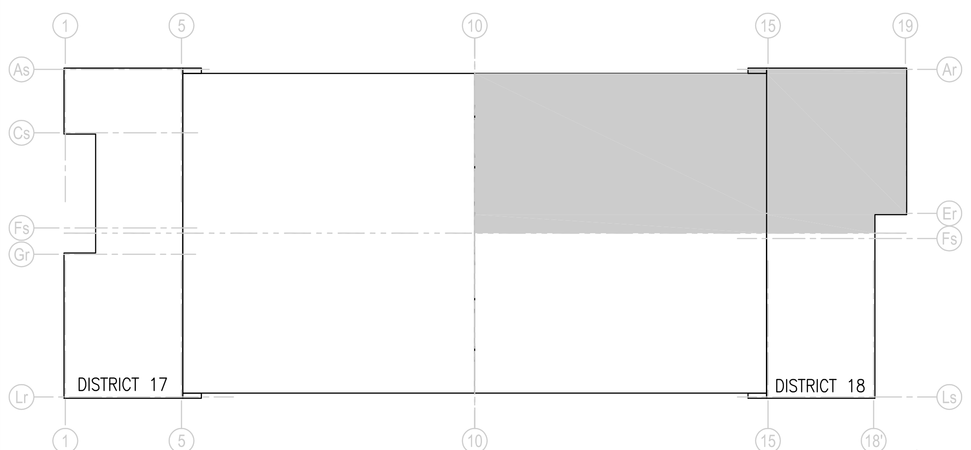
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PROJECT NO:	DDC33000
DRAWN BY:	JM
CHECKED BY:	JM
DRAWING NUMBER:	FA-102.00
3/32" = 1'-0"	148 of 169

Plotted: 9/27/2019 7:59:55 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-102.00_DDC33000.DWG - ksimpson



1 1ST FL FIRE ALARM FLOOR PLAN - DISTRICT 18
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

NEW

SHEET NOTES

1. THE FIRE ALARM CONTRACTOR SHALL CONNECT ALL NEW FIRE ALARM DEVICES TO THE EXISTING BUILDING FIRE ALARM CONTROL PANEL. THE FIRE ALARM CONTRACTOR SHALL REFER TO DRAWING FA-001.00 FOR ADDITIONAL INFORMATION.
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SHEET KEYNOTES

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

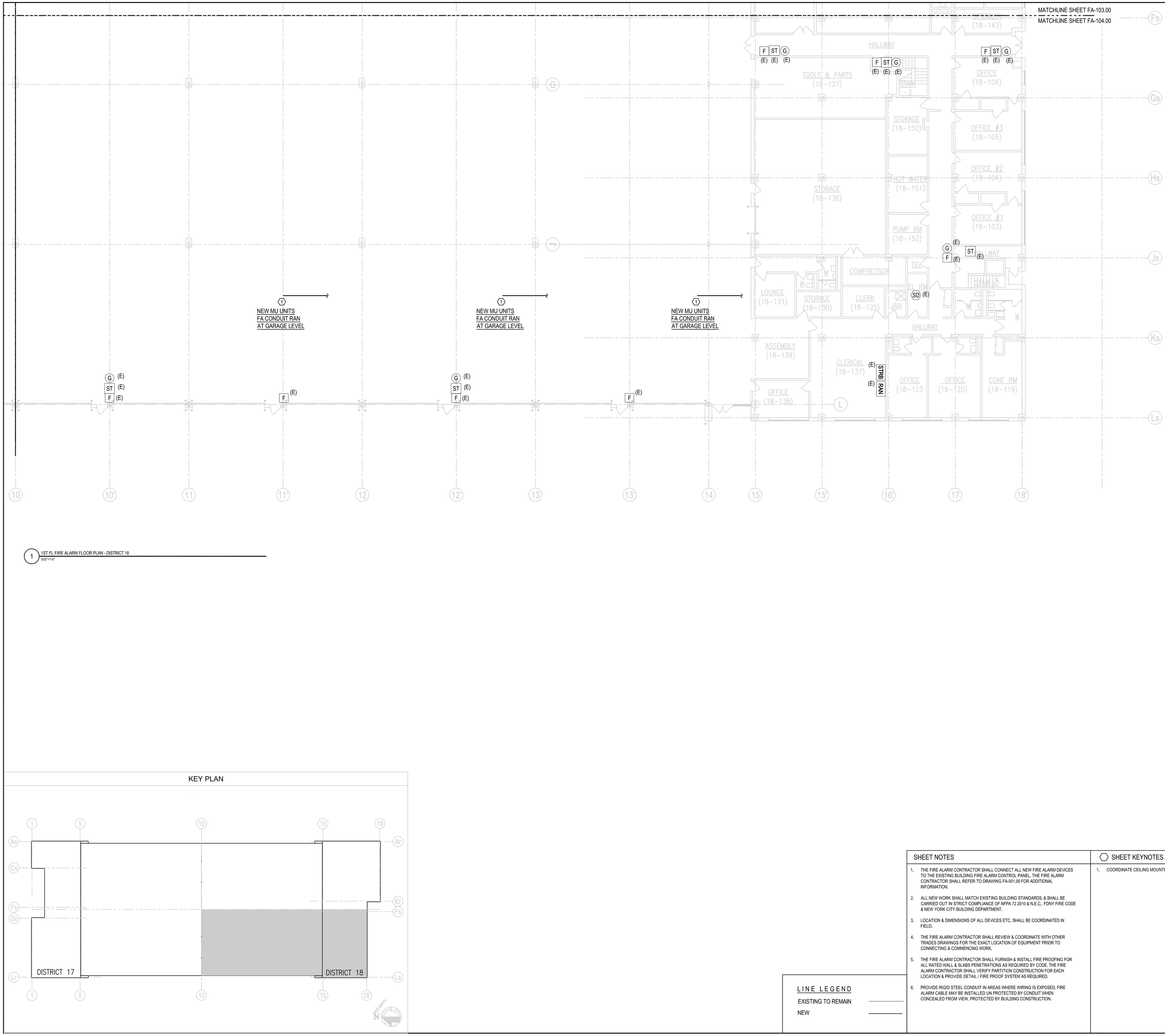
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DRAWING TITLE:
FIRE ALARM GROUND FLOOR PLAN - DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH FITZPATRICK · 074116 · PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: JM
CHECKED BY: JM
DRAWING NUMBER:
FA-103.00
3/32" = 1'-0"

Plotted: 9/27/2019 7:59:42 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-103.00_DDC33000.DWG - kslimpson



1 1ST FL FIRE ALARM FLOOR PLAN - DISTRICT 18
3/32"=1'-0"

KEY PLAN

LINE LEGEND

EXISTING TO REMAIN

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

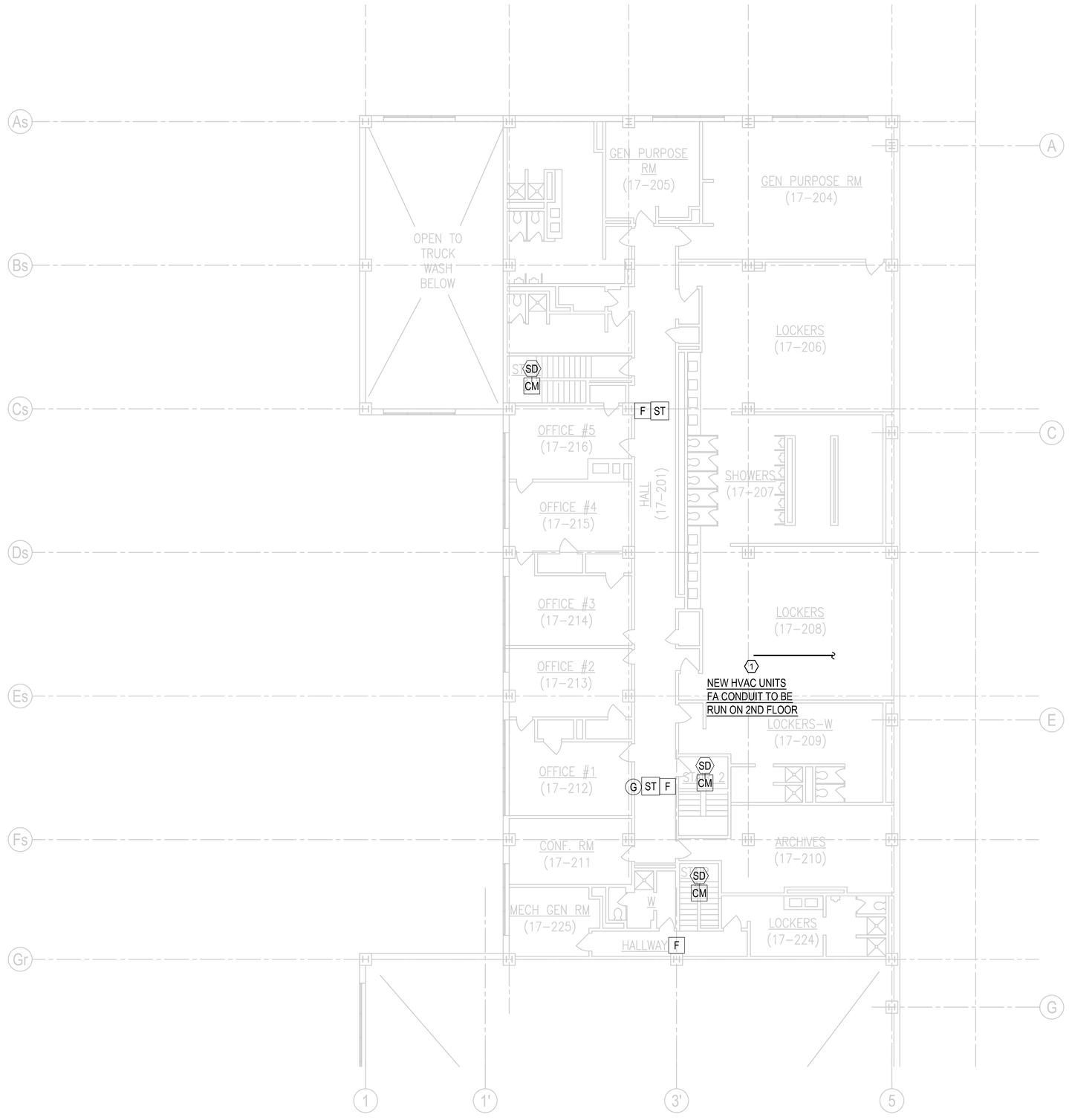
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DRAWING TITLE:
FIRE ALARM GROUND FLOOR PLAN - DISTRICT 18

SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTEL · 074116 · LICENSED PROFESSIONAL ENGINEER

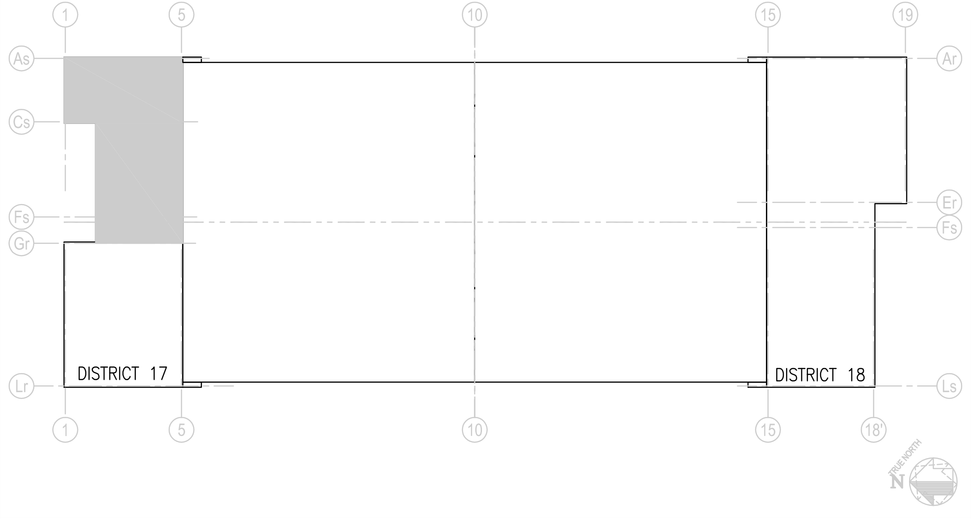
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CHECKED BY:	JM
DRAWING NUMBER:	FA-104.00
3/32" = 1'-0"	150 of 169

Plotted: 9/27/2019 7:59:28 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-104.00_DDC33000.DWG - ksimpson



1 2ND FL FIRE ALARM FLOOR PLAN - DISTRICT 17
3/32" = 1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN

NEW

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NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

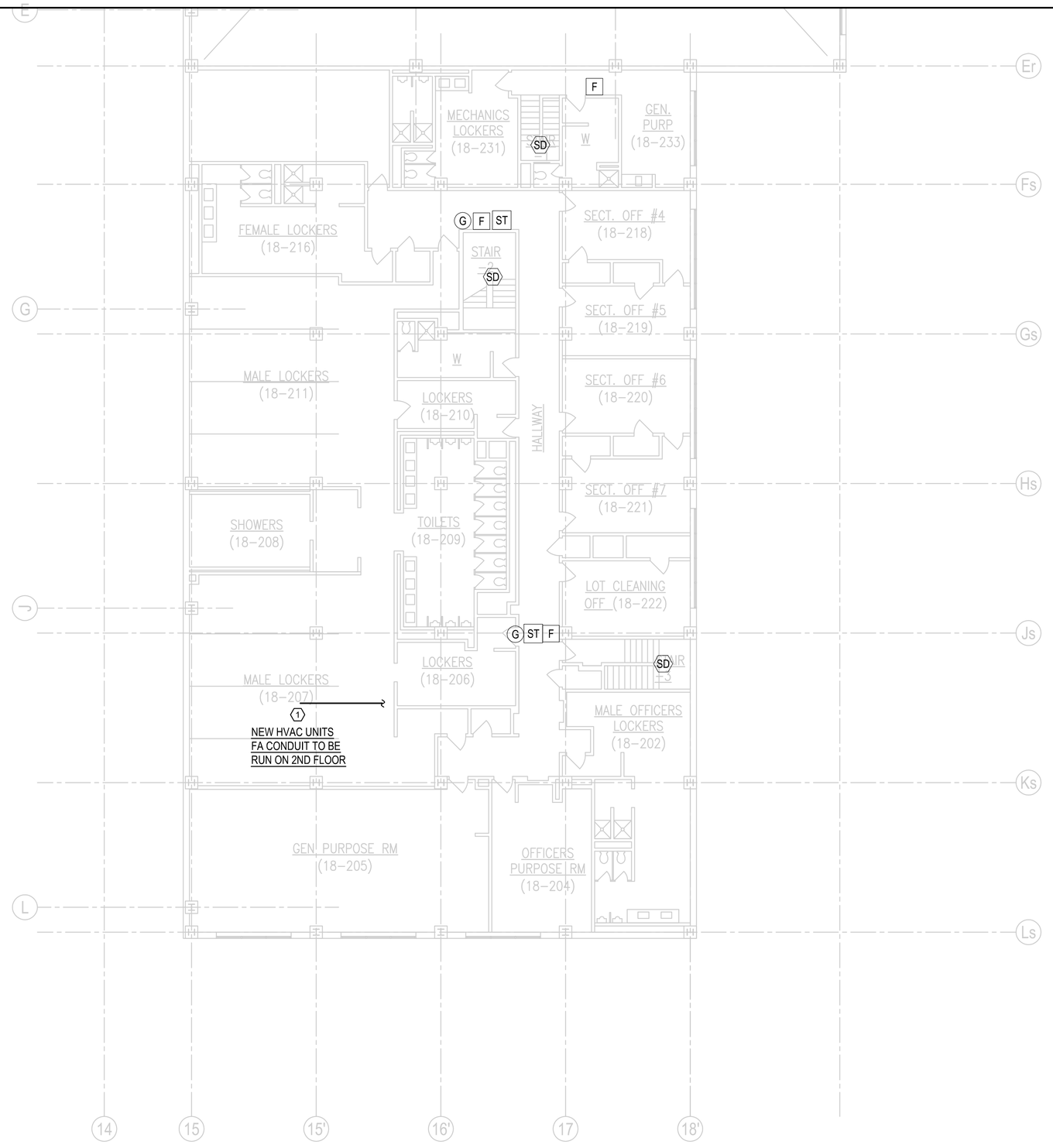
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DRAWING TITLE:
FIRE ALARM 2ND FLOOR PLAN - DISTRICT 17

SEAL & SIGNATURE
KEITH FITZPATRICK 074116 LICENSED PROFESSIONAL ENGINEER STATE OF NEW YORK

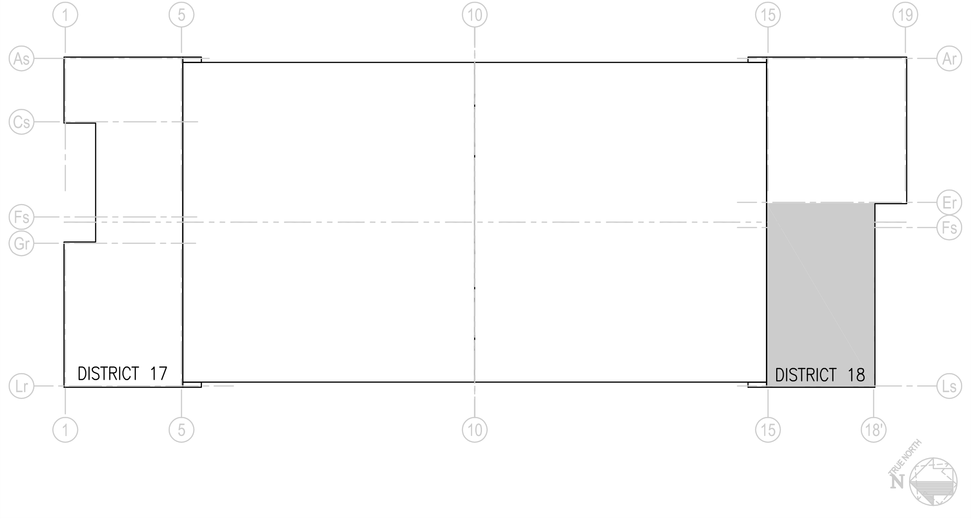
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CHECKED BY:	JM
DRAWING NUMBER:	FA-105.00
3/32" = 1'-0"	151 of 169

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1 2ND FL FIRE ALARMFLOOR PLAN-DISTRICT 18
3/32"=1'-0"

KEY PLAN



SHEET NOTES	SHEET KEYNOTES
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LINE LEGEND

EXISTING TO REMAIN

NEW

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DOB BSCAN STICKER

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

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DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

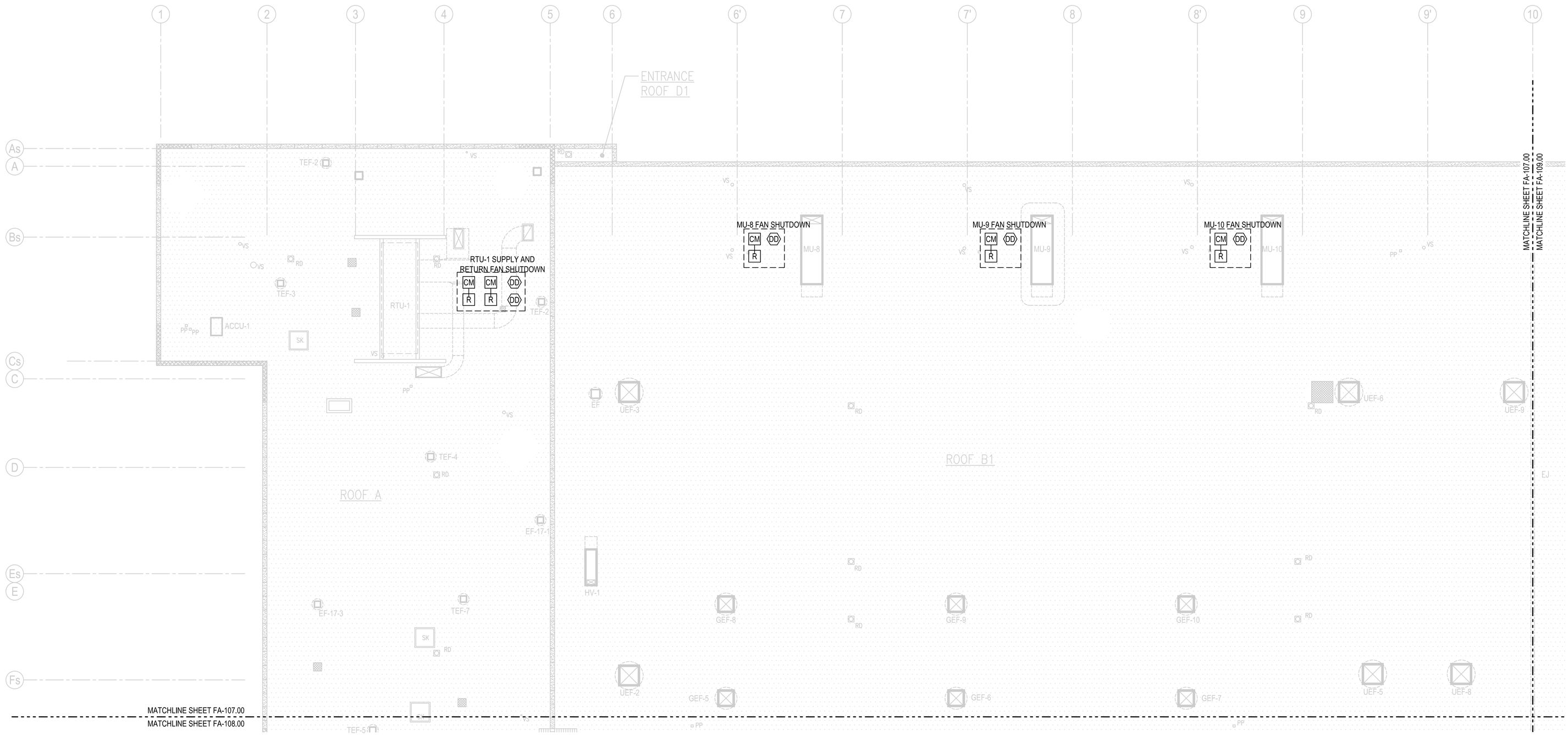
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DRAWING TITLE:
FIRE ALARM 2ND FLOOR PLAN-DISTRICT 18

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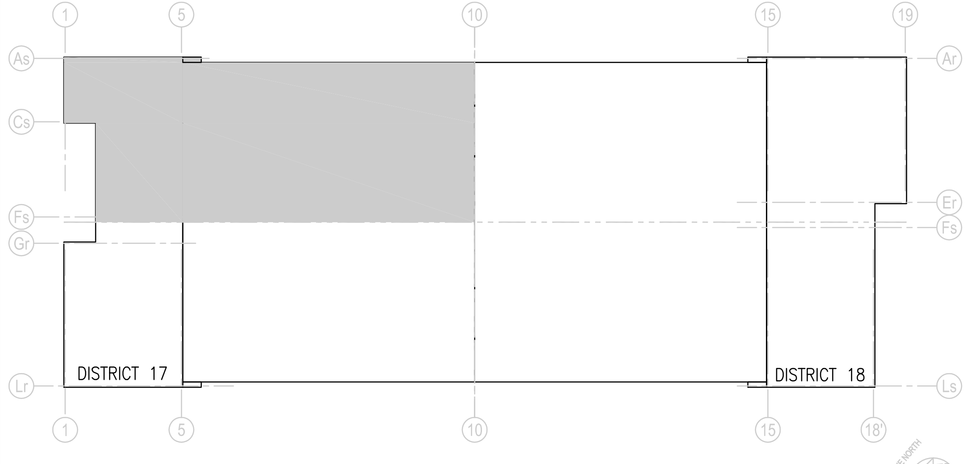
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PROJECT NO: DDC33000
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CHECKED BY: JM
DRAWING NUMBER:
FA-106.00
3/32" = 1'-0"

Plotted: 9/27/2019 7:59:07 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-106.00_DDC33000.DWG - ksimpson



1 FIRE ALARM ROOF PLAN
3/32"=1'-0"

KEY PLAN



LINE LEGEND

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NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
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PROJECT
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BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

LOT: 1 BLOCK: 8138

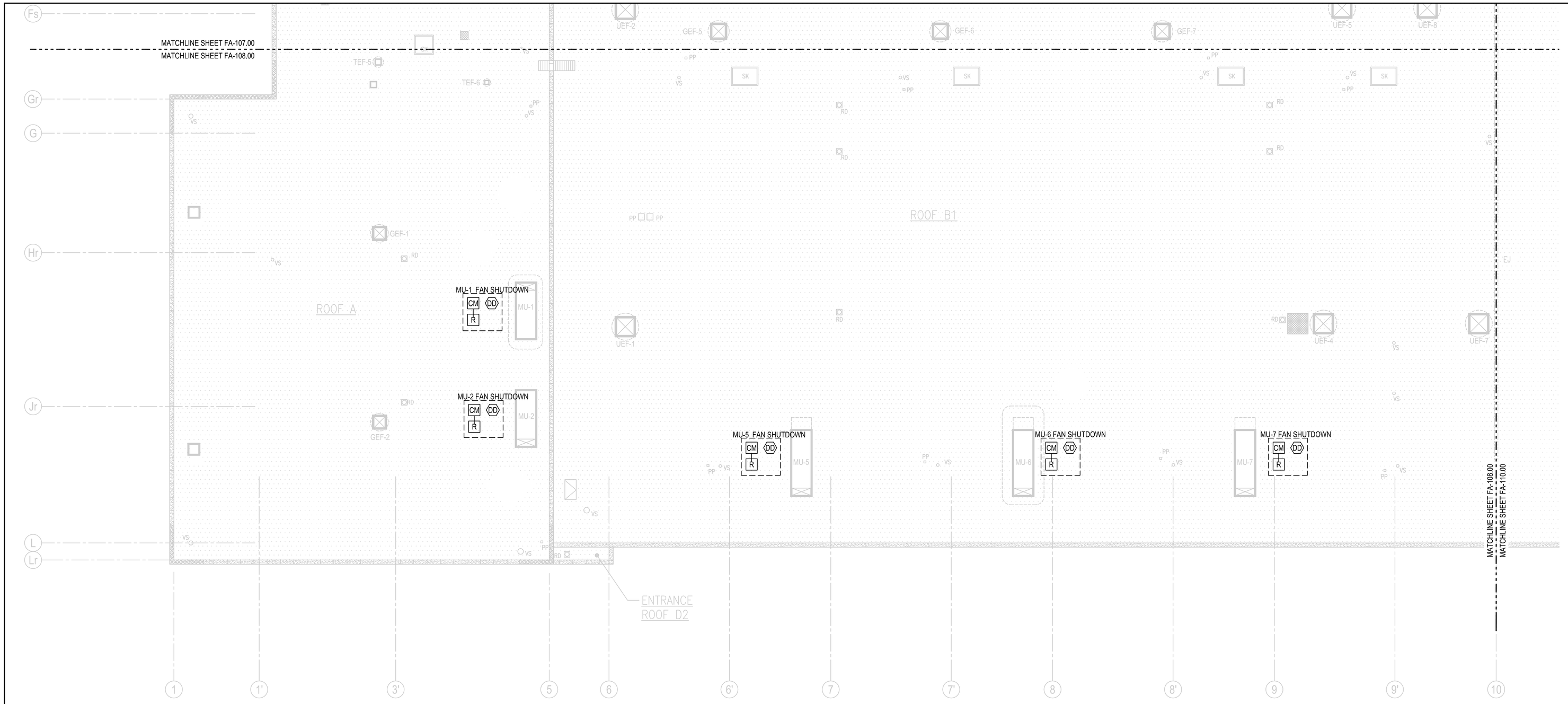
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FIRE ALARM ROOF PLAN

SEAL & SIGNATURE

STATE OF NEW YORK — JUSTIN TITTERTON — 074116 — LICENSED PROFESSIONAL ENGINEER

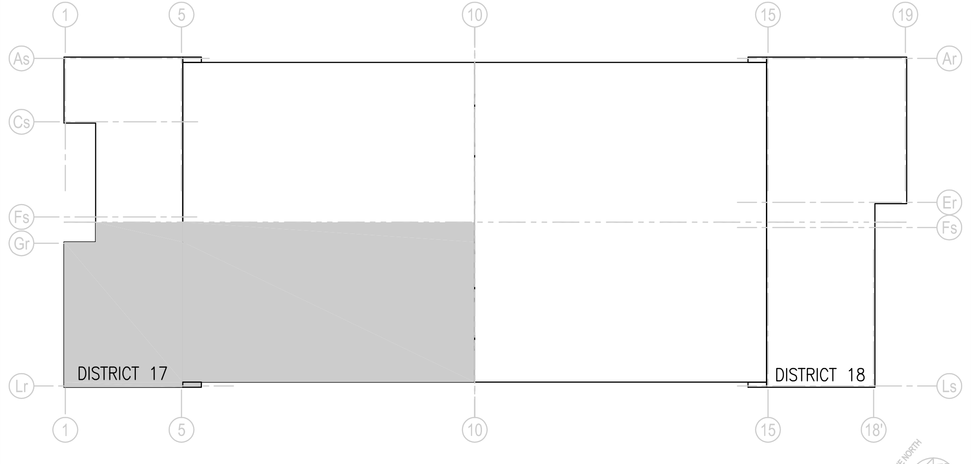
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PROJECT NO:	DDC33000
DRAWN BY:	JM
CHECKED BY:	JM
DRAWING NUMBER:	FA-107.00
3/32" = 1'-0"	153 of 169

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1 FIRE ALARM ROOF PLAN
3/32" = 1'-0"

KEY PLAN



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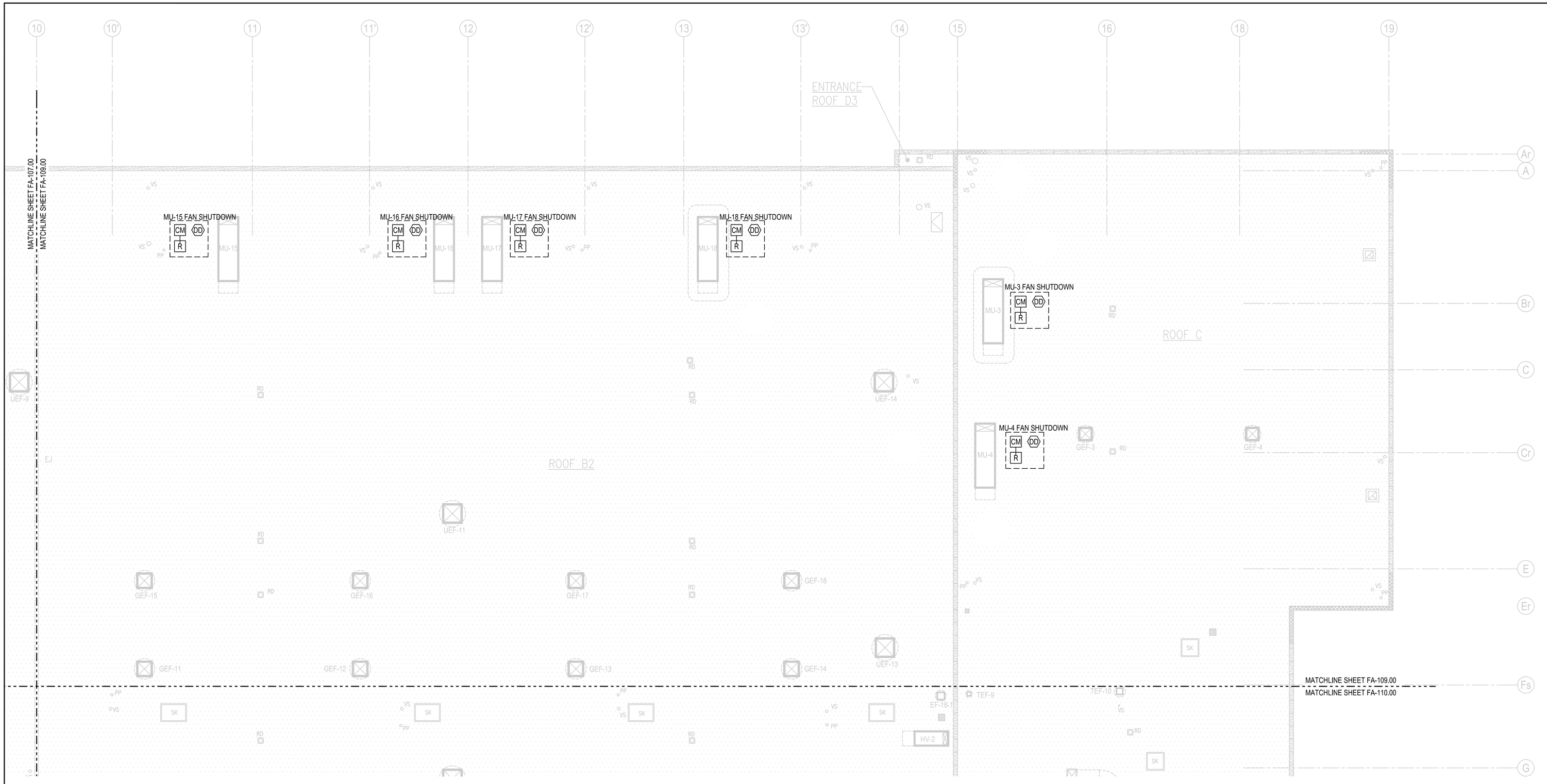
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DRAWING TITLE:
FIRE ALARM ROOF PLAN

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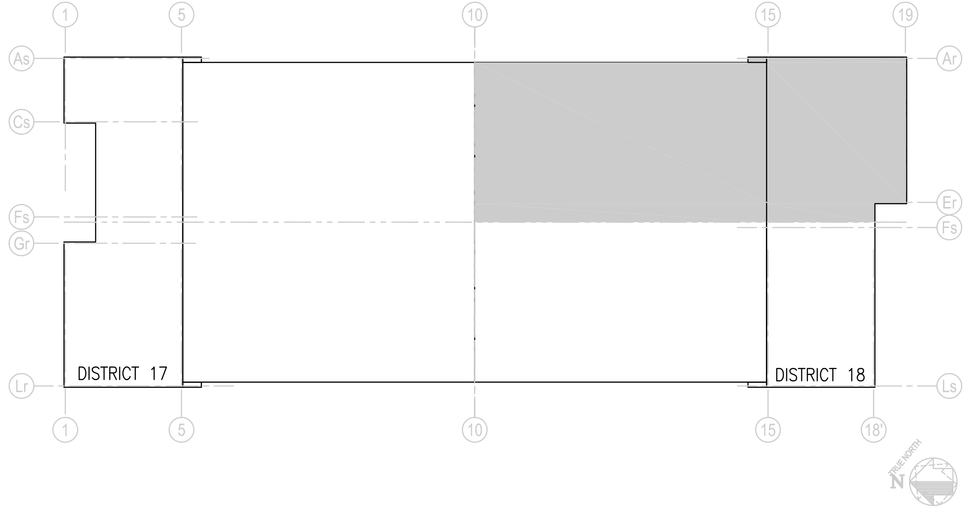
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PROJECT NO: DDC33000
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CHECKED BY: JM
DRAWING NUMBER:
FA-108.00
3/32" = 1'-0"

Plotted: 9/27/2019 7:58:40 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-108.00_DDC33000.DWG - ksimpson



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KEY PLAN



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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

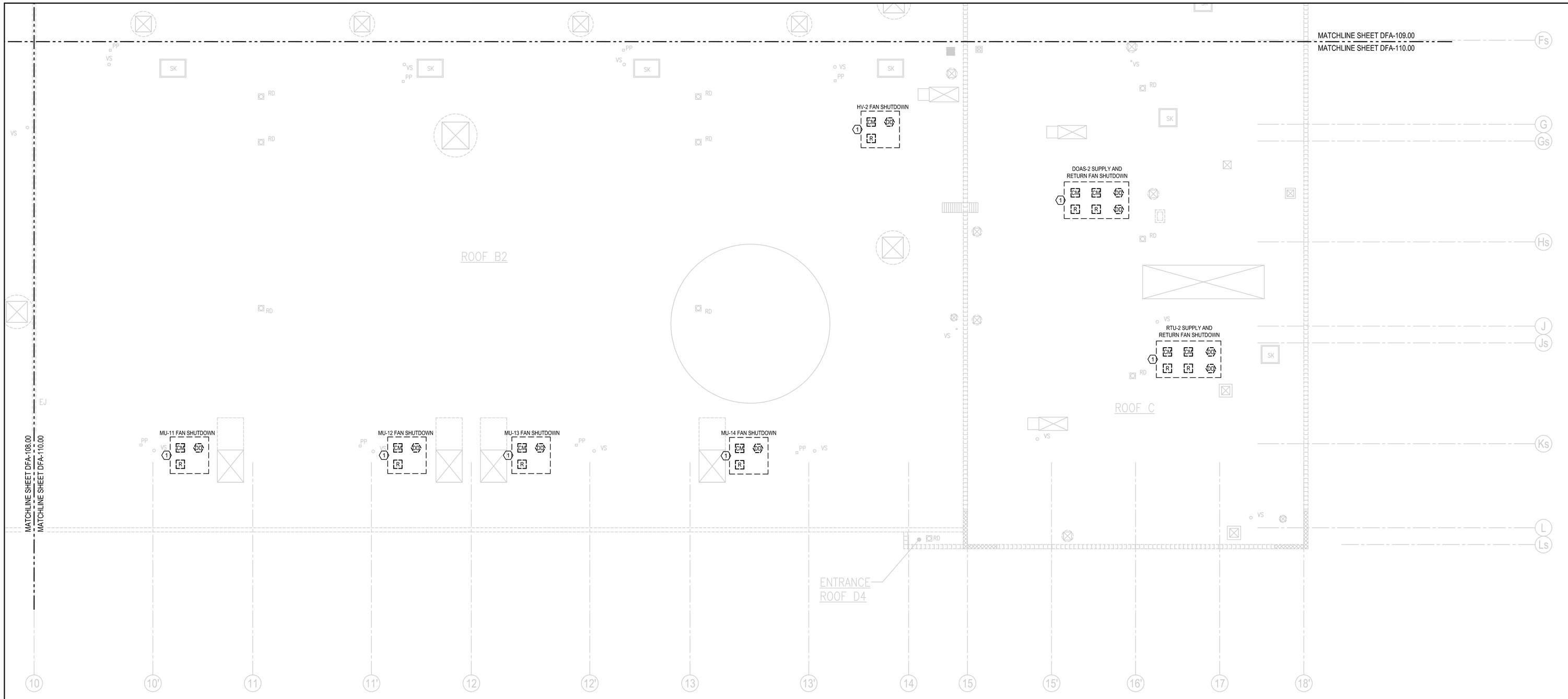
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DRAWING TITLE:
FIRE ALARM ROOF PLAN

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

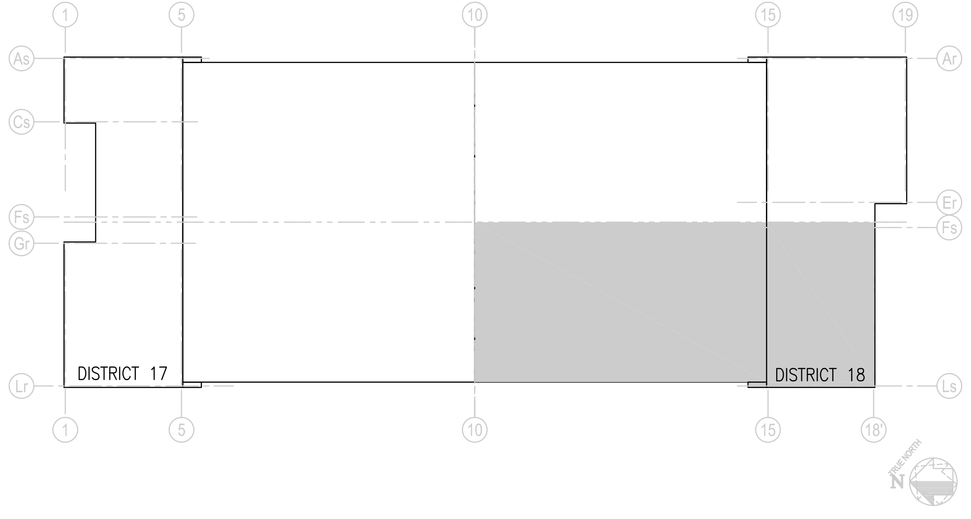
DATE:	09/27/2019
PROJECT NO:	DDC33000
DRAWN BY:	JM
CHECKED BY:	JM
DRAWING NUMBER:	FA-109.00
3/32" = 1'-0"	155 of 169

Plotted: 9/27/2019 7:58:23 AM P:\NYO\MEP_ENPP\DDC33000\DRAWINGS\SHEETS\FA-109.00_DDC33000.DWG - ksimpson



1 1ST FL FIRE ALARM DEMOLITION FLOOR PLAN - DISTRICT 17
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN	———
EXISTING TO BE REMOVED	- - - - - - - -

SHEET NOTES

1. THE FIRE ALARM CONTRACTOR SHALL CONNECT ALL NEW FIRE ALARM DEVICES TO THE EXISTING BUILDING FIRE ALARM CONTROL PANEL. THE FIRE ALARM CONTRACTOR SHALL REFER TO DRAWING FA-001.00 FOR ADDITIONAL INFORMATION.
2. ALL NEW WORK SHALL MATCH EXISTING BUILDING STANDARDS, & SHALL BE CARRIED OUT IN STRICT COMPLIANCE OF NFPA 72 2010 & N.E.C., FDNY FIRE CODE & NEW YORK CITY BUILDING DEPARTMENT.
3. LOCATION & DIMENSIONS OF ALL DEVICES ETC. SHALL BE COORDINATED IN FIELD.
4. THE FIRE ALARM CONTRACTOR SHALL REVIEW & COORDINATE WITH OTHER TRADES DRAWINGS FOR THE EXACT LOCATION OF EQUIPMENT PRIOR TO CONNECTING & COMMENCING WORK.
5. THE FIRE ALARM CONTRACTOR SHALL FURNISH & INSTALL FIRE PROOFING FOR ALL RATED WALL & SLABS PENETRATIONS AS REQUIRED BY CODE. THE FIRE ALARM CONTRACTOR SHALL VERIFY PARTITION CONSTRUCTION FOR EACH LOCATION & PROVIDE DETAIL / FIRE PROOF SYSTEM AS REQUIRED.
6. PROVIDE RIGID STEEL CONDUIT IN AREAS WHERE WIRING IS EXPOSED. FIRE ALARM CABLE MAY BE INSTALLED UN PROTECTED BY CONDUIT WHEN CONCEALED FROM VIEW, PROTECTED BY BUILDING CONSTRUCTION.
7. CONTRACTOR SHALL PROVIDE FIRE WATCH DURING CONSTRUCTION FOR ANY OCCUPIED AREA NOT COVERED BY THE FIRE ALARM SYSTEM.

SHEET KEYNOTES

1. FIRE ALARM CONTRACTOR SHALL DISCONNECT & REMOVE ALL EXISTING FIRE ALARM DEVICES, ASSOCIATED CONTROL MODULES, CABLES & CONDUIT BACK TO THE GROUND FLOOR EXISTING FIRE ALARM PANEL. PATCH & SEAL ALL CONDUIT OPENINGS AS REQUIRED.

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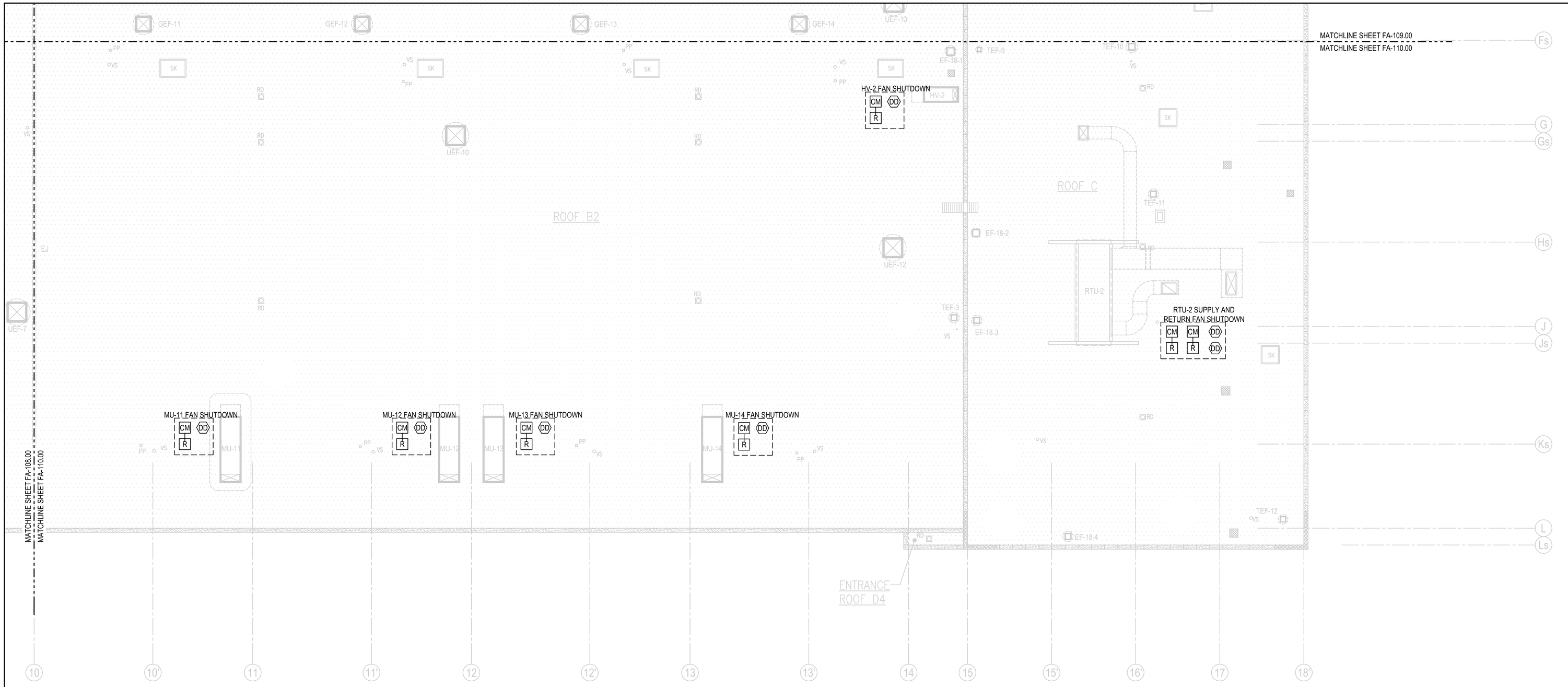
LOT: 1 BLOCK: 8138

DRAWING TITLE:
FIRE ALARM ROOF DEMOLITION PLAN

SEAL & SIGNATURE
STATE OF NEW YORK — KEITH TITTERTON — 074116 — LICENSED PROFESSIONAL ENGINEER

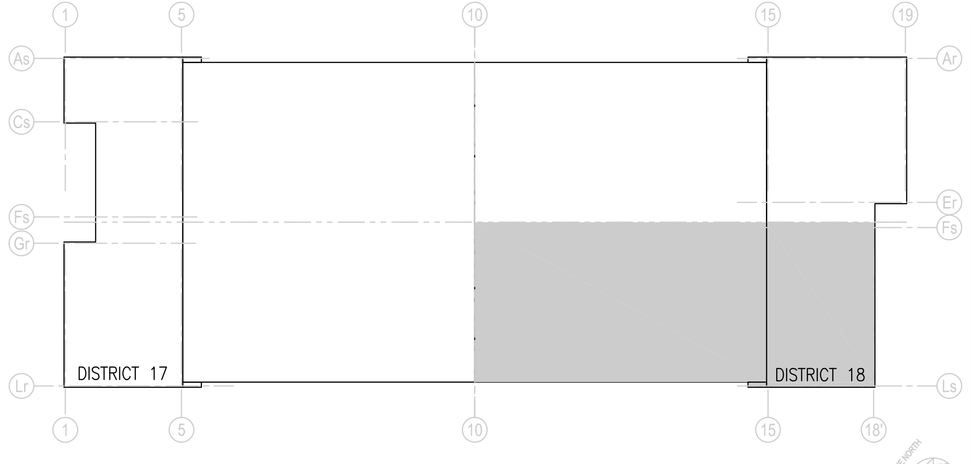
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DRAWING NUMBER:	DFA-110.00
3/32" = 1'-0"	156 of 169

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1 FIRE ALARM ROOF PLAN
3/32"=1'-0"

KEY PLAN



LINE LEGEND

EXISTING TO REMAIN _____

NEW _____

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SHEET KEYNOTES

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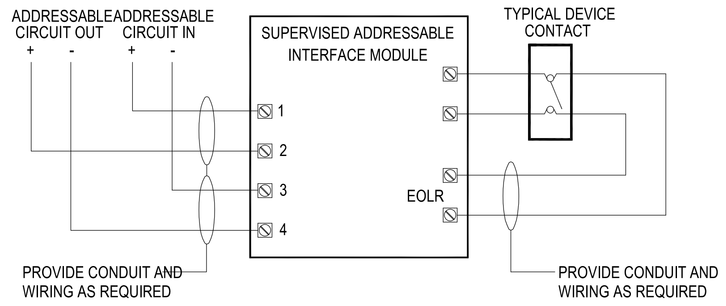
LOT: 1 BLOCK: 8138

DRAWING TITLE:
FIRE ALARM ROOF PLAN

SEAL & SIGNATURE
KEITH TITTEL
074116
LICENSED PROFESSIONAL ENGINEER
STATE OF NEW YORK

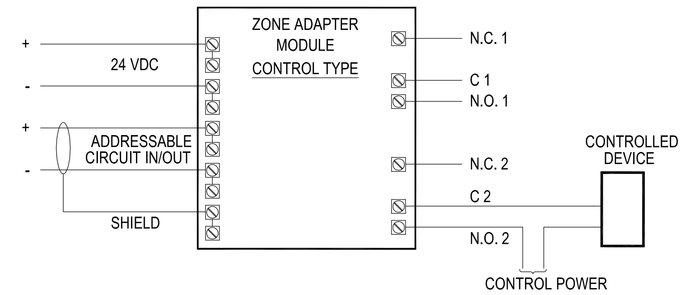
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157 of 169

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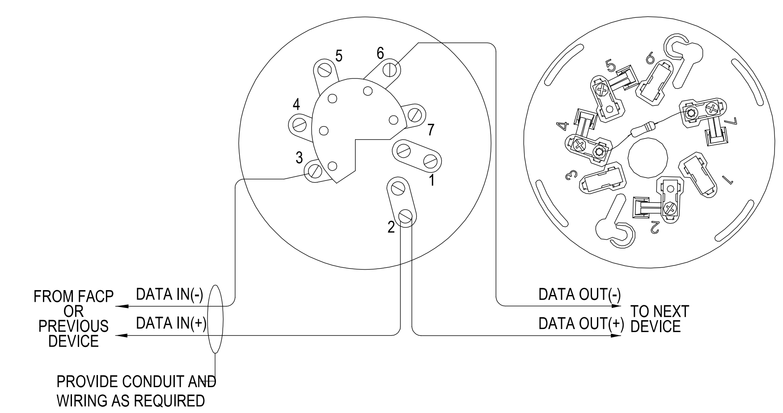
NOTES:
1. PROVIDE ADDRESSABLE INTERFACE MODULE TO INTERFACE NEW DEVICES TO THE NEW SYSTEM. CONNECT TO THE ADDRESSABLE CIRCUIT SERVING THE FLOOR.
2. PROVIDE WIRING AND CONDUIT AS REQUIRED. COORDINATE WITH THE FIRE ALARM SYSTEM MANUFACTURER FOR ADDITIONAL INTERFACE EQUIPMENT REQUIRED.

TYPICAL ADDRESSABLE INTERFACE MONITOR MODULE DETAIL



NOTES:
1. PROVIDE ADDRESSABLE CONTROL MODULES TO INTERFACE NEW CONTROL EQUIPMENT (EG: SECURITY PANEL, AMBIENT AUDIO SYSTEM, DOOR RELEASE) TO THE NEW FIRE ALARM SYSTEM AS REQUIRED.
2. PROVIDE POWER SUPPLIES, INTERFACE MODULES, TRANSFORMERS, CONTROL RELAYS, WIRING AND CONDUIT AS REQUIRED. COORDINATE WITH FIRE ALARM SYSTEM MANUFACTURER FOR ADDITIONAL INTERFACE EQUIPMENT REQUIRED.

TYPICAL ADDRESSABLE INTERFACE CONTROL MODULE DETAIL



NOTES:
1. PROVIDE NEW AREA SMOKE/HEAT DETECTORS AS INDICATED ON THE DRAWINGS. CONNECT NEW DEVICES TO THE ADDRESSABLE CIRCUIT SERVING THE FLOOR, AS REQUIRED.
2. PROVIDE WIRING, CONDUIT AND MOUNTING HARDWARE, AS REQUIRED.

TYPICAL ADDRESSABLE SMOKE/HEAT DETECTOR WIRING DETAIL

BUILDING DEPARTMENT APPROVAL NOTE:
THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

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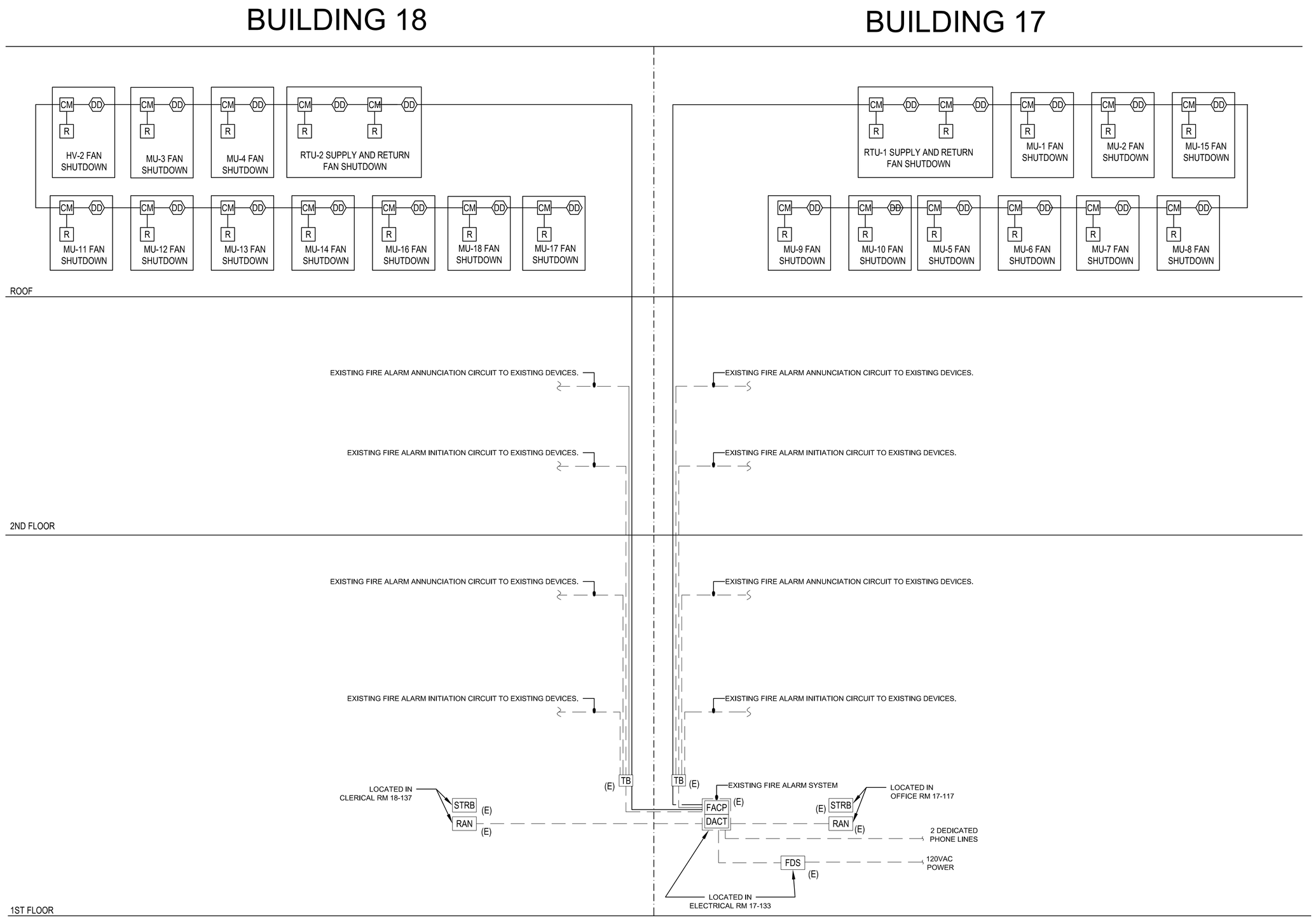
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DRAWING TITLE:
FIRE ALARM DETAILS

SEAL & SIGNATURE
STATE OF NEW YORK JOSEPH MICHAEL FITZPATRICK 024116 LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
DRAWN BY: JM
CHECKED BY: JM
DRAWING NUMBER:
FA-501.00
3/32" = 1'-0"

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1 FIRE ALARM SINGLE LINE DIAGRAM - NEW WORK

SCALE: NTS

LINE LEGEND

EXISTING TO REMAIN

NEW

CABLE TYPE LEGEND

ID	DESCRIPTION	TYPE
A	ADDRESSABLE CIRCUIT	#16 T.S.P.
B	HORN CIRCUIT	#14 P.R.
C	STROBE CIRCUIT	#14 P.R.
D	CONTROL CIRCUIT	#14 P.R.
E	MONITORING CIRCUIT	#16 P.R.
F	24VDC POWER CIRCUIT	#14 P.R.
G	GROUND CONDUCTOR	#10 COND
H	120VAC POWER CIRCUIT	2 #10 P.R.

BUILDING DEPARTMENT APPROVAL NOTE:

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SEAL & SIGNATURE
STATE OF NEW YORK · KEITH TITTMANN · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
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ASBESTOS ABATEMENT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS
10502 AVENUE D
BROOKLYN, NEW YORK 11236

ASBESTOS ABATEMENT GENERAL NOTES:

1. ALL ASBESTOS REMOVAL SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAW, GUIDELINES, REGULATIONS, ORDERS AND DIRECTIVES, INCLUDING WITHOUT LIMITATIONS, THE U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA), AND U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH), NEW YORK CITY LOCAL LAW TITLE 15, CHAPTER 1 RCNY, AND THE NEW YORK STATE DEPARTMENT OF LABOR (NYSDOL).

2. ASBESTOS ABATEMENT CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, SERVICES, ETC., NECESSARY TO PERFORM THE WORK REQUIRED FOR ASBESTOS ABATEMENT IN ACCORDANCE WITH CONTRACT DOCUMENTS AND ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

3. ASBESTOS ABATEMENT CONTRACTOR SHALL DEVELOP AND IMPLEMENT A WRITTEN STANDARD PROCEDURE FOR ABATEMENT WORK TO ENSURE MAXIMUM PROTECTION AND SAFEGUARD FROM ASBESTOS EXPOSURE OF THE WORKERS, VISITORS, EMPLOYEES, GENERAL PUBLIC, AND THE ENVIRONMENT.

4. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE SIGNS, LABELS, WARNINGS, AND POST INSTRUCTIONS THAT ARE NECESSARY TO PROTECT, INFORM AND WARN PEOPLE OF THE HAZARD FROM ASBESTOS EXPOSURE. POST IN A PROMINENT AND CONVENIENT PLACE FOR THE WORKERS A COPY OF THE LATEST APPLICABLE REGULATIONS FROM OSHA, EPA, NIOSH, NYCDEP, AND NYSDOL.

5. CITY TO NOTIFY ASBESTOS ABATEMENT CONTRACTOR OF ITEMS THAT CANNOT BE REMOVED OR REQUIRES SPECIAL ATTENTION. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE PROPER PROTECTION AS WELL AS DECONTAMINATION OF ALL ITEMS REMAINING IN THE WORK AREA.

6. ASBESTOS ABATEMENT CONTRACTOR SHALL HEPA VACUUM AND WET WIPE ALL PORTABLE ITEMS WITHIN THE WORK AREA. CITY IS TO INDICATE ALL ITEMS THAT MAY REQUIRE SPECIAL ATTENTION (I.E., COMPUTERS, ELECTRICAL EQUIPMENT, ETC).

7. ASBESTOS ABATEMENT CONTRACTOR SHALL NOTE THAT PORTIONS OF THE BUILDING WILL BE OCCUPIED, REFER TO CONTRACT SPECIFICATIONS FOR WORK SCHEDULES AND ACCESS TO THE WORK AREA.

8. THE ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE ALL ELECTRICAL, WATER, AND WASTE CONNECTIONS, TIE-INS, EXTENSIONS, CONSTRUCTION MATERIALS, SUPPLIES, ETC. AS REQUIRED TO FACILITATE ASBESTOS REMOVAL.

9. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE TEMPORARY ELECTRIC AND LIGHT THROUGHOUT THE WORK AREA(S) AS REQUIRED IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND CODES.

10. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE PORTABLE SMOKE/HEAT DETECTORS THROUGHOUT EACH WORK AREA.

11. ASBESTOS ABATEMENT CONTRACTOR SHALL PROPERLY PROTECT ALL CONTROLS, TUBING, ELECTRICAL PANELS, EQUIPMENT, ETC. WITHIN THE WORK AREA.

12. ASBESTOS ABATEMENT CONTRACTOR SHALL ISOLATE AND PROTECT ALL MECHANICAL EQUIPMENT REMAINING IN THE WORK AREA. ALL EQUIPMENT TO REMAIN SHALL BE HEPA VACUUMED AND WET WIPED PRIOR TO PLASTICIZING AND UPON THE COMPLETION OF THE PROJECT. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE WOOD BOX ENCLOSURES AND ADEQUATE VENTILATION FOR ANY EQUIPMENT THAT WILL REMAIN IN OPERATION DURING ASBESTOS ABATEMENT. ASBESTOS ABATEMENT CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS WITH CONSULTANT AND CITY.

13. ASBESTOS ABATEMENT CONTRACTOR SHALL EXERCISE EXTREME CARE AND CAUTION DURING ANY AND ALL DEMOLITION AND ABATEMENT OPERATIONS. ASBESTOS ABATEMENT CONTRACTOR SHALL CONDUCT REMOVAL OF ALL MATERIALS FROM THE SITE WITH MINIMUM DISTURBANCE; PROVIDE PROPER PROTECTION AND REGULAR MAINTENANCE OF ALL BUILDING PREMISES DIRECTLY OR INDIRECTLY ASSOCIATED WITH ABATEMENT OPERATIONS.

14. ASBESTOS ABATEMENT CONTRACTOR SHALL COMPLETELY ISOLATE WORK AREA AS DESCRIBED IN CONTRACT DOCUMENTS. ALL ISOLATION BARRIERS, PERSONAL/WASTE DECONTAMINATION ENCLOSURE SYSTEM (P./W.D.E.S.), PLASTIC SHEETING, AIR FILTRATION DEVICES (AFD), AUXILIARY MAKE-UP AIR MANIFOLDS, ETC. SHALL BE IN PLACE AND APPROVED BY THE CITY PRIOR TO THE BEGINNING OF ASBESTOS REMOVAL.

15. ASBESTOS ABATEMENT CONTRACTOR SHALL LOCATE AND SEAL ALL PENETRATIONS THROUGH WALLS BETWEEN THE WORK AREA AND ADJACENT AREAS, INCLUDING, BUT NOT LIMITED TO PIPE, DUCT, CONDUIT, CHASES, AND OPENINGS IN FIRE WALLS OR DECKS BETWEEN FLOORS AS REQUIRED BY THE FIELD CONDITION.

16. ASBESTOS ABATEMENT CONTRACTOR SHALL CONSTRUCT ISOLATION BARRIERS IN ORDER TO PROVIDE COMPLETE AND TOTAL ISOLATION OF THE ABATEMENT SITE FROM ALL ADJACENT AREAS. ALL ISOLATION BARRIERS SHALL BE OF WOOD; 2" X 4" AT 16" O.C. WITH 1/2" PLYWOOD SHEATHING, SEALED ON BOTH SIDES WITH TWO LAYERS OF 6 MIL PLASTIC SHEETING, CAULK AND SEAL ALL JOINTS AT THE PERIMETER. ALL MATERIALS SHALL BE FIRE RETARDANT. ASBESTOS ABATEMENT CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS. CONSTRUCTION OF BARRIERS SHALL BE CONDUCTED UNDER STRICT ASBESTOS ABATEMENT CONTROLS.

17. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE EMERGENCY EXITS (EMCB) AS REQUIRED.

18. ASBESTOS ABATEMENT CONTRACTOR SHALL COORDINATE WITH CONSTRUCTION PROJECT MANAGER AND BUILDING ENGINEER HVAC SHUTDOWN AS REQUIRED.

19. ASBESTOS ABATEMENT CONTRACTOR SHALL SEPARATE AND BLANK-OFF WITH SHEET METAL AND CAP ALL RETURN AND LOW PRESSURE DUCT SYSTEMS WHICH ENTER AND EXIT THE WORK AREA AS REQUIRED, SEAL ALL CONNECTING JOINTS AIR TIGHT WITH TAPE AND PLASTIC SHEETING. COORDINATE ALL WORK WITH THE FACILITY MANAGER AND THE CONSTRUCTION PROJECT MANAGER.

20. ASBESTOS ABATEMENT CONTRACTOR SHALL CONSTRUCT A PERSONAL/WASTE DECONTAMINATION ENCLOSURE SYSTEM (P./W.D.E.S.) AS INDICATED. IT SHALL BE OF SUFFICIENT SIZE TO ACCOMMODATE STORAGE OF MATERIALS, EQUIPMENT, ETC. WHILE ALLOWING FOR THE PASSAGE OF LABORERS AND THEIR EQUIPMENT (SCAFFOLDING) BETWEEN CLEAN AND CONTAMINATED AREAS.

21. SHOWER AND WASTEWATER MUST BE FILTERED AND DISPOSED OF IN THE BUILDING'S SANITARY SYSTEM. REFER TO CONTRACT SPECIFICATIONS.

22. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE PORTABLE CABINET-MOUNTED AIR FILTRATION DEVICES (AFD) EQUIPPED WITH HEPA FILTERS AT 99.97% EFFICIENCY, TO .3 MICRONS. THE NUMBER OF UNITS SHALL BE SUFFICIENT TO ENSURE A MINIMUM OF FOUR (4) COMPLETE AIR CHANGES PER HOUR AND MAINTAIN A NEGATIVE PRESSURE DIFFERENTIAL OF .02 INCHES OF WATER.

23. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE SECURITY SUCH THAT ALL BUILDING EMPLOYEES AND/OR VISITORS ARE PROHIBITED FROM ENTERING THE WORK AREA. ASBESTOS ABATEMENT CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE FIRE WATCH DURING ALL ABATEMENT OPERATIONS.

24. ASBESTOS ABATEMENT CONTRACTOR SHALL INSTALL AFD EXHAUST MANIFOLD AS REQUIRED FOR ADEQUATE AIRFLOW. REFER TO CONTRACT SPECIFICATIONS FOR DESCRIPTION. COORDINATE ALL LOCATIONS WITH CONSTRUCTION PROJECT MANAGER.

25. ASBESTOS ABATEMENT CONTRACTOR SHALL SUPPLY ALL NECESSARY CONNECTIONS, FASTENERS, FLEXIBLE DUCTS, MANIFOLDS, SUPPORTS, ETC. ANY AND ALL INSTALLATIONS SHALL COMPLY WITH CONTRACT DOCUMENTS AND MANUFACTURER'S REQUIREMENTS.

26. ASBESTOS ABATEMENT CONTRACTOR SHALL APPLY ONE (1) COAT OF SEALANT PRIOR TO POST TESTING CLEARANCE OVER ALL SURFACES FROM WHICH ASBESTOS-ABATEMENT HAVE BEEN REMOVED. REFER TO CONTRACT SPECIFICATIONS.

27. ASBESTOS ABATEMENT CONTRACTOR SHALL HEPA VACUUM AND WET WIPE ALL SURFACES WITHIN THE WORK AREA UPON THE COMPLETION OF ASBESTOS ABATEMENT. REFER TO CONTRACT SPECIFICATIONS.

28. ASBESTOS ABATEMENT CONTRACTOR MAY ENCOUNTER EXTENSIVE CONDUIT, WIRING, DUCTS, ETC, ABOVE CEILING. ALL ITEMS SHALL BE PROPERLY PROTECTED PRIOR TO ABATEMENT AND THOROUGHLY DECONTAMINATED UPON COMPLETION OF ASBESTOS REMOVAL. REFER TO CONTRACT SPECIFICATIONS.

29. DEBRIS RESULTING FROM ANY DEMOLITION AND/OR ASBESTOS ABATEMENT ACTIVITIES SHALL BE DISPOSED OF AS INDICATED IN CONTRACT DOCUMENTS OR DIRECTED BY THE CONSTRUCTION PROJECT MANAGER.

30. ALL ROUTES THROUGH THE BUILDING, TO BE USED DURING THE ASBESTOS ABATEMENT OPERATIONS SHALL BE COORDINATED WITH FACILITY MANAGER AND CONSTRUCTION PROJECT MANAGER. ASBESTOS ABATEMENT CONTRACTOR SHALL UTILIZE ENCLOSED MOBILE CONTAINERS FOR TRANSPORTATION OF ALL WASTE MATERIALS. ALL EGRESS ROUTES SHALL BE PROPERLY PROTECTED AND SUFFICIENTLY MAINTAINED BY THE ASBESTOS ABATEMENT CONTRACTOR.

31. UNLESS OTHERWISE NOTED, ALL WORKER AND WASTE DECONTAMINATION FACILITIES, BOTH CONTIGUOUS AND REMOTE FROM THE WORK AREA, SHALL BE CONSTRUCTED WITH A SOLID OUTER SHELL. THE OUTER SHELL SHALL BE FRAMED WITH 2" x 4" STUDDING 16" O.C. WITH A SOLID SHEATHING MATERIAL OF AT LEAST 3/8" MINIMUM THICKNESS.

32. LOCATION OF ANY REMOTE DECONTAMINATION FACILITIES SHALL BE COORDINATED AND APPROVED BY THE CITY AND THE CONSTRUCTION PROJECT MANAGER PRIOR TO THE START OF WORK.

33. AIR FILTRATION DEVICE (AFD) EXHAUST LOCATIONS WILL BE COORDINATED WITH THE FACILITY MANAGER AND THE CONSTRUCTION PROJECT MANAGER.

34. CONTRACT DRAWINGS WERE PREPARED FROM EXISTING DRAWINGS SUPPLIED BY THE CITY AND PROVIDED FOR INFORMATION PURPOSES ONLY. THE CONSULTANT MAKES NO CLAIMS AS TO THEIR ACCURACY OR ANY INFORMATION DERIVED THROUGH THEIR USE.

35. ASBESTOS ABATEMENT CONTRACTOR IS RESPONSIBLE TO COORDINATE AND CONFIRM THE EXACT SCOPE OF WORK FOR EACH PHASE OF ABATEMENT WITH THE GENERAL CONTRACTOR AND OTHER TRADES.

36. ASBESTOS ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE JOB SITE AND DETERMINING ALL QUANTITIES, MEASUREMENTS, AND ANY OTHER CONDITIONS RELATIVE TO THE ENTIRE PROJECT. THE DRAWINGS ARE ONLY A DIAGRAMMATICAL REPRESENTATION OF THE WORK AREAS AND MAY NOT CONSTITUTE THE ACTUAL QUANTITIES OF THE MATERIAL. ASBESTOS ABATEMENT CONTRACTOR IS RESPONSIBLE FOR CONFIRMATION OF THE ACTUAL TOTAL QUANTITIES OF THE WORK PRIOR TO BIDDING. NO EXTRA COMPENSATION WILL BE ALLOWED ON ACCOUNT OF DIFFERENCES BETWEEN ACTUAL CONDITIONS AND THOSE INDICATED ON THE DRAWINGS. IT IS THE CITY'S INTENT TO REMOVE ALL ASBESTOS-CONTAINING MATERIAL SCHEDULED TO BE DISTURBED WITHIN THE WORK AREAS. THE ASBESTOS ABATEMENT CONTRACTOR SHALL PROMPTLY NOTIFY THE CITY SHOULD ADDITIONAL SUSPECT ACM BE ENCOUNTERED DURING ABATEMENT ACTIVITIES.

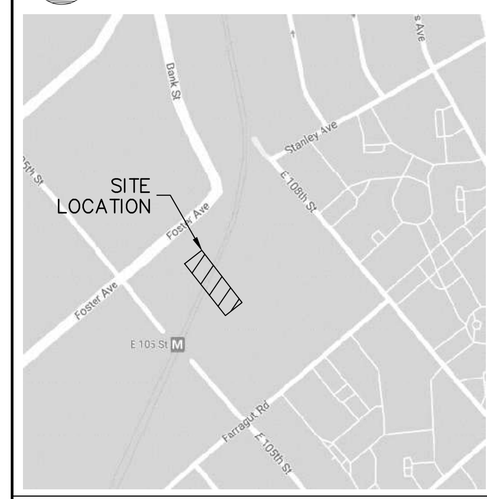
37. ASBESTOS ABATEMENT CONTRACTOR SHALL PROVIDE ALL SCAFFOLDING, PLATFORM INSTALLATION, EQUIPMENT, TOOLS, TRANSPORTATION AND ANY OTHER EQUIPMENT REQUIRED AND/OR NECESSARY TO COMPLETE ALL WORK DESCRIBED IN THE CONTRACT DOCUMENTS.

38. CONTRACTOR SHALL PROTECT NON-ACM INSULATION AND/OR ALL FIXED OBJECTS WITHIN THE WORK AREAS WITH TWO LAYERS OF 6 MIL POLYETHYLENE SHEETING DURING REMOVAL ACTIVITIES. COSTS ASSOCIATED WITH THESE ACTIVITIES SHALL BE INCLUDED IN THE CONTRACTORS BID.

39. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL ROOFING COMPONENTS, INCLUDING MULTIPLE LAYERS OF BUILT-UP MEMBRANE, TAR, VAPOR BARRIER, AND/OR FLASHING DOWN TO SUBSTRATE/DECK.

DRAWING	DRAWING NAME
H001.00	ASBESTOS ABATEMENT GENERAL NOTES
H002.00	ASBESTOS ABATEMENT - DISTRICT 17 ROOF PLAN
H003.00	ASBESTOS ABATEMENT - DISTRICT 18 ROOF PLAN
H004.00	ASBESTOS ABATEMENT - DISTRICT NO. 17 AND NO. 18 GARAGE ROOF PLAN

KEY PLAN



LiRo Engineers, Inc.
Three Aerial Way
Syosset, New York 11791

NYC DDC **Department of Design and Construction**

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		
5		

CAPITAL PROJECT NUMBER: S136-383N

DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NEW YORK 11236

DRAWING TITLE:
ASBESTOS ABATEMENT GENERAL NOTES

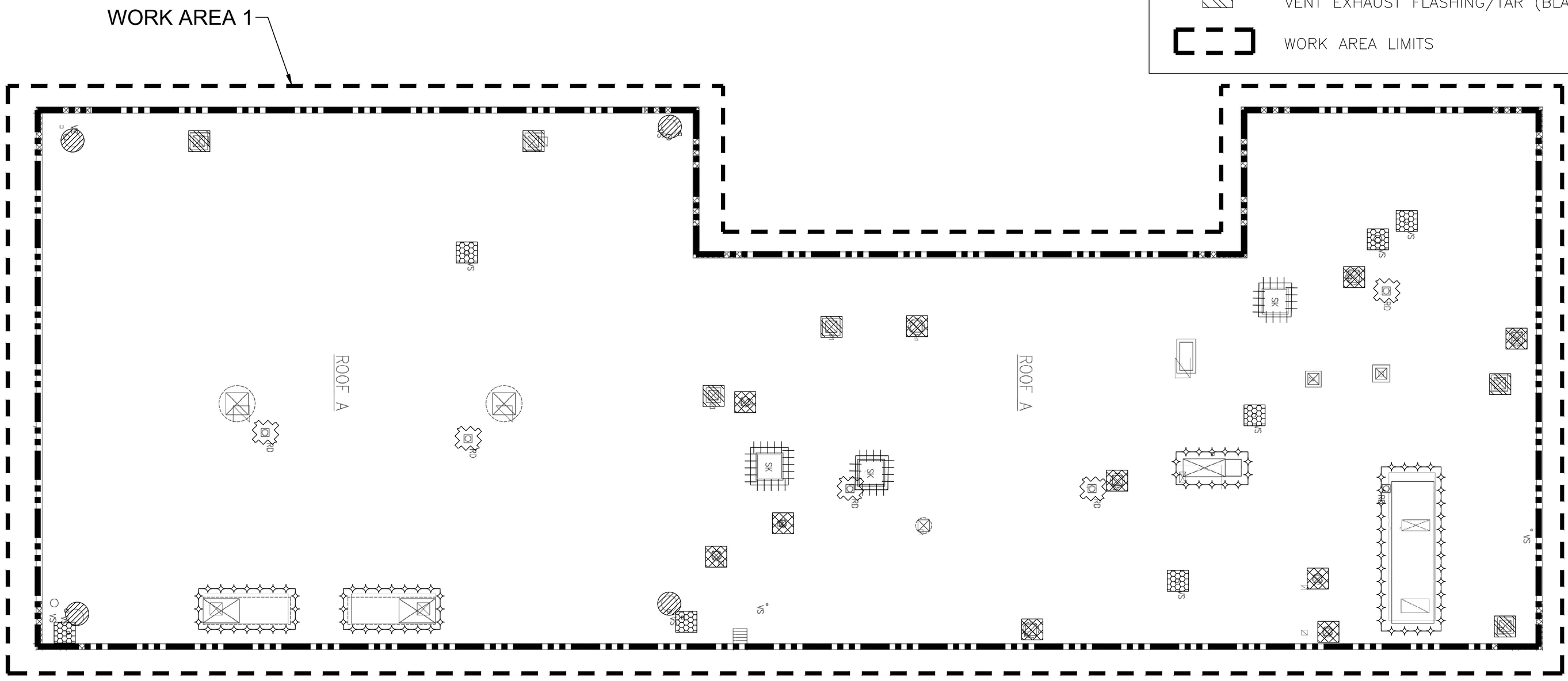
DRAWN BY: A. KELLY
PROJ. DESIGNER: V. ORTIZ
CERTIFICATE NO.: 06-01697
CHECKED BY: B. CZELUSTA
SCALE: SEE BAR SCALE
DATE: 4/17/2019
DRAWING NUMBER: **H001.00**
DRAWING NUMBER: 1 OF 4

CONSULTANTS PROJECT #: 17-155-0265

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
1	NYCDEP Title 15, Chapter 1 §1-107 Foam Procedure for Roof Removal	1,200 Sq. Ft. of Roof Flashing/Tar (Black)	–
		20 Sq. Ft. of Drain Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Vent Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Flue/Stack Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof Skylight Flashing/Tar (Black)	–
		275 Sq. Ft. of Roof A/C Unit Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof TEF/EF Exhaust Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof TPE/Roof Vent Exhaust Flashing/Tar (Black)	–

LEGEND

- LOCATION OF ASBESTOS CONTAINING ROOF FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING VENT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING ROOF DRAIN FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING SKYLIGHT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING AC UNIT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING FLUE/STACK FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING TEF/EF EXHAUST FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING TPE/ROOF VENT EXHAUST FLASHING/TAR (BLACK)
- WORK AREA LIMITS

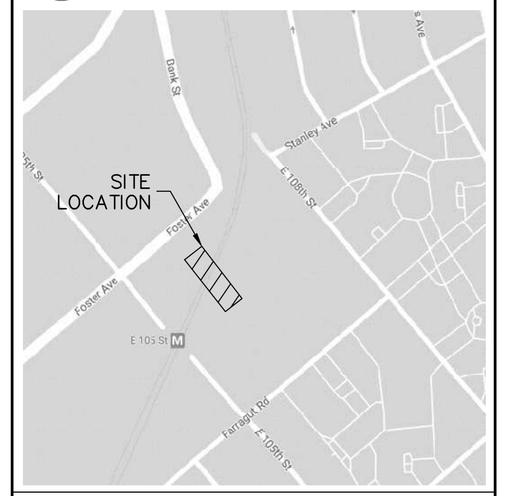


1 / H002.00 DISTRICT NO. 17 - ROOF PLAN

0 6 12 24

SCALE IN FEET

KEY PLAN



LiRo Engineers, Inc.
Three Aerial Way
Syosset, New York 11791

NYC DDC Department of Design and Construction

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		
5		

CAPITAL PROJECT NUMBER: S136-383N

DSNY 17/18 GARAGE
REPLACEMENT OF
ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NEW YORK 11236

DRAWING TITLE:

ASBESTOS ABATEMENT
DISTRICT NO. 17 - ROOF PLAN

DRAWN BY: A. KELLY	SCALE: SEE BAR SCALE
PROJ. DESIGNER: V. ORTIZ	DATE: 4/17/2019
CERTIFICATE NO.: 06-01697	DRAWING NUMBER:
CHECKED BY: B. CZELUSTA	**H002.00**
	DRAWING NUMBER: 2 OF 4

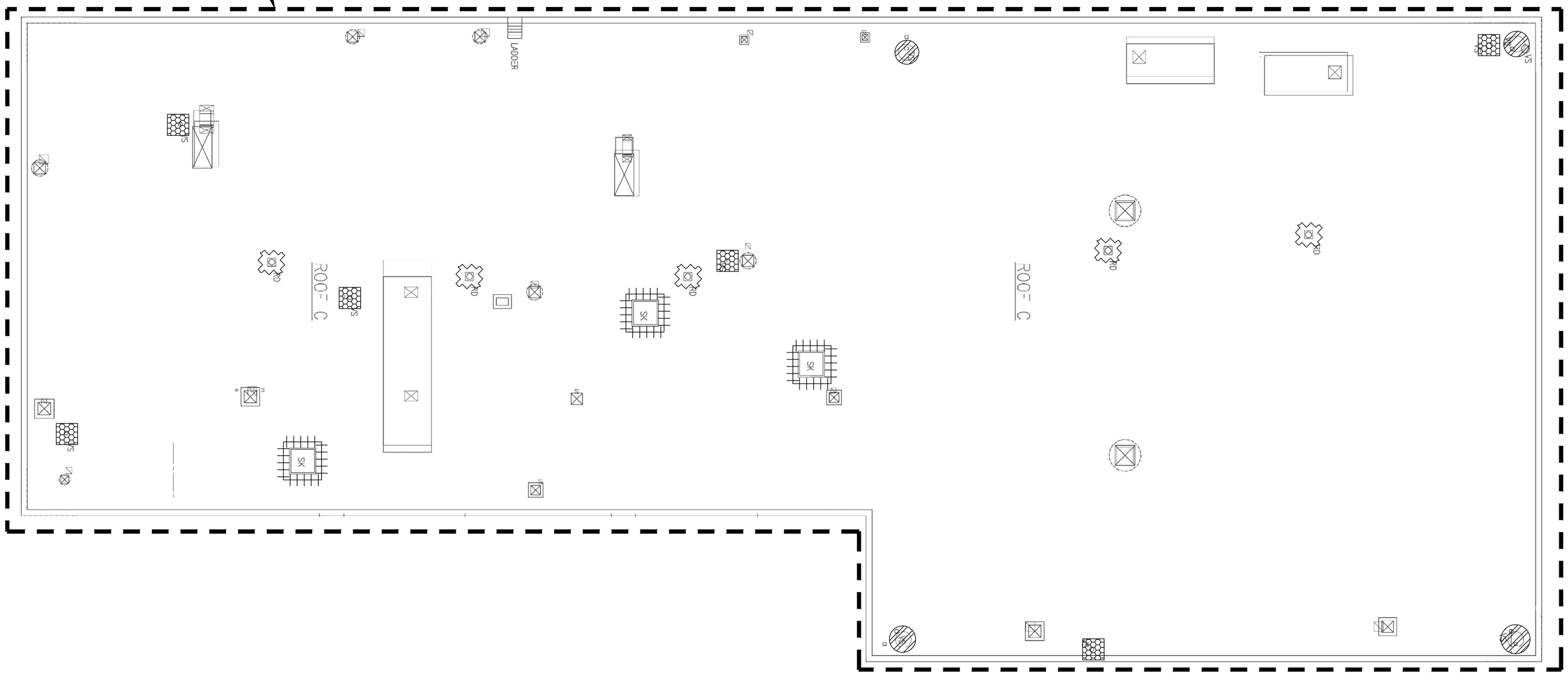
CONSULTANTS PROJECT #: 17-155-0265

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
2	NYCDEP Title 15, Chapter 1 §1-107 Foam Procedure for Roof Removal	25 Sq. Ft. of Roof Drain Flashing/Tar (Black)	–
		20 Sq. Ft. of Roof Vent Flashing/Tar (Black)	–
		20 Sq. Ft. of 18 Roof Flue/Stack Flashing/Tar (Black)	–
		120 Sq. Ft. of Roof Skylight Flashing/Tar (Black)	–

LEGEND

- LOCATION OF ASBESTOS CONTAINING VENT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING ROOF DRAIN FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING SKYLIGHT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING FLUE/STACK FLASHING/TAR (BLACK)
- WORK AREA LIMITS

WORK AREA 2

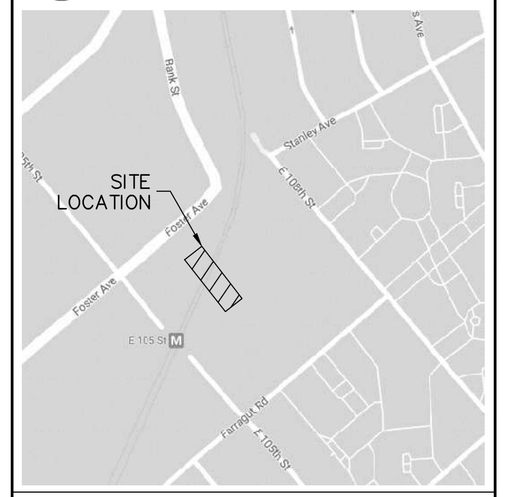


1 / H003.00 DISTRICT NO. 18 - ROOF PLAN

0 6 12 24

SCALE IN FEET

KEY PLAN



LiRo Engineers, Inc.
Three Aerial Way
Syosset, New York 11791

NYC DDC Department of Design and Construction

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
3		
4		
5		

CAPITAL PROJECT NUMBER: S136-383N

DSNY 17/18 GARAGE
REPLACEMENT OF
ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NEW YORK 11236

DRAWING TITLE:

ASBESTOS ABATEMENT
DISTRICT NO. 18 - ROOF PLAN

DRAWN BY: A. KELLY	SCALE: SEE BAR SCALE
PROJ. DESIGNER: V. ORTIZ	DATE: 4/17/2019
CERTIFICATE NO.: 06-01697	DRAWING NUMBER: **H003.00**
CHECKED BY: B. CZELUSTA	DRAWING NUMBER: 3 OF 4

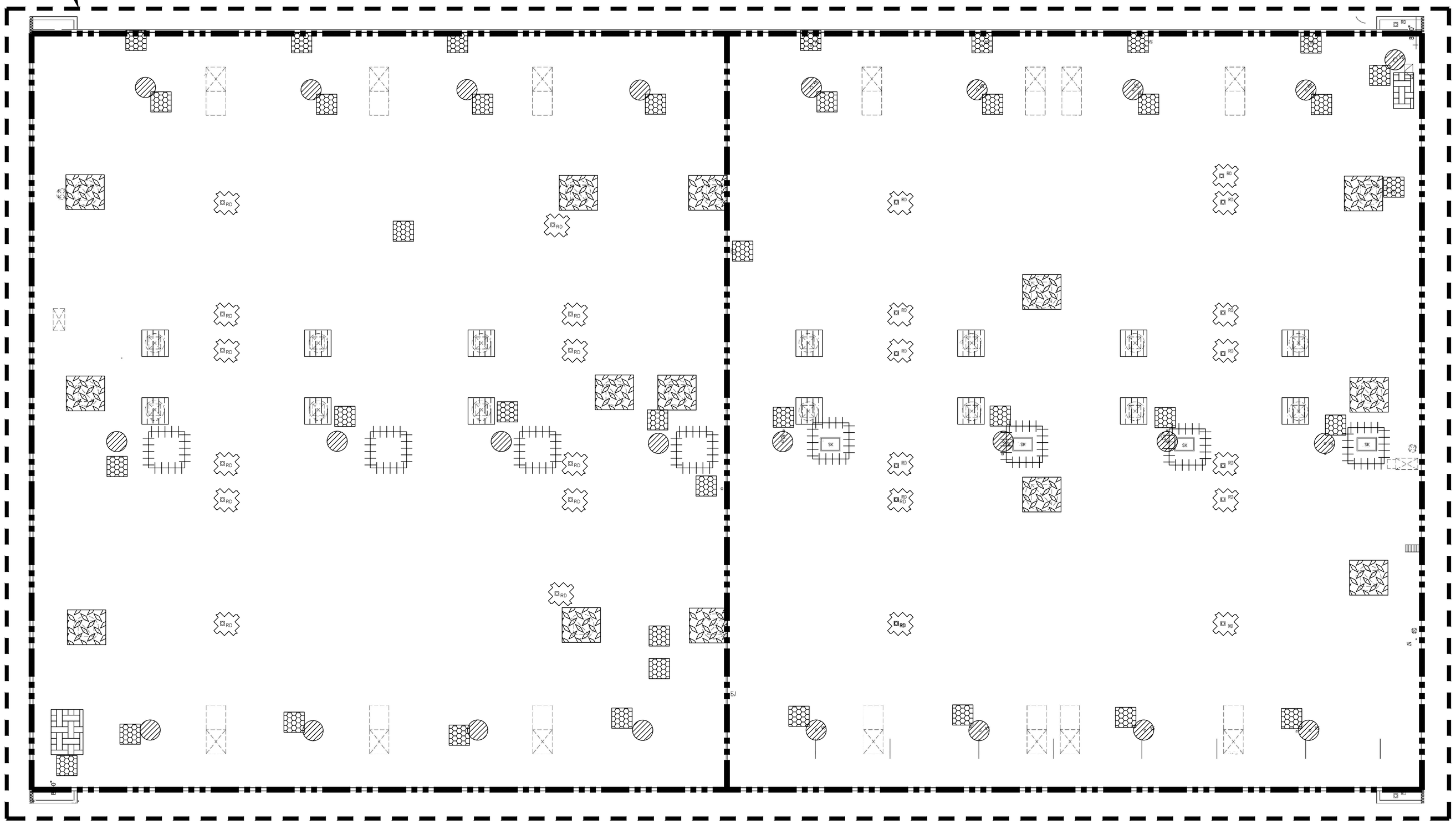
CONSULTANTS PROJECT #: 17-155-0265

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
3	NYCDEP Title 15, Chapter 1 §1-107 Foam Procedure for Roof Removal	3,340 Sq. ft. of Garage Roof Flashing/Tar (Black) and Garage Roof Joint Flashing/Tar (Black)	–
		69 Sq. Ft. of Garage Roof Drain Flashing/Tar (Black)	–
		125 Sq. Ft. of Garage Roof Vent Flashing/Tar (Black)	–
		100 Sq. Ft. of Garage Roof Flue/Stack Flashing/Tar (Black)	–
		320 Sq. Ft. of Garage Roof Skylight Flashing/Tar (Black)	–
		80 Sq. Ft. of Garage Roof Access Hatch Flashing/Tar (Black)	–
		420 Sq. Ft. of Garage Roof GEF Exhaust Flashing/Tar (Black)	–
		1500 Sq. Ft. of Garage Roof UEF Exhaust Flashing/Tar (Black)	–

LEGEND

- LOCATION OF ASBESTOS CONTAINING ROOF FLASHING/TAR AND JOINT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING VENT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING ROOF DRAIN FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING SKYLIGHT FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING FLUE/STACK FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING ACCESS HATCH FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING GEF EXHAUST FLASHING/TAR (BLACK)
- LOCATION OF ASBESTOS CONTAINING UEF EXHAUST FLASHING/TAR (BLACK)
- WORK AREA LIMITS

WORK AREA 3

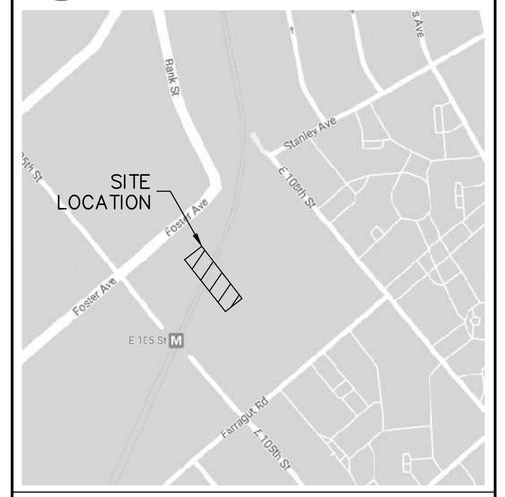


1 / H004.00 DISTRICT NO. 17 AND NO. 18 - GARAGE ROOF PLAN

0 6 12 24

SCALE IN FEET

KEY PLAN



LiRo Engineers, Inc.
Three Aerial Way
Syosset, New York 11791

NYC DDC **Department of Design and Construction**

REVISIONS:

NUMBER	DESCRIPTION	DATE
1		
2		
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4		
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CAPITAL PROJECT NUMBER: S136-383N

DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

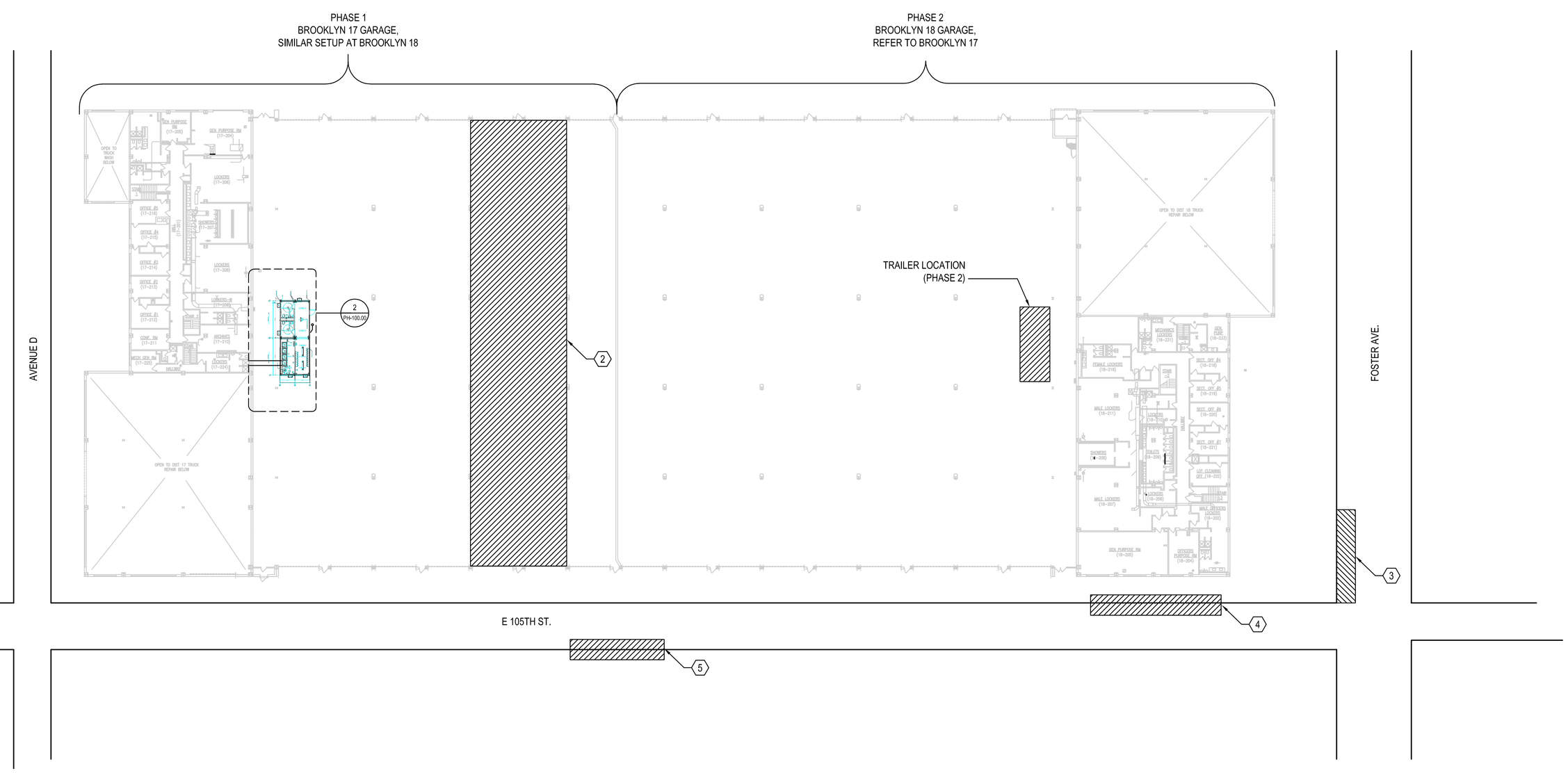
10502 AVENUE D
BROOKLYN, NEW YORK 11236

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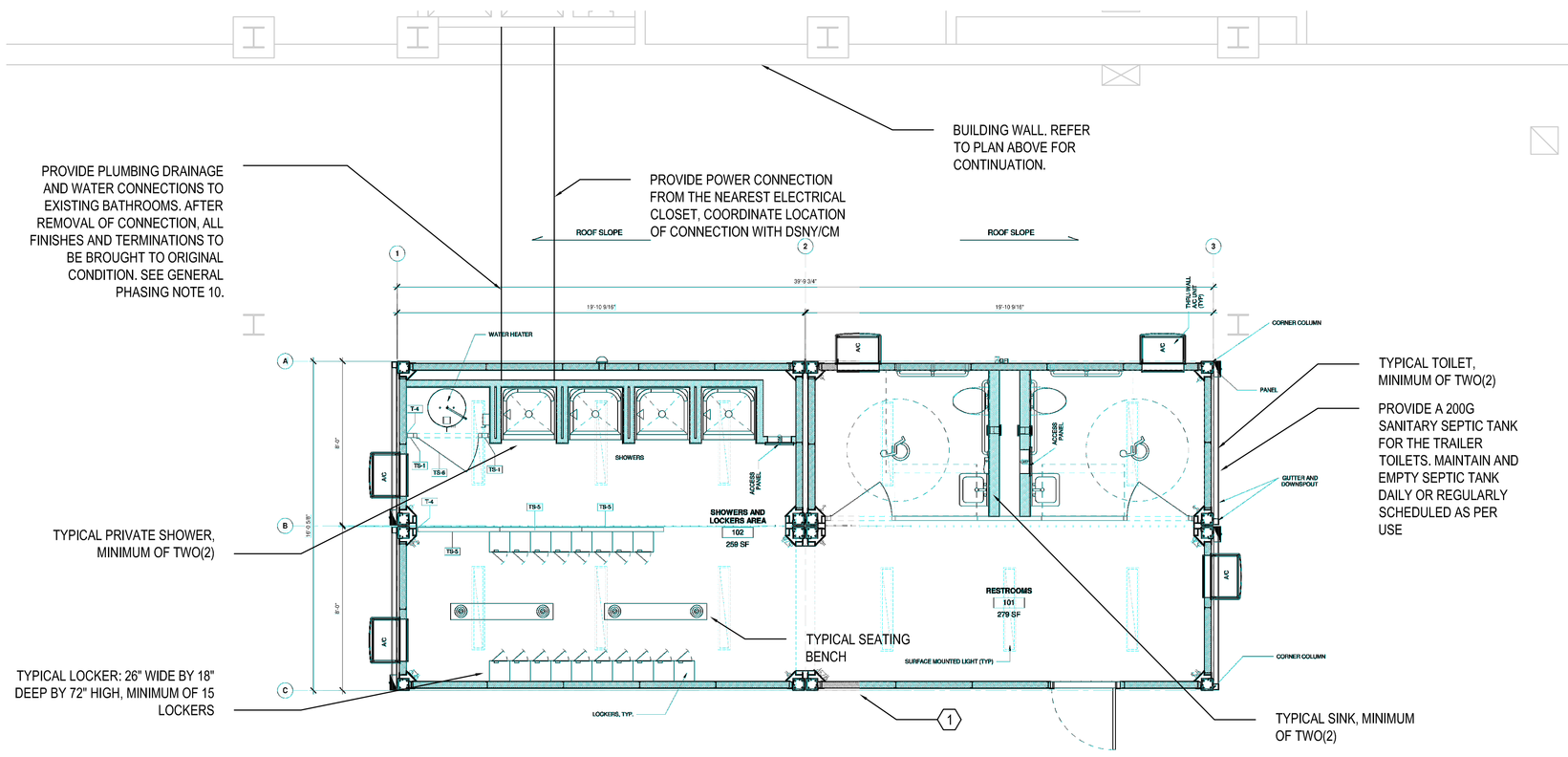
ASBESTOS ABATEMENT
DISTRICT NO. 17 AND NO. 18 - GARAGE ROOF PLAN

DRAWN BY: A. KELLY	SCALE: SEE BAR SCALE
PROJ. DESIGNER: V. ORTIZ	DATE: 4/17/2019
CERTIFICATE NO.: 06-01697	DRAWING NUMBER: **H004.00**
CHECKED BY: B. CZELUSTA	DRAWING NUMBER: 4 OF 4

CONSULTANTS PROJECT #: 17-155-0265



1 DIST 17/18 OVERALL FIRST FLOOR PLAN WITH TRAILER LOCATION
1/32"=1'-0"
0 32' 64'



2 TEMPORARY LOCKER/SHOWER/BATHROOM TRAILER FOR PHASING
1/4"=1'-0"
0 4' 8'

GENERAL PHASING NOTES:

1. THE PHASING PLANS INDICATED HERE ARE FOR INFORMATIONAL USE ONLY AND SHOW A GENERAL APPROACH TO PHASING. CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND SUBMITTING FOR APPROVAL PLANS FOR PHASING INCLUDING BUT NOT LIMITED TO, EXISTING CONDITIONS, SCHEDULES, TEMPORARY UTILITIES, SITE ACCESS, LEGAL MEANS OF EGRESS, SITE AND TRAILER ADA ACCESSIBILITY, SHUT-DOWN, TEMPORARY TRAILER LAYOUT AND FURNISHING.
2. CONTRACTOR SHALL SUBMIT TRAILER LAYOUT FOR EACH PHASE FOR REVIEW. COORDINATE WITH DSNY FOR SPECIFIC FUNCTIONAL/PROGRAMMING REQUIREMENTS THAT ARE TO BE MAINTAINED AT EACH PHASE AND BETWEEN EACH PHASE.
3. CONTRACTOR SHALL NOT DISPLACE MORE THAN 15 LOCKERS OF ANY ONE TYPE, TWO TOILETS AND TWO SHOWERS AT ANY ONE TIME AND SHALL CONSIDER THIS WITHIN PHASING.
4. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING HVAC/PLUMBING/ELECTRICAL SERVICES TO THE SPACES OCCUPIED WHERE WORK IS NOT BEING PERFORMED.
5. NO OCCUPIED SPACE SHALL BE LEFT IN AN UNSAFE OR HAZARDOUS CONDITION.
6. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING FURNISHINGS DURING PERFORMANCE OF WORK AND AFTER HOURS.
7. IF, AS PART OF PHASING WORK, CONTRACTOR RELOCATES/MOVES ANY OF THE EXISTING FURNISHINGS, THE FURNISHINGS MUST BE PLACED BACK AND BE LEFT IN THE SAME CONDITION THEY WERE PRIOR TO THE WORK. IN CASE OF ANY DAMAGE, CONTRACTOR IS RESPONSIBLE TO FIX OR REPLACE THE DAMAGED FURNISHINGS.
8. ALL WORK WITHIN BK 17/18 BUILDINGS CAN ONLY BE PERFORMED DURING A NON-SNOW SEASON (APRIL 1 - OCTOBER 31) AND DURING SWING-SHIFT (3PM-12AM). COORDINATE EXACT TIMEFRAME OF SNOW SEASON WITH DSNY. (1)
9. TEMPORARY LOCKER/BATHROOM/SHOWER TRAILER IS TO BE REMOVED DURING THE SNOW SEASON AND, IF REQUIRED, REINSTALLED THEREAFTER.
10. UTILITY CONNECTION TO INTERIOR LOCKER ROOM TRAILER SHALL BE COORDINATED WITH EGRESS/ACCESS SIDEWALK. PROVIDE PEDESTRIAN PROTECTION AS REQUIRED.

(#) SHEET KEYNOTES:

1. PROVIDE A 16'X40' CODED, NON-COMBUSTIBLE TRAILER WITH INSULATED WALLS FOR DSNY LOCKER ROOM/ SHOWERS/ BATHROOM WITH TEMPORARY POWER AND PLUMBING CONNECTION TO THE EXISTING BUILDING (PROVIDE TANK AND EJECTOR PUMP IF REQUIRED) WITH THE EXCEPTION OF SANITARY/SEWER, WHICH IS TO BE DONE VIA A SEPTIC TANK (TRAILER BY WILLSCOT, NADLER, MOBILE MINI, OR APPROVED EQUAL). EACH PERSONNEL LOCKER SHALL HAVE ONE PARTITION WITH TWO DOORS (ONE FOR WET SIDE AND ONE FOR DRY SIDE). COORDINATE WITH CONSTRUCTION MANAGER FOR THE EXACT LOCATION OF TRAILER TEMPORARY CONNECTIONS.
2. CONTRACTOR SHALL NOT CLOSE MORE THAN TWO BAYS AT ANY ONE TIME. TWO BAYS ARE IDENTIFIED HERE AS AN EXAMPLE.
3. PROVIDE A DDC/CM TRAILER (WILLSCOT, NADLER, MOBILE MINI, OR APPROVED EQUAL). PROVIDE TEMPORARY UTILITIES CONNECTION TO THE BUILDING, COORDINATE LOCATION OF CONNECTION WITH CONSTRUCTION MANAGER.
4. SPACE ALLOCATION FOR CONTRACTOR TRAILERS/CONEX BOXES. ACQUIRE ALL NECESSARY PERMITS FOR LOCATING TRAILERS ON THE STREET.
5. AREA FOR STAGING/LAYDOWN FOR CONTRACTOR MATERIAL AND EQUIPMENT, MAXIMUM OF 50' BY 12'.

SYSKA HENNESSY GROUP
A member company of SH Group, Inc.
Syska Hennessy Group, Inc.
1515 Broadway
New York, NY 10036
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A&W ARCHITECTS & ENGINEERS, P.C.
96 Morton Street, NY, New York 10014-3309

VJ ASSOCIATES
A CONSTRUCTION CONSULTING FIRM

Hirani Engineering & Land Surveying, P.C.
Hirani Group
Engineers ■ Land Surveyors ■ Construction Managers
120 West John Street Hicksville, NY 11801
Tel: 516-248-1010 Fax: 516-248-9018
www.hiranigroup.com

DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
-	ISSUED FOR BID	09/30/2019
1	ADDENDUM # 6	08/30/2021

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

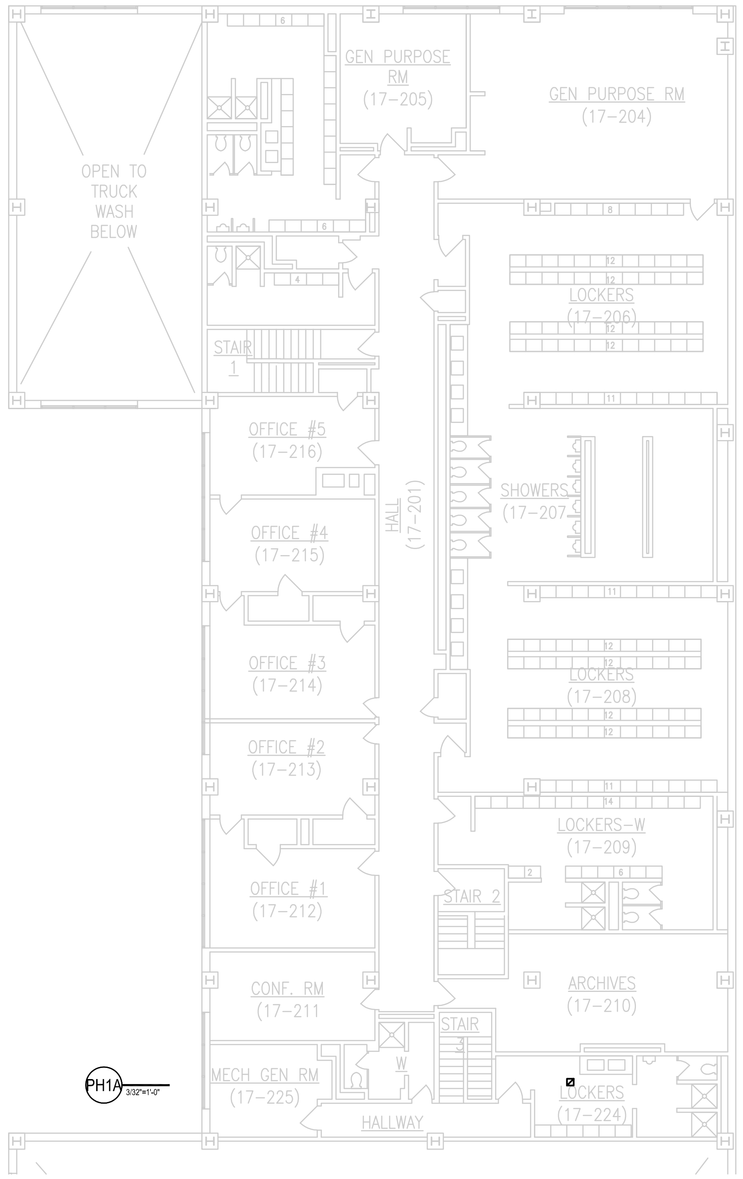
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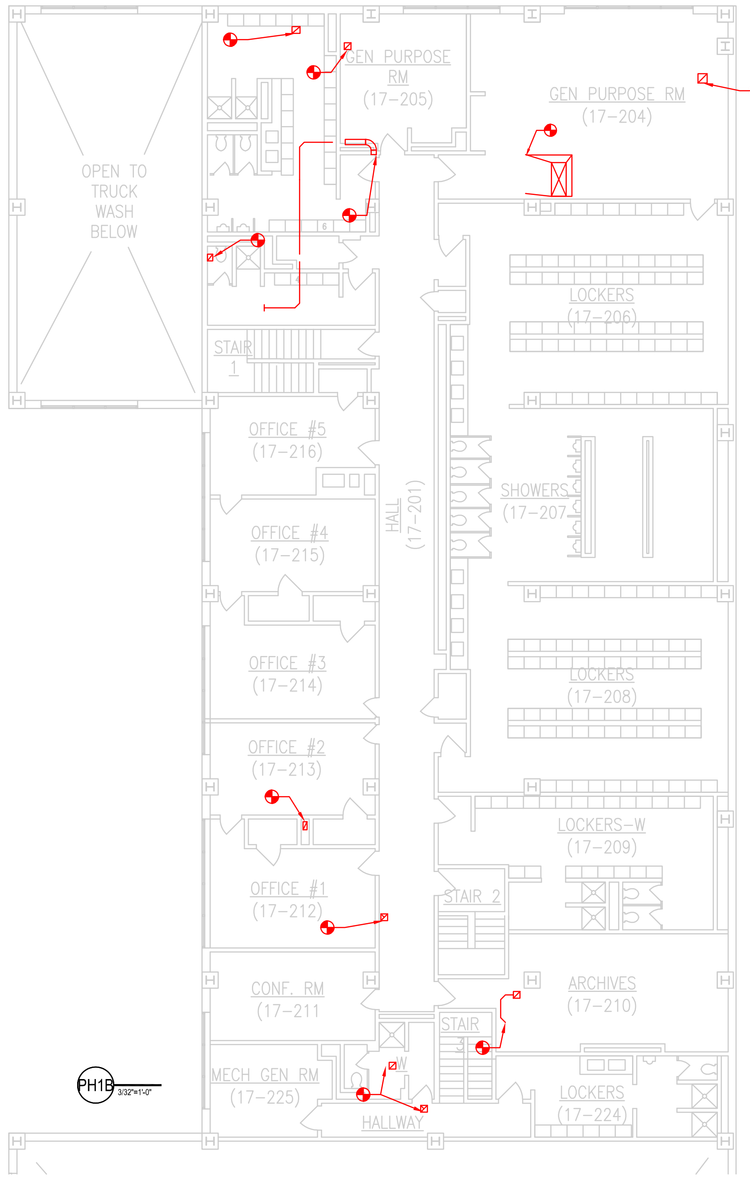
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TRAILER LOCATION AND PLAN

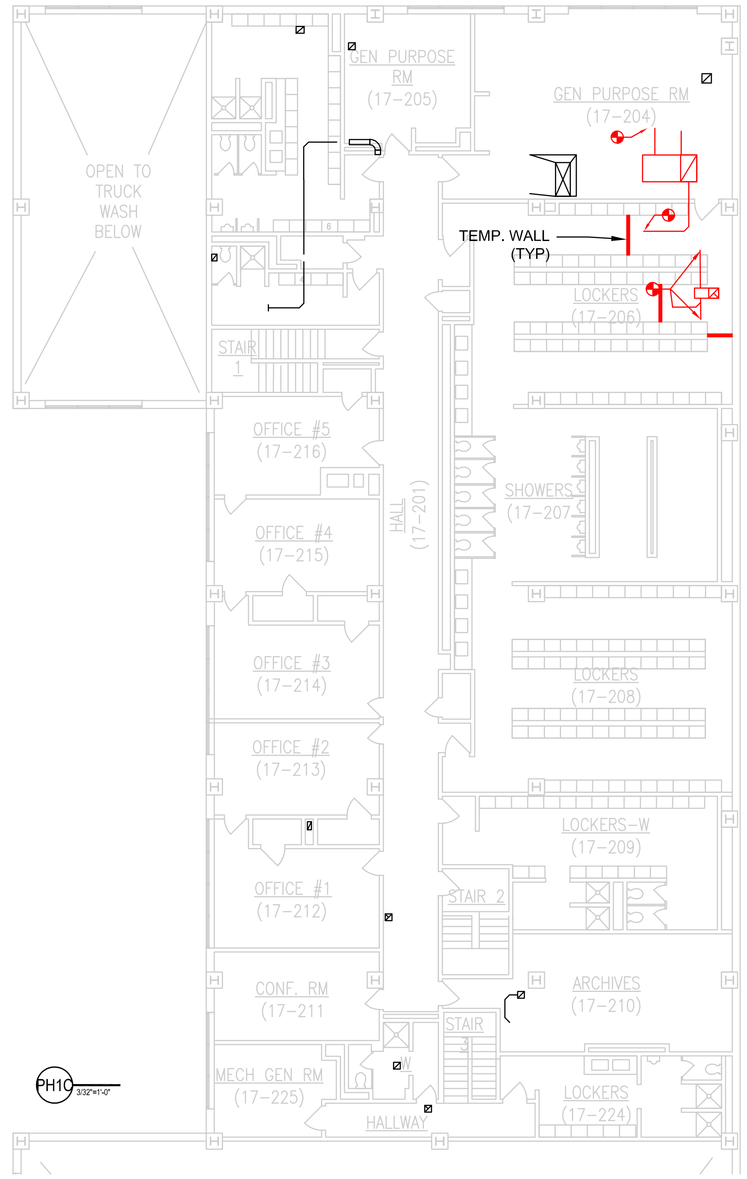
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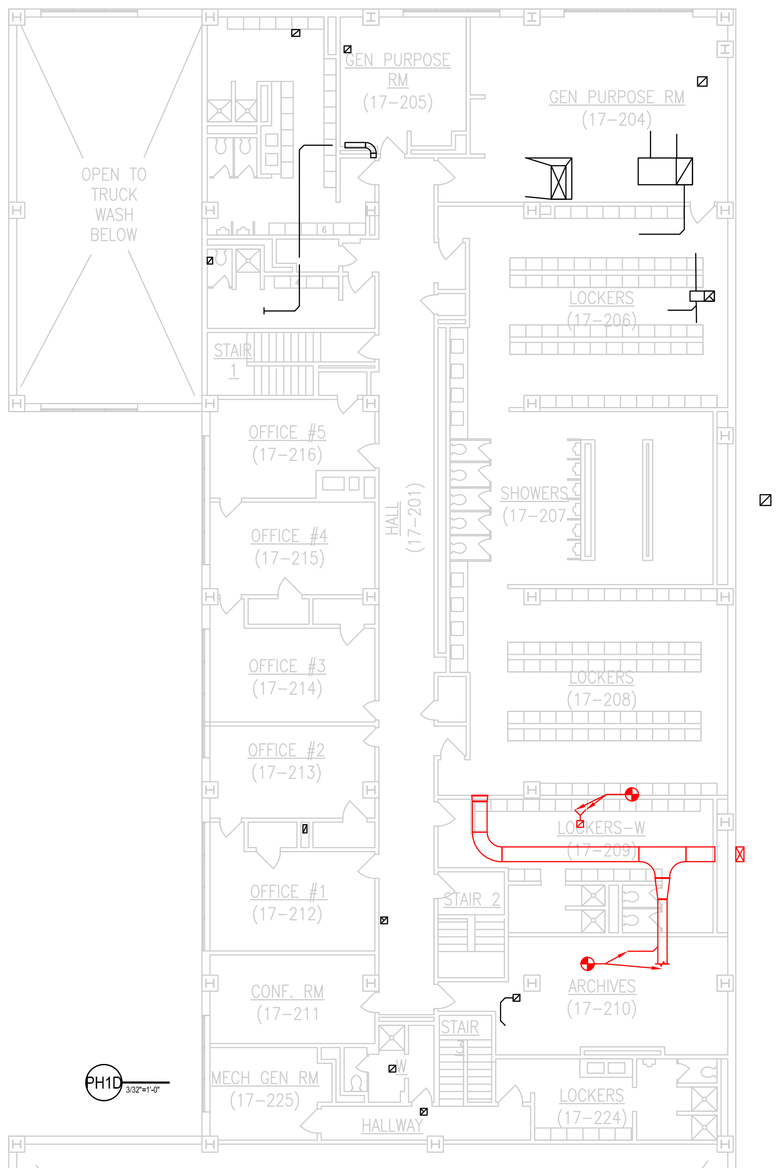
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PH-100.00
XX OF XX

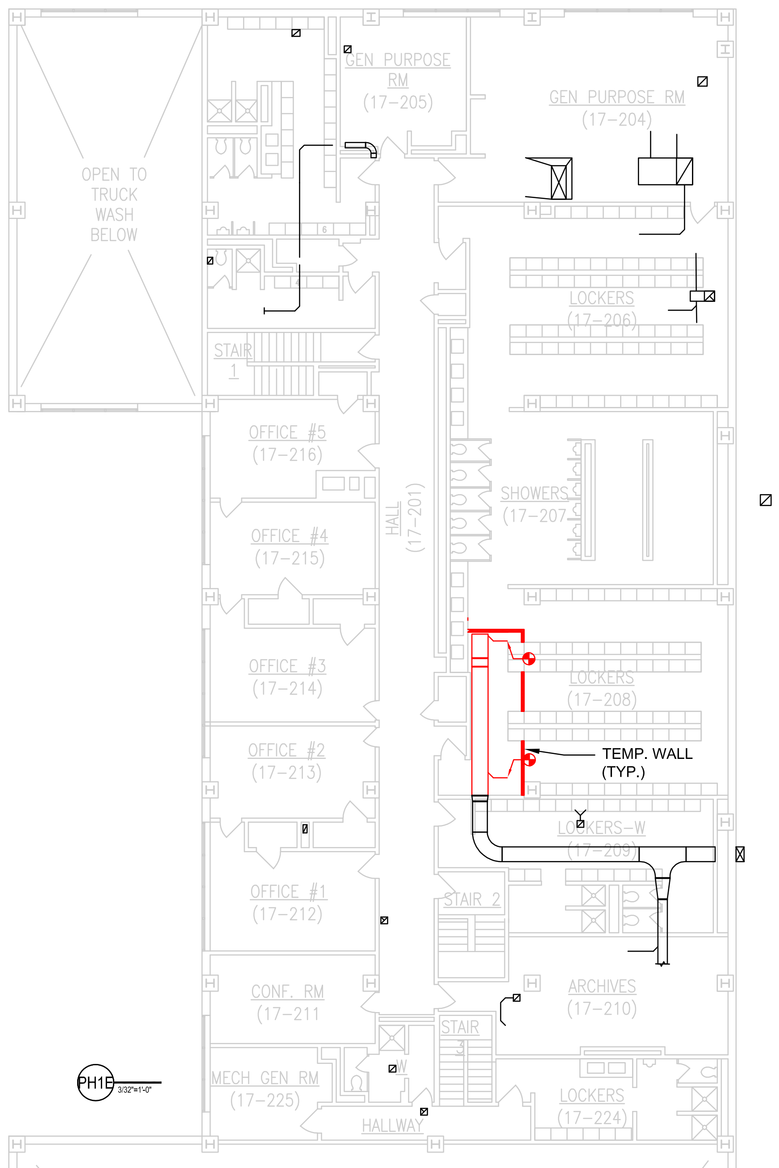
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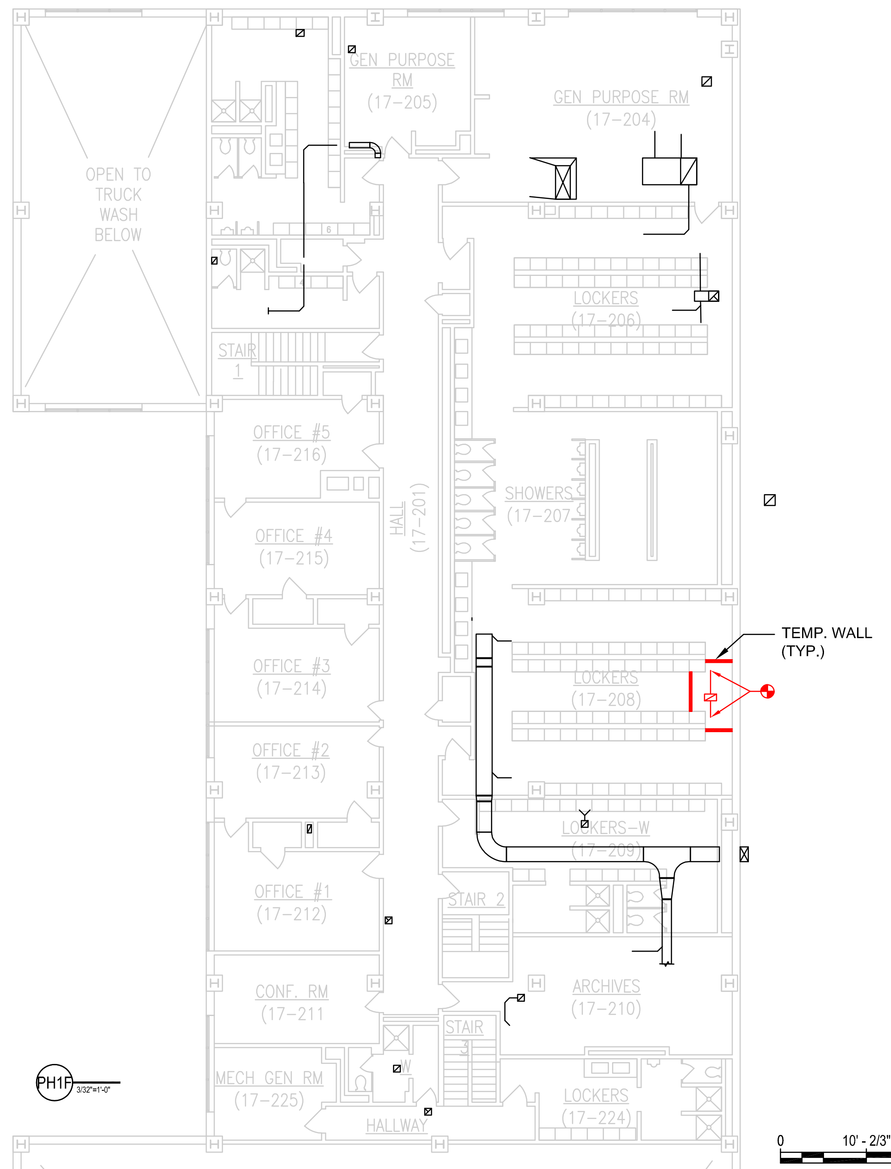












NOTES:

1. FOR GENERAL PHASING NOTES, REFER TO DRAWINGS PH.100.00
2. DURING THE REMOVAL OF HVAC EQUIPMENT AND ROOF PENETRATIONS, PROVIDE TEMPORARY EXHAUST SERVING THE EXISTING EFFECTED AREAS.
3. COORDINATE ALL WORK WITH MECHANICAL AND ELECTRICAL PLANS.

SYSKA HENNESSY GROUP
A member company of SH Group, Inc.
Syska Hennessy Group, Inc.
1515 Broadway
New York, NY 10036
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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC **Department of Design and Construction**

DIVISION OF BUILDINGS

CAPITAL PROJECT NUMBER:
S136-383N

PROJECT
DSNY 17/18 GARAGE REPLACEMENT OF ROOF AND HVAC SYSTEMS

10502 AVENUE D
BROOKLYN, NY 11236
FOR THE: DEPARTMENT OF SANITATION

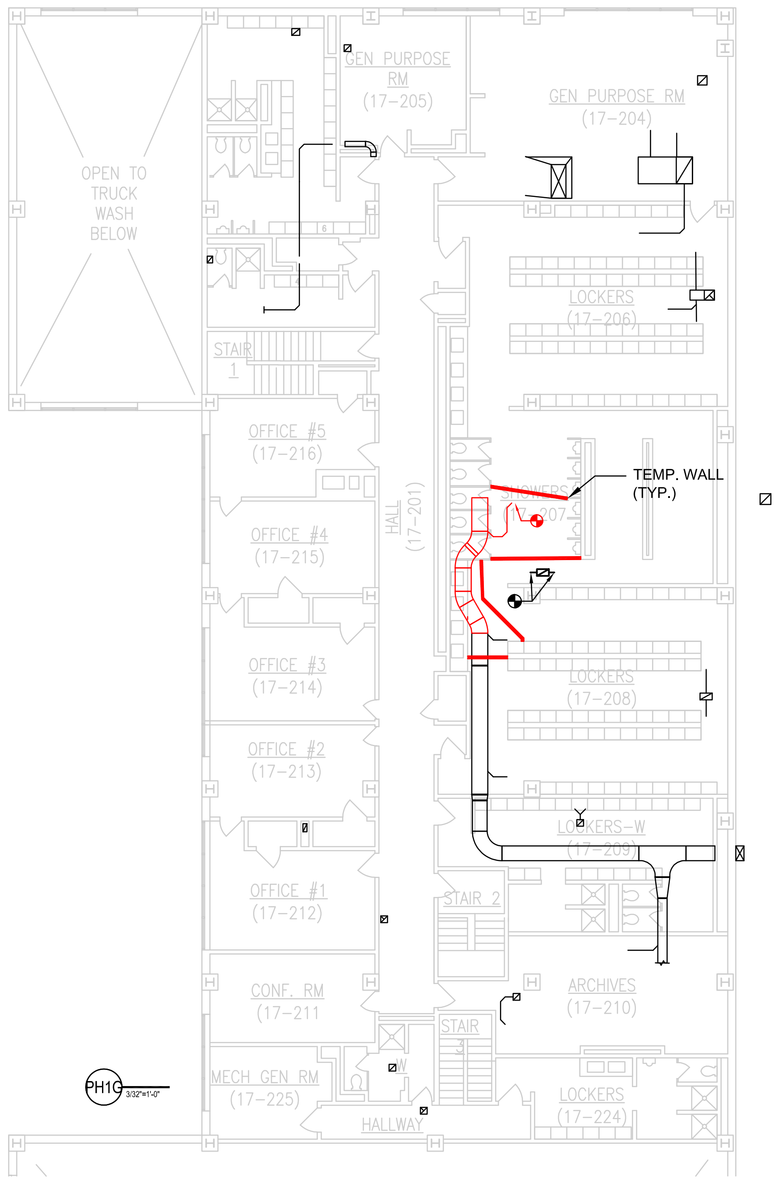
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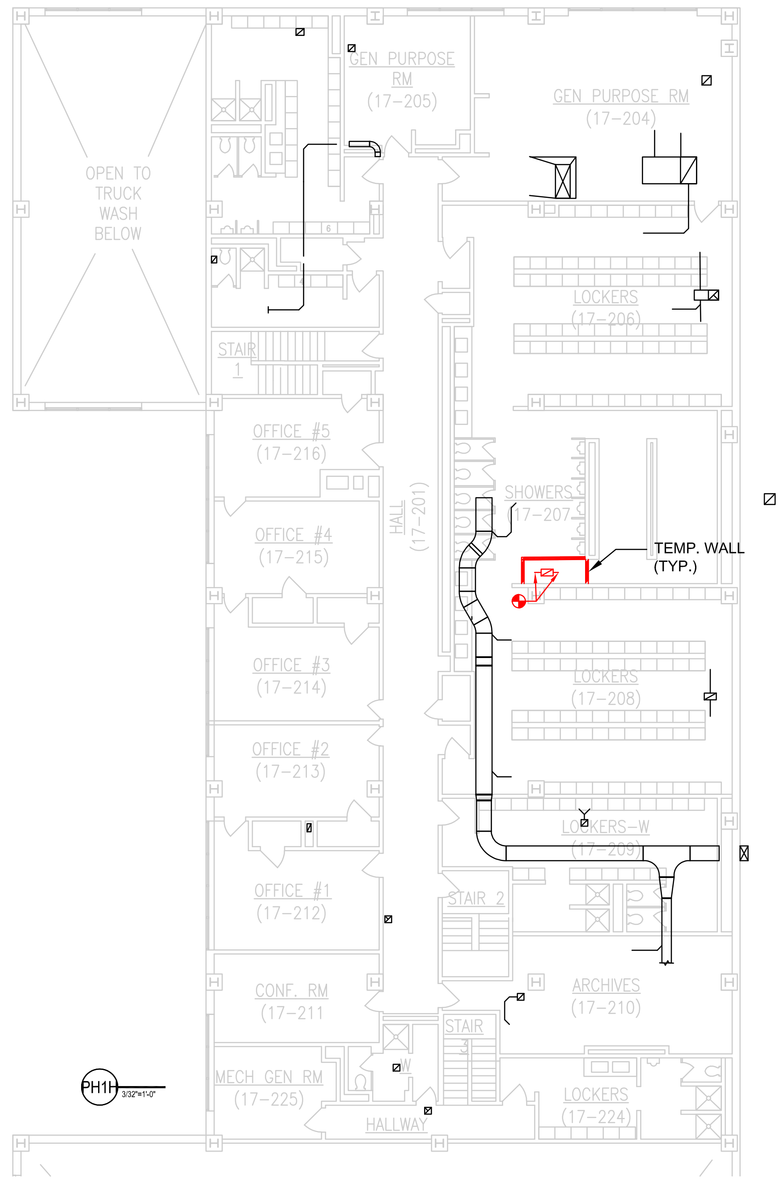
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DISTRICT 17 PHASING PLANS

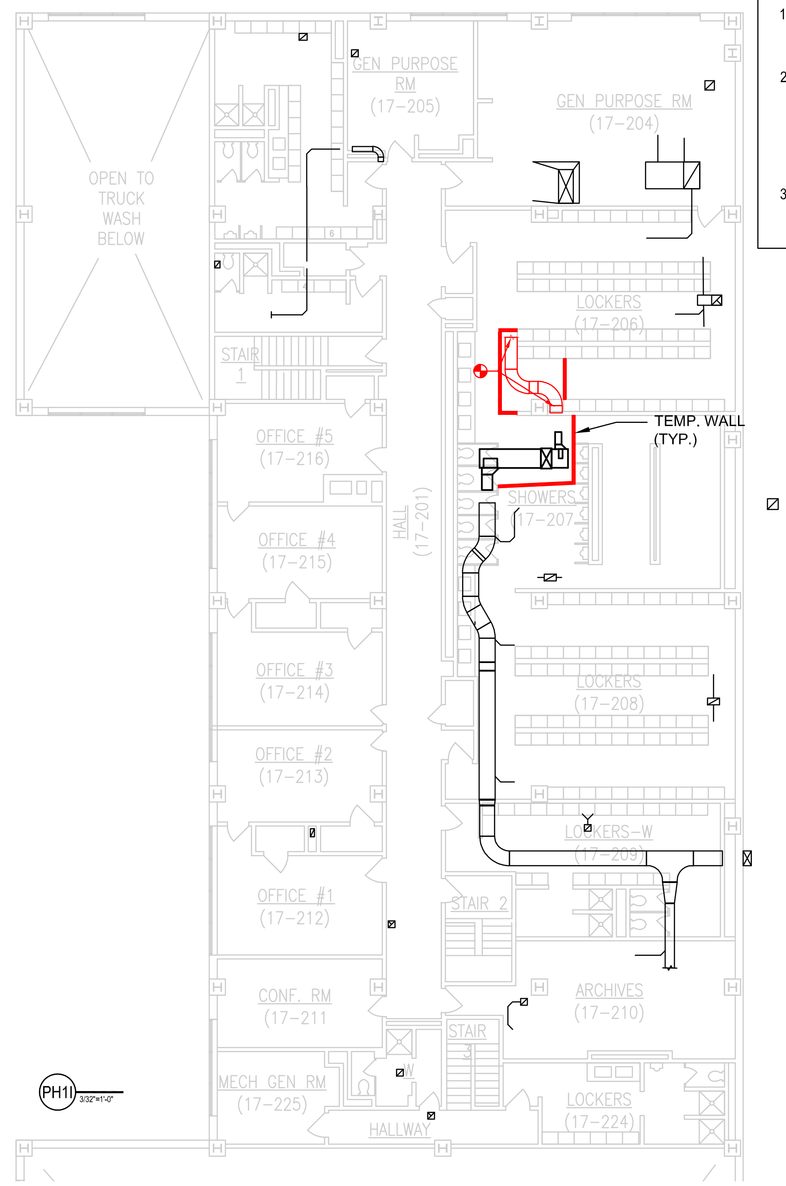
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STATE OF NEW YORK — KEITH FITZPATRICK — 074116 — LICENSED PROFESSIONAL ENGINEER

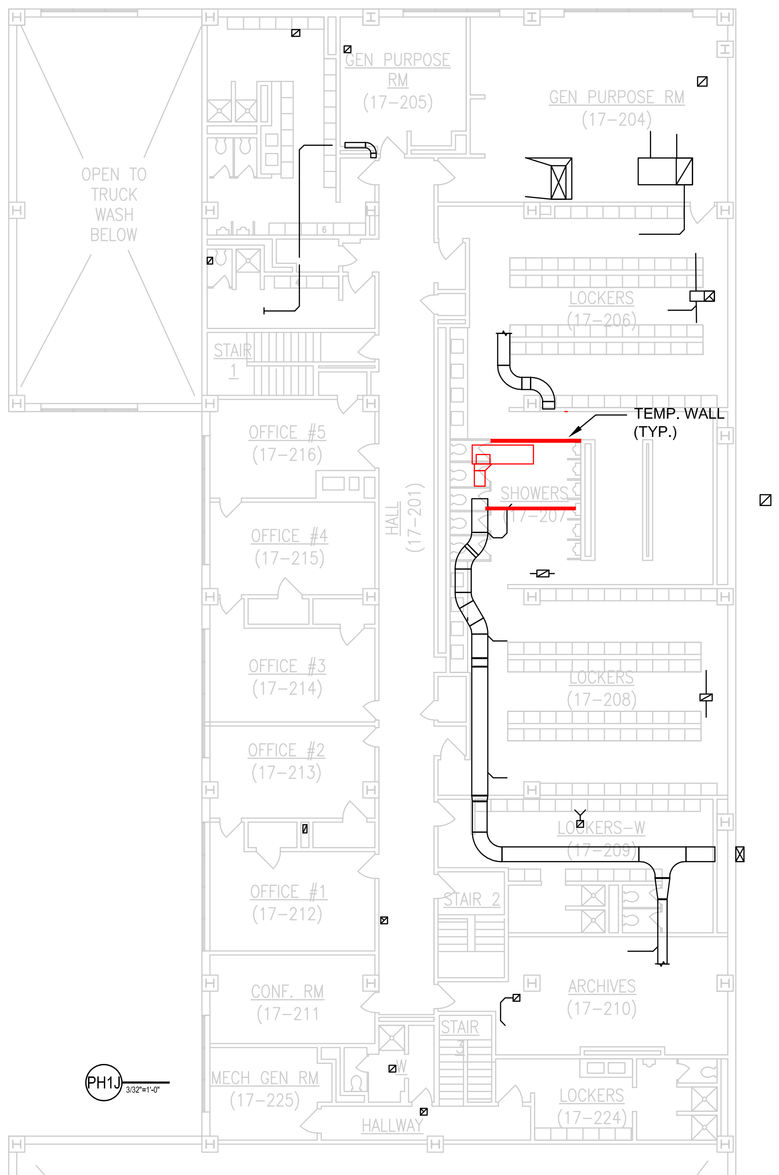
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PROJECT NO: DDC33000
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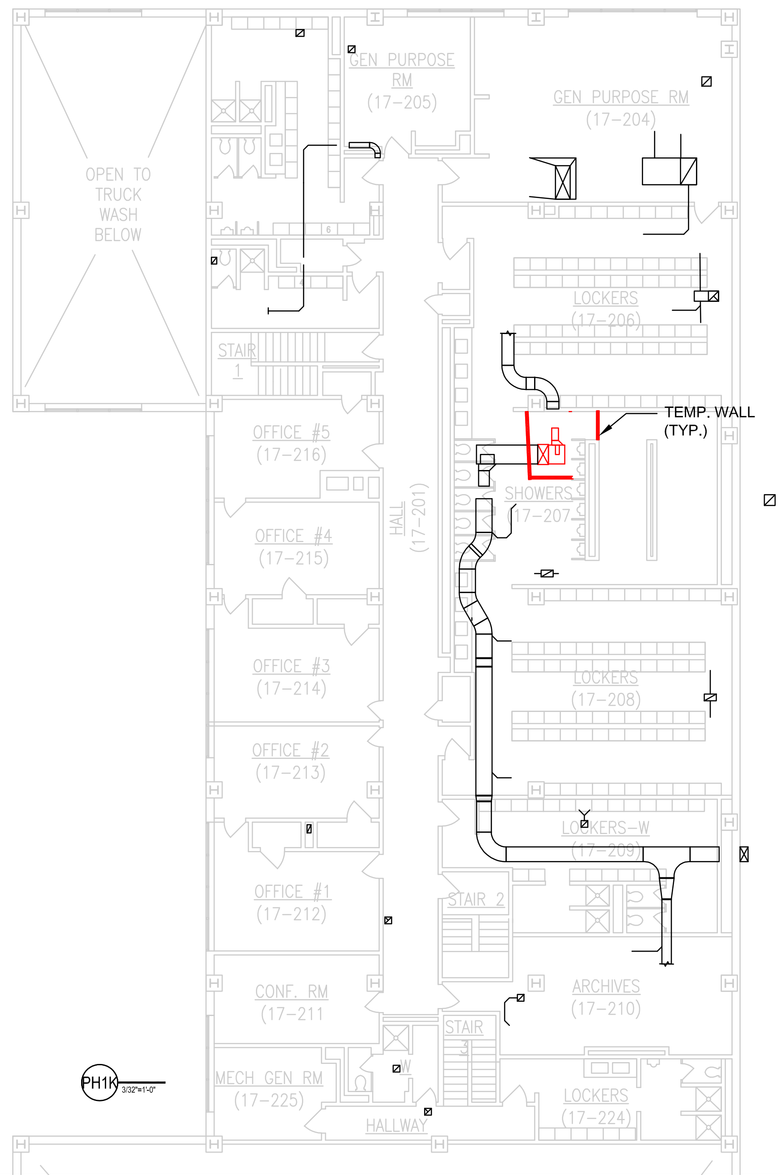
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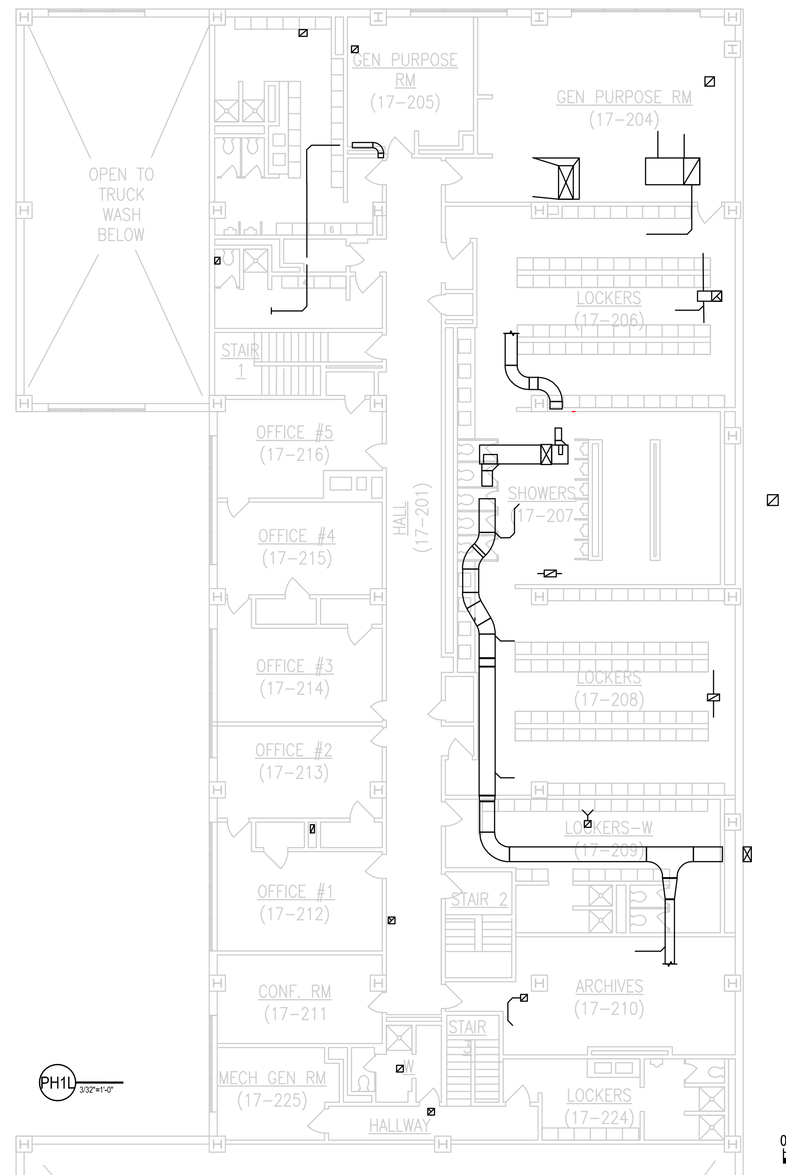












0 10' - 2/3" 21' - 1/3"

NOTES:

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DOB BSCAN STICKER

DOB EMPLOYEE STAMP AND SIGNATURE

REVISIONS:

NUMBER	DESCRIPTION	DATE
1	ISSUED FOR BID	09/30/2019

NYC DDC Department of Design and Construction

DIVISION OF BUILDINGS

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10502 AVENUE D
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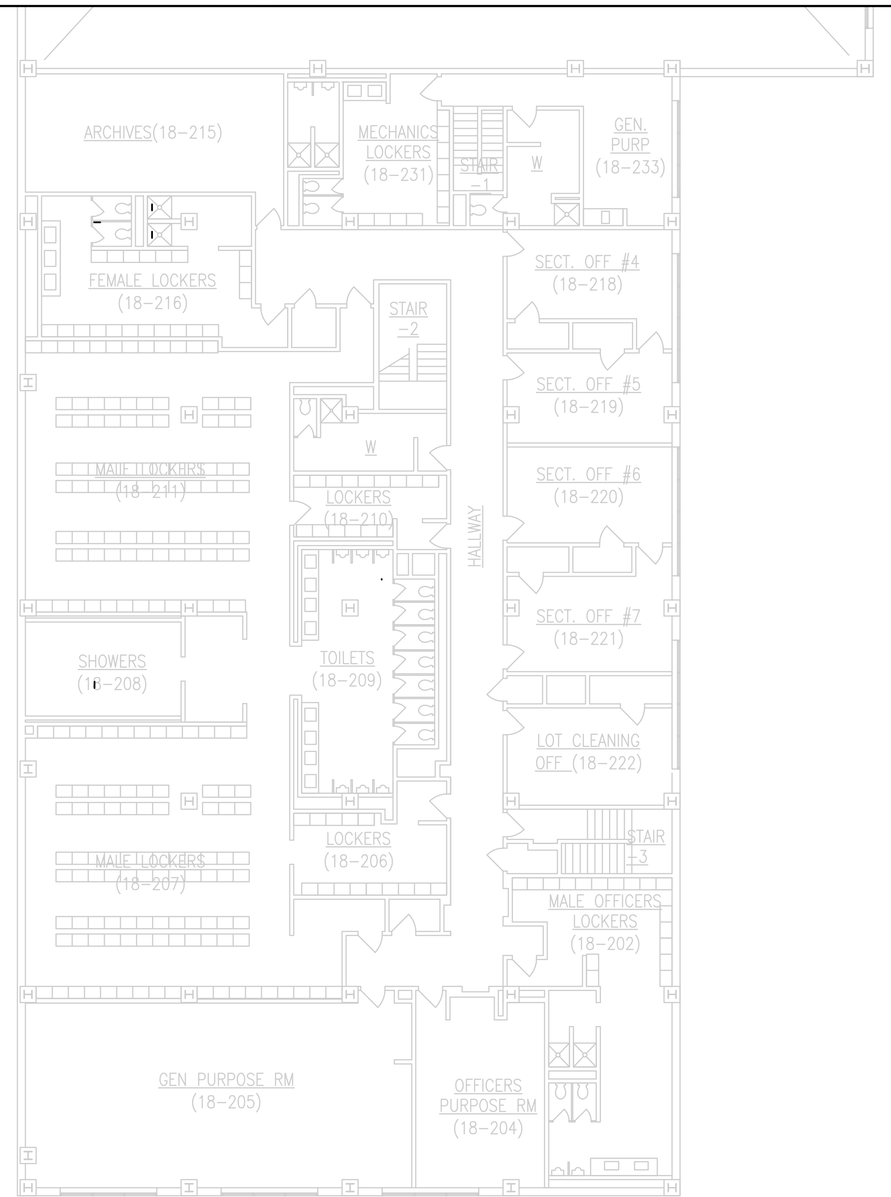
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DISTRICT 17 PHASING PLANS

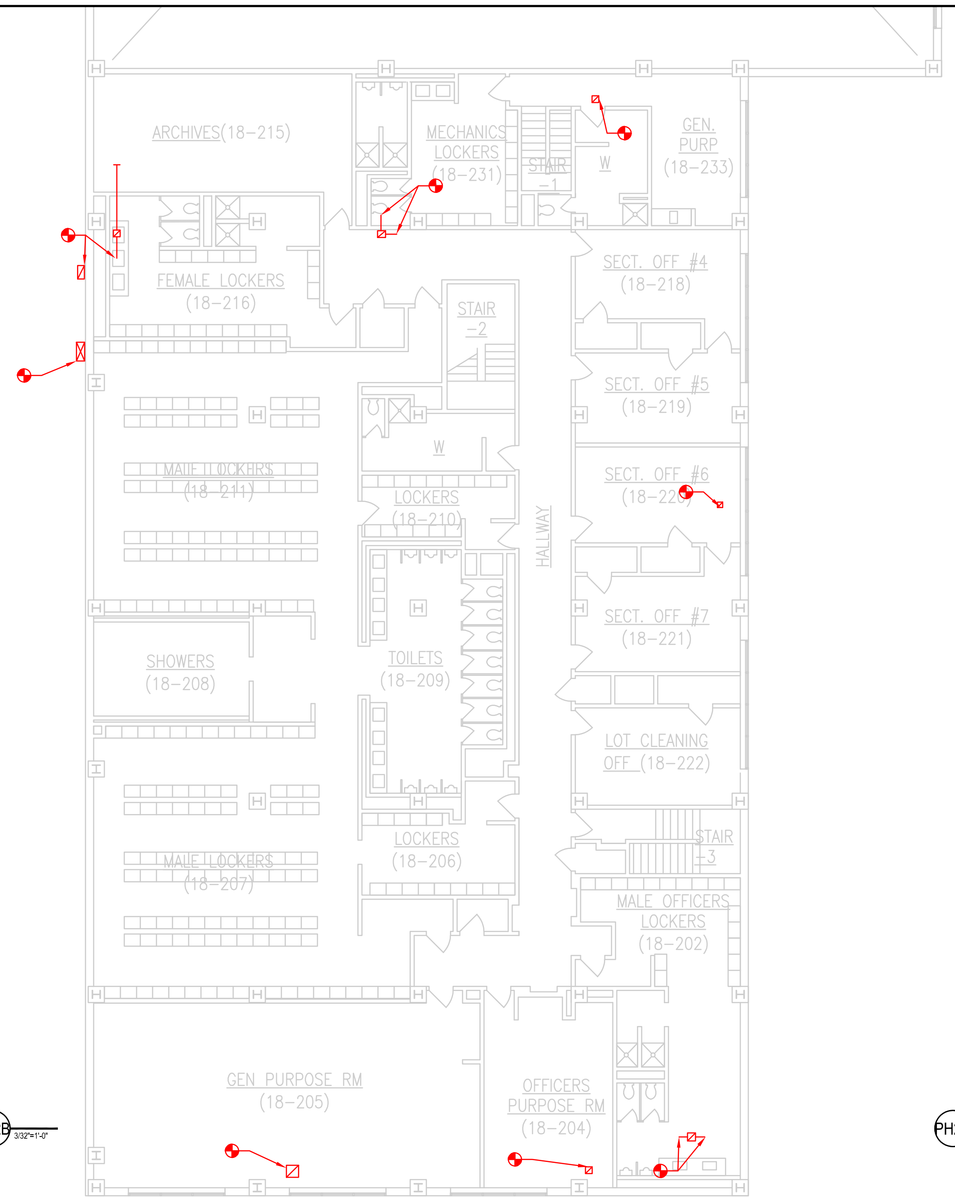
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STATE OF NEW YORK KEITH FITZPATRICK 074116 LICENSED PROFESSIONAL ENGINEER

DATE: 09/27/2019
PROJECT NO: DDC33000
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PH-102.00

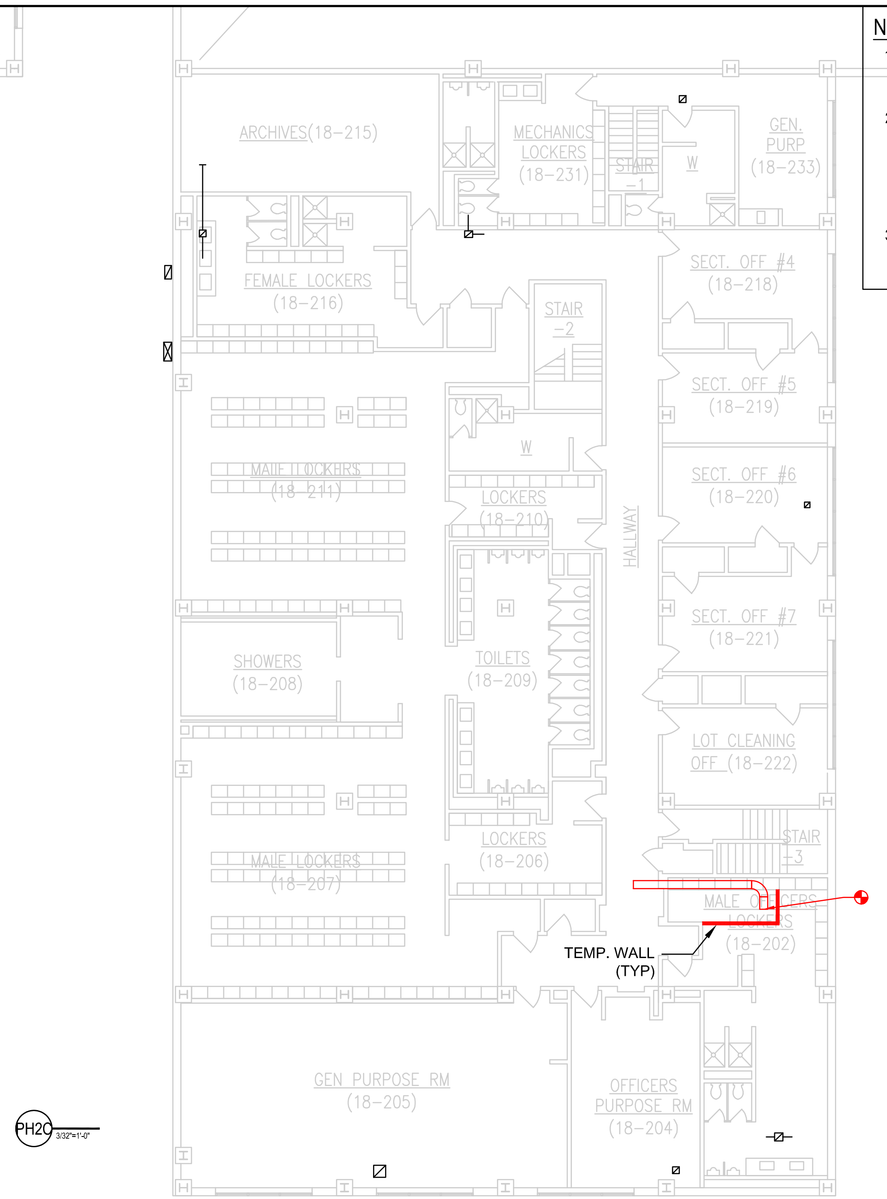
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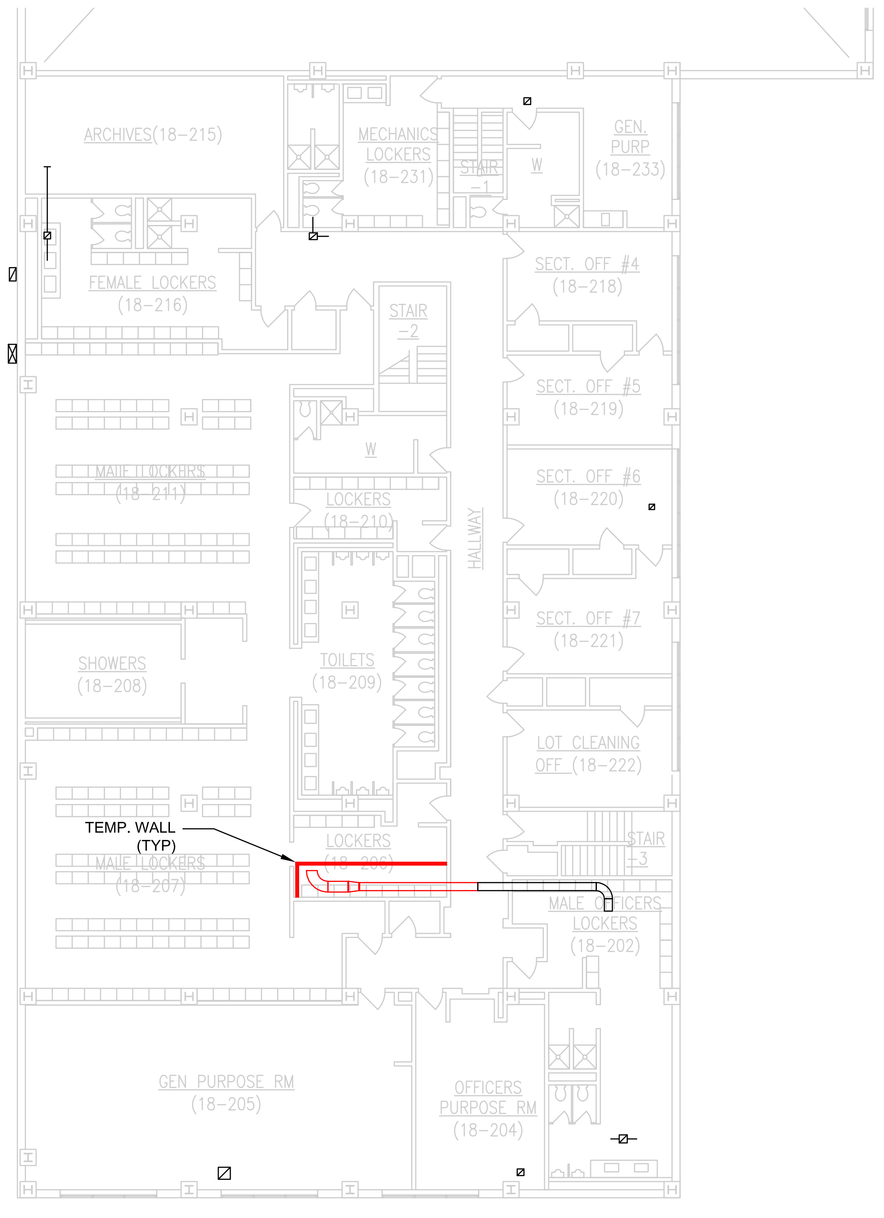
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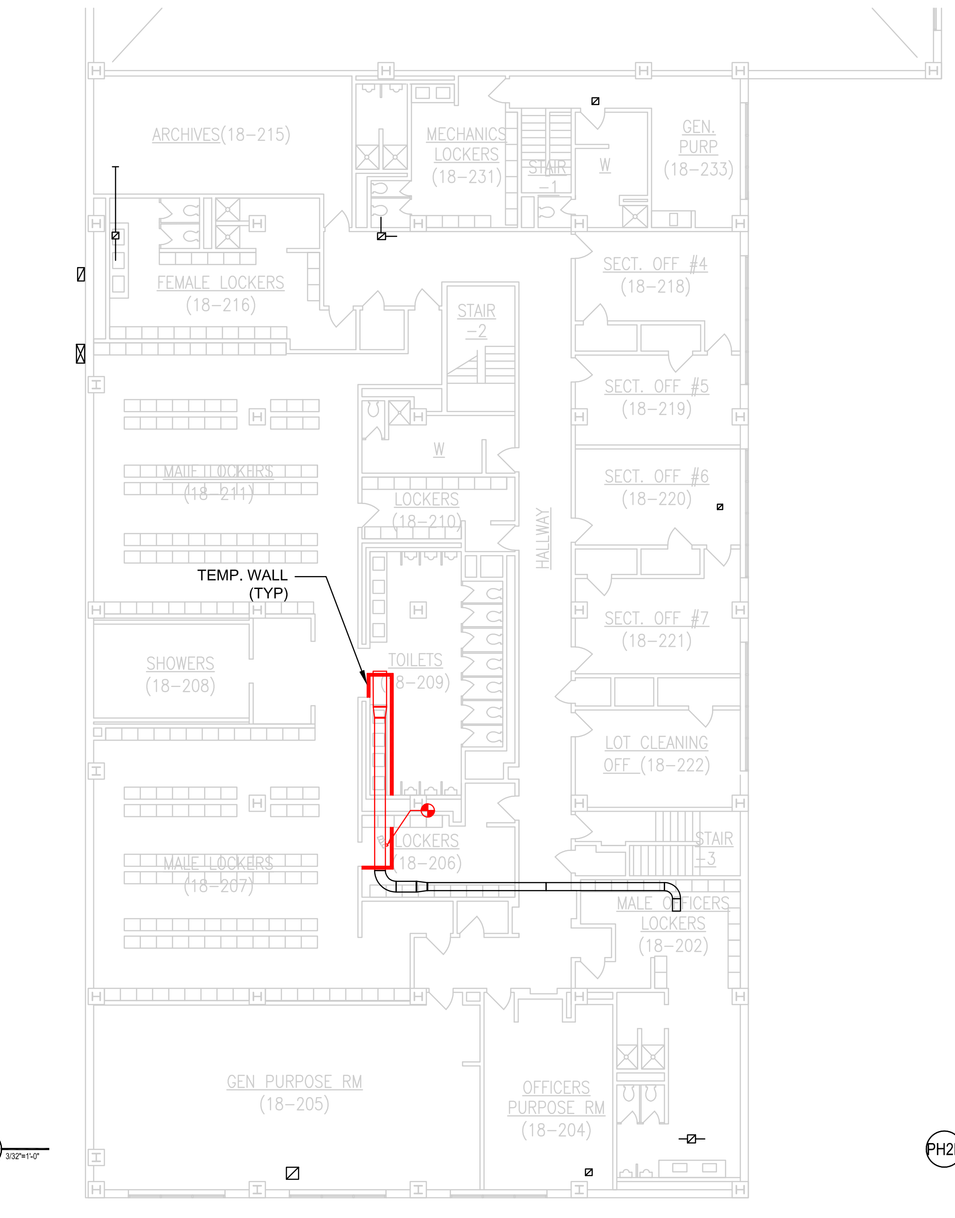
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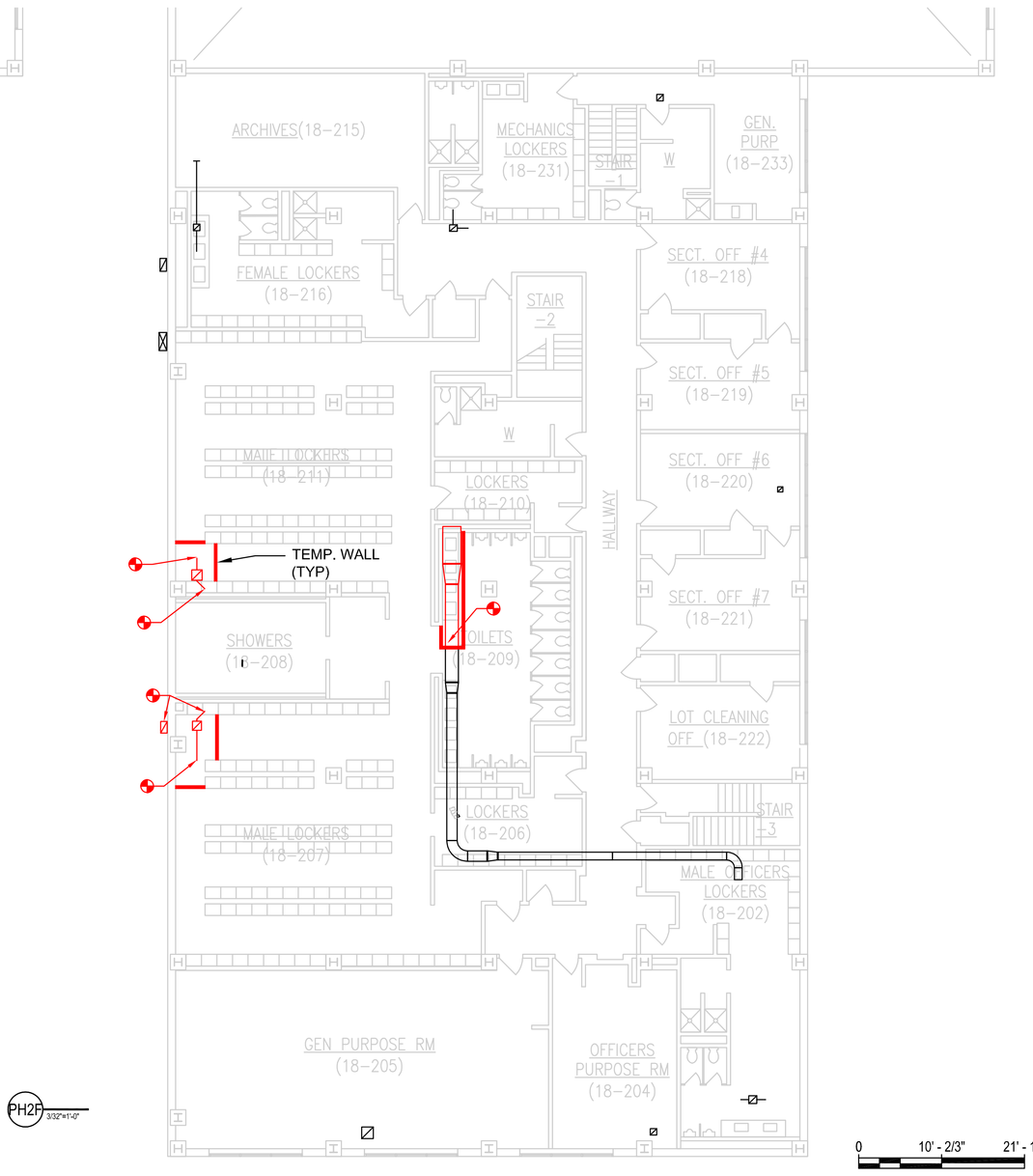
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PH2D 3/32"=1'-0"



PH2E 3/32"=1'-0"



PH2F 3/32"=1'-0"

0 10' - 2/3" 21' - 1/3"

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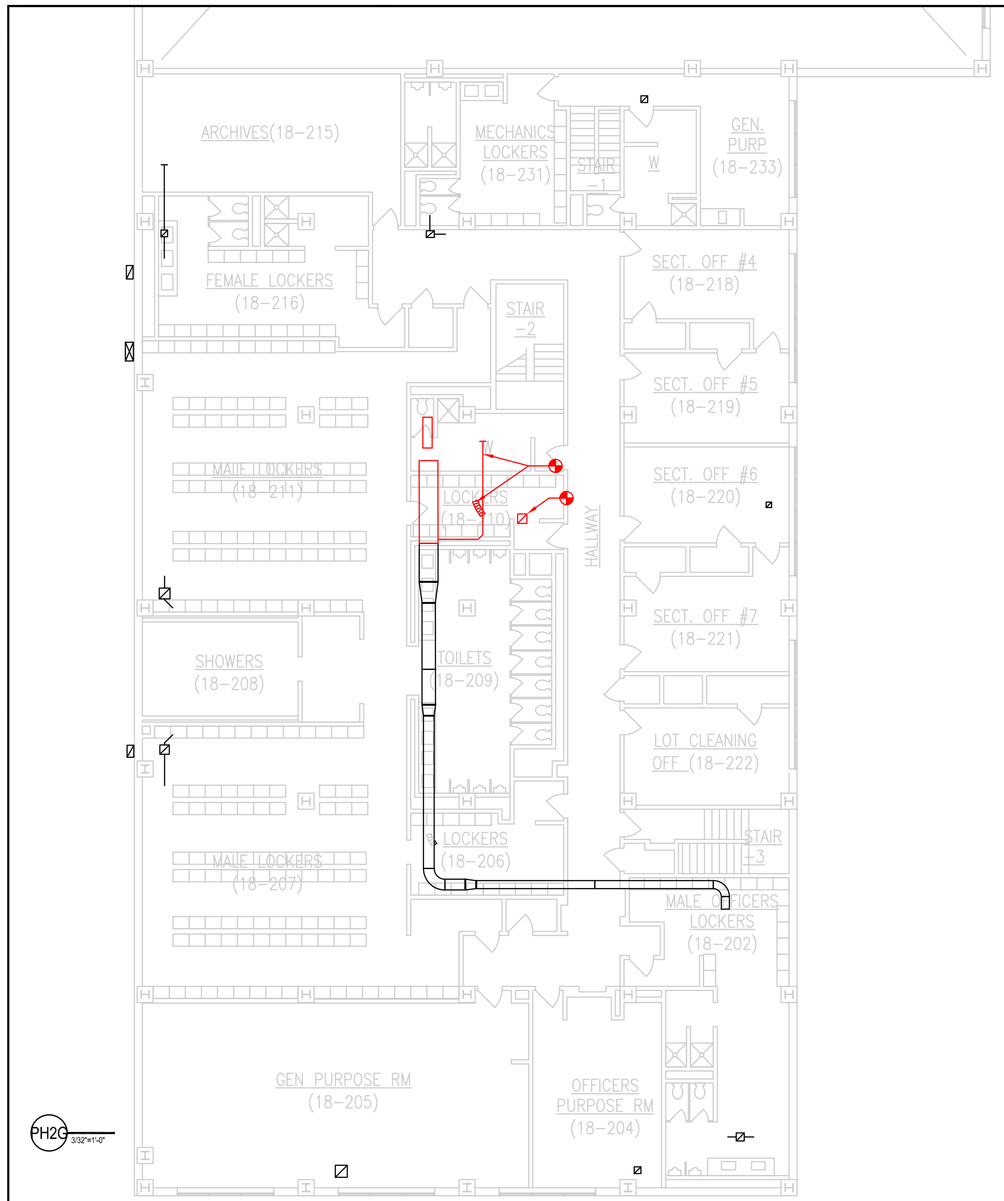
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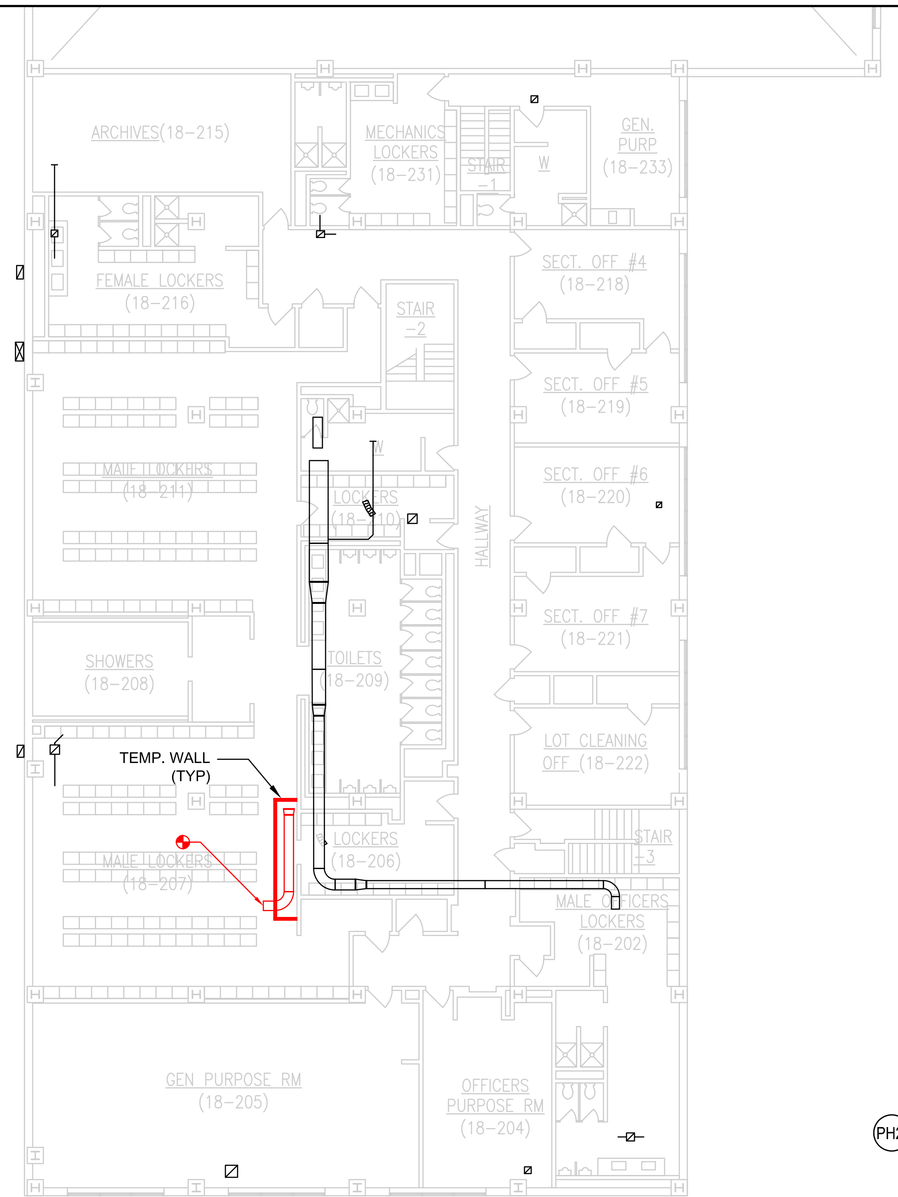
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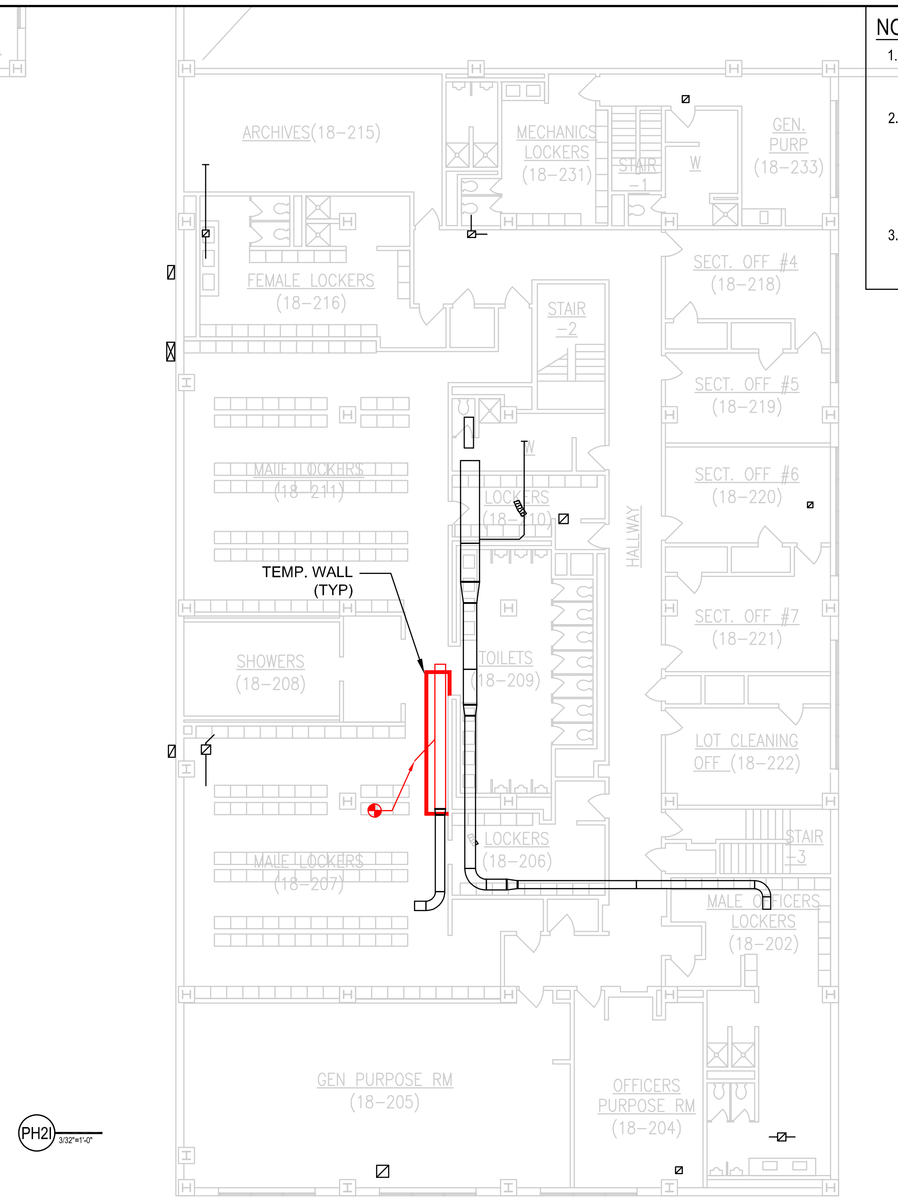
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STATE OF NEW YORK · KEITH TITTMANN · 074116 · LICENSED PROFESSIONAL ENGINEER

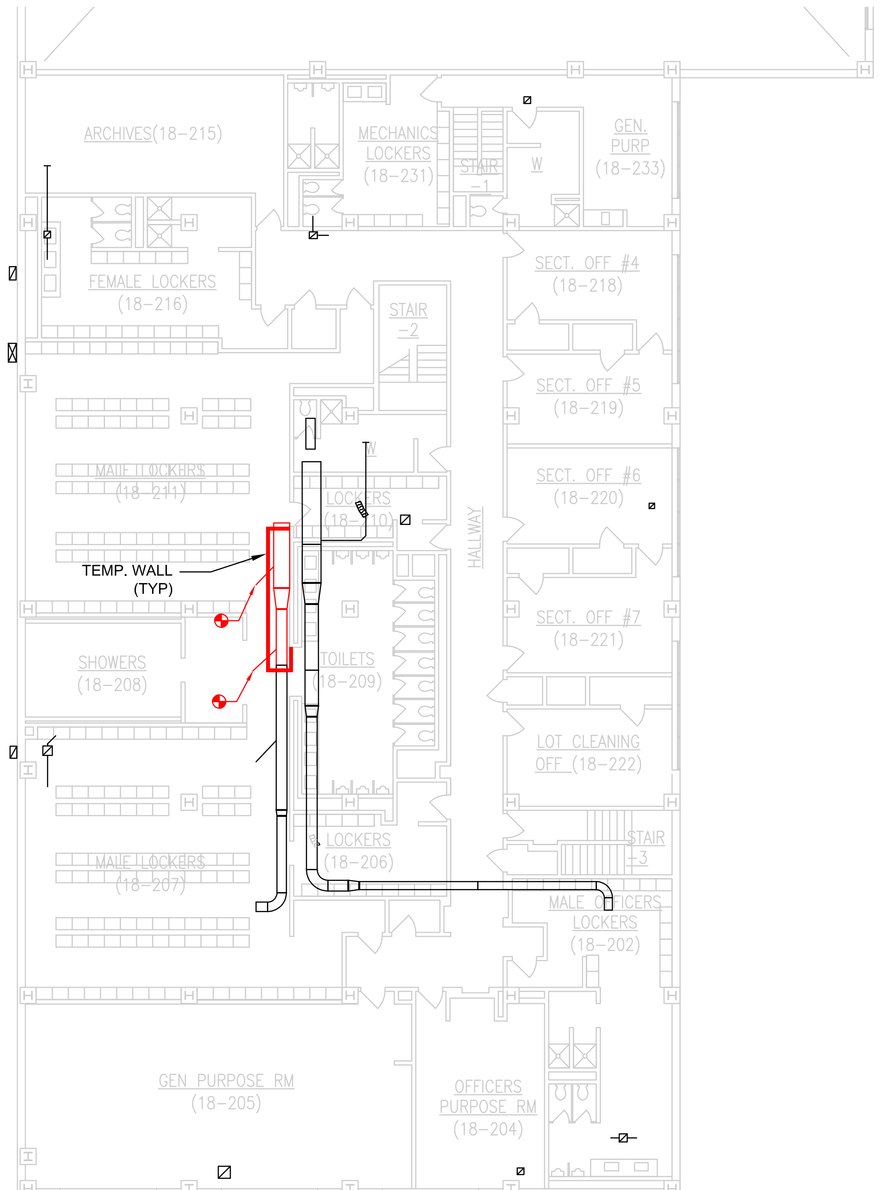
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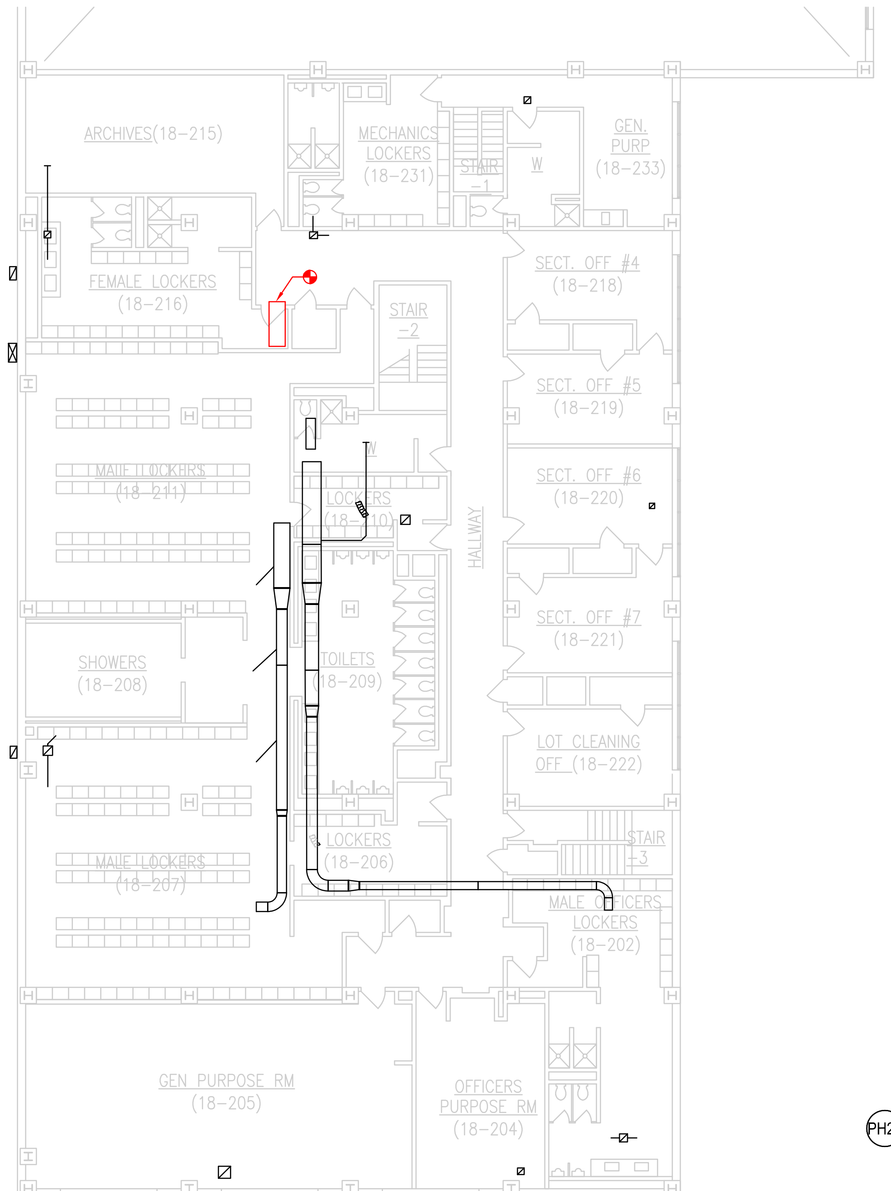
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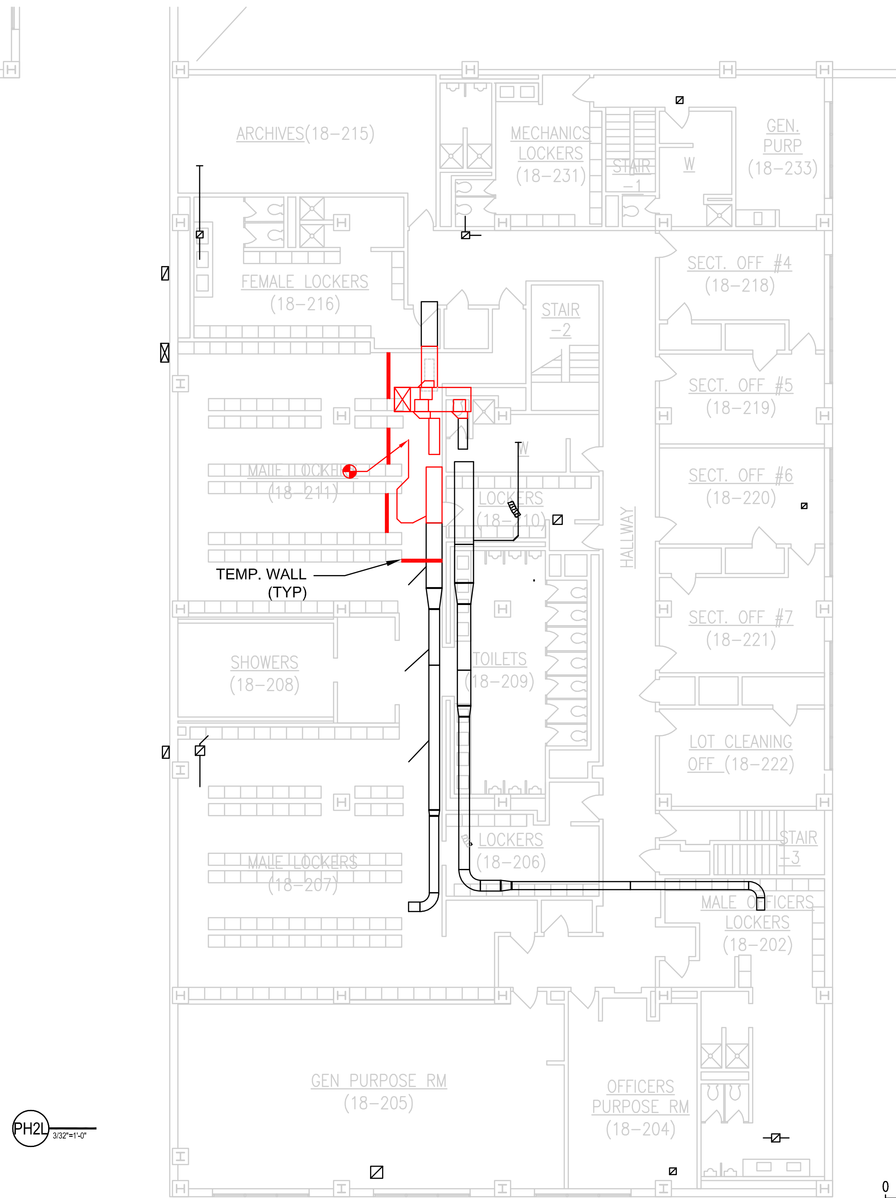












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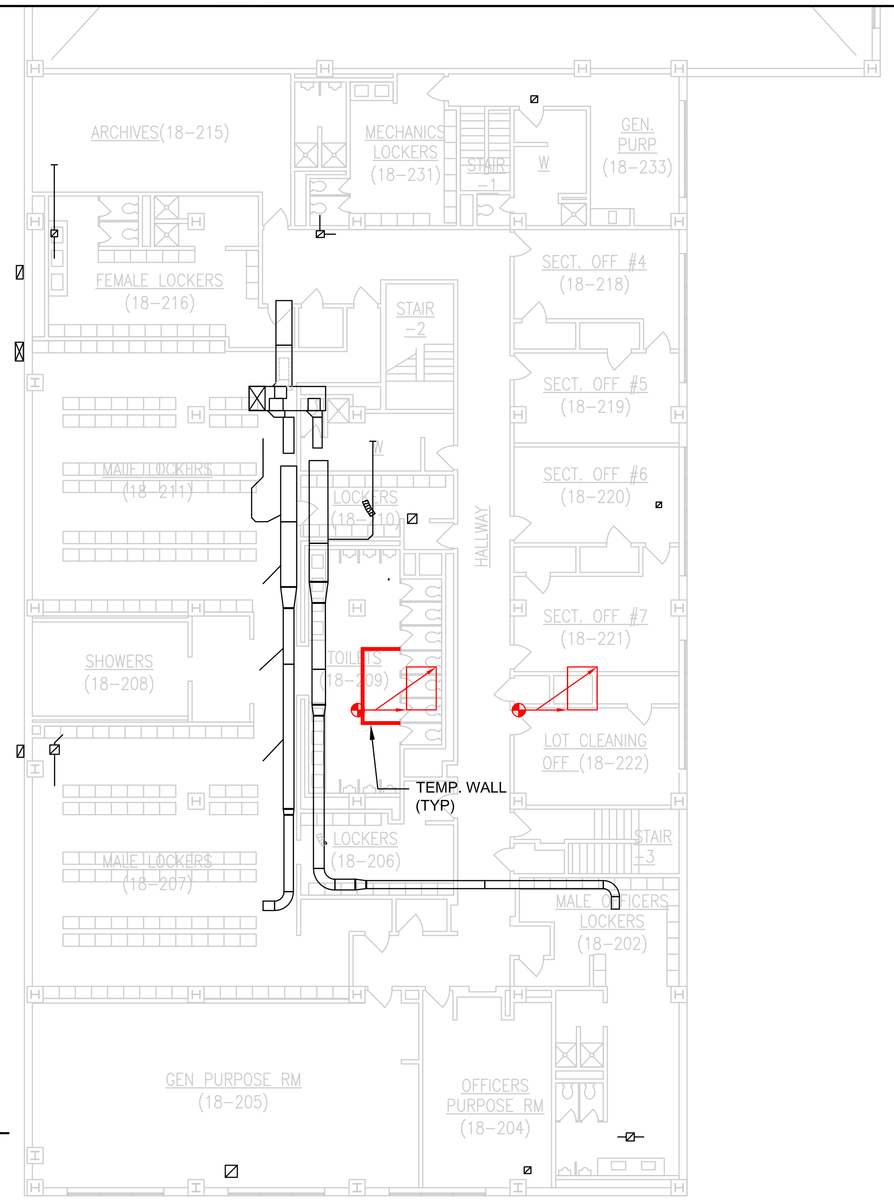
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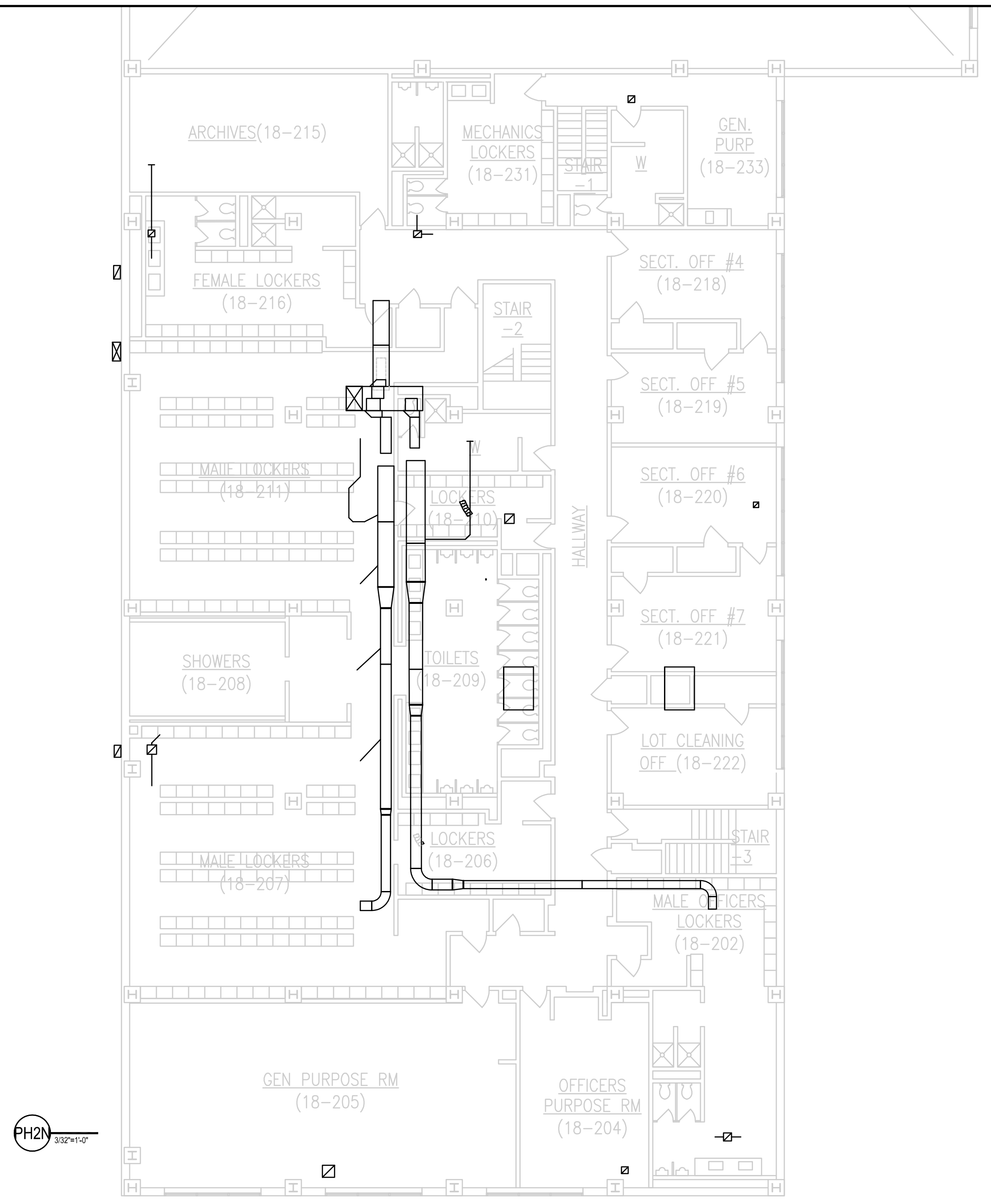
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STATE OF NEW YORK · KEITH TITTERTON · 074116 · LICENSED PROFESSIONAL ENGINEER

DATE:	09/27/2019
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DRAWN BY:	AE
CHECKED BY:	AE
DRAWING NUMBER:	PH-104.00

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PH2N 3/32"=1'-0"

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SEAL & SIGNATURE
STATE OF NEW YORK KEITH TITTEL 074116 LICENSED PROFESSIONAL ENGINEER

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CHECKED BY: AE
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PH-105.00

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Vendor	E-mail Address	Telephone Number
AFL CONSTRUCTION CO. INC.	aflconst@aol.com	(718) 507-5890
ABCD CONSTRUCTION CORP	info@abcdconstruction.com	(718) 439-3385
Infinity Contracting Services, Corp	gwu@infinitycsc.com	(718) 762-3200
C&L CONTRACTING CORP	amassaro@clcont.com	(718) 886-1958
CDE AIR CONDITIONING CO INC	roberta@cdeair.com	(718) 788-1040
DYNAMIC ELECTRIC SYSTEM, INC	akrysa@dynamiccontractors.com	(718) 842-4386
ATTRI ENTERPRISES INC	ATTRISHRI@AOL.COM	(718) 486-7395
JOBCO INCORPORATED	rmpascucci@jobco.com	(516) 487-0050
DYNAMIC US INC	gbolla@dynamiccontractors.com	(914) 312-2411
WELKIN MECHANICAL	slynch@welkinmechanical.com	(718) 554-2800
J-TRACK LLC	tiovino@iovinoent.com	(718) 554-2760
LO SARDO GENERAL CONTRACTORS INC	silvio@losardo.net	(718) 647-4924
IANNELLI CONSTRUCTION CO INC	ti@iancc.com	(718) 836-2000
KANTA ELECTRIC CORP	KantaElectricCorp@nyc.rr.com	(718) 397-9527
METROPOLITAN CONSTRUCTION CORP	lf@metrocorp.nyc	(718) 305-4874
NORTH STAR MECHANICAL CORP	nvaz@northstarmech.co	(718) 532-0051
NEELAM CONSTRUCTION CORP	neelam1238@yahoo.com	(201) 768-2213
N.S.P. ENTERPRISES, INC.	bids@nspenterprises.com	(718) 748-6507
PAUL J. SCARIANO INC	bidadmin@ipjs.com	(914) 623-9200
SEA BREEZE GENERAL CONSTRUCTION, INC.	eli@seabreezegc.com	(718) 721-9030
FINESSE CREATIONS INC	esther@finessecreations.com	(718) 692-2100
WDF INC	lroman@wdfinc.net	(914) 776-8185
ASTIVIDA CONSTRUCTION INC	ASTIVIDACONSTRUCTION@GMAIL.COM	(718) 238-3803
GREENMAN-PEDERSEN INC	gfrenklakh@gpinet.com	(845) 368-4050
ALLIANCE TRI-STATE CONSTRUCTION INC	info@atcservicesny.com	(718) 556-9700
MIXONSITE USA	jweiner@mixonsite.com	(847) 415-9601
ARMSTRONG ROOFING CORP	vlata@armstrongroofingny.com	(718) 494-6777
RJS Control Installations and Service, LLC	rich@rjscontrols.com	(845) 988-5133
LITEHOUSE BUILDERS, INC.	KIRK@LITEHOUSEBUILDERS.COM	(516) 883-8500
FIDELIS CONTRACTING INC	INFO@FIDELISCONTRACTING.COM	(718) 305-1860
Tri-State General Construction INC.	info@tristategc.org	(347) 444-1354
ENL MECHANICAL INCORPORATED	lgeorge@enlmechanical.com	(732) 456-5005
ROMBOUTS AVE LLC	cindy@romboutconstruction.com	(917) 777-0081
Fenagh LLC	rpalermo@fenaghengineering.com	(516) 423-3428
RLC TECHNICIANS LLC	rlctechnicians@hotmail.com	(718) 938-8984
ECOSAVE HOLDINGS INC	mrouco@ecosaveinc.com	(267) 397-1048
STAR CONSTRUCTION INDUSTRIES INC	starconnys@gmail.com	(516) 998-4133
3H RESTORATION INC	maahadhassan@3hrestorationinc.com	(631) 829-4434

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum initiates Round 7 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

The Bid Opening scheduled for September 22, 2021 at 2:30pm has been rescheduled to September 21, 2021 at 2:30pm.

Questionnaire Changes:

Bid Breakdown has been revised to include new section 262200 Low Voltage Transformers.

Item Grid Changes:

Updated item grid functionality

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

ADDENDA CONTROL SHEET

BID SUBMISSION DATE/ TIME: September 21, 2021; between 11:30am and 2:00pm
BID OPENING DATE/ TIME: September 21, 2021; 2:30pm

PROJECT No. : S136-383N

TITLE: DSNY BK 17/18 Garage Roof and HVAC Upgrade

ADDENDA ISSUED	NO. OF DWG	DATE	APPROVED BY: ARCHITECTURE/ ENGINEERING	APPROVED BY: GENERAL COUNSEL
#1 Revised Pre-Bid Site Walk Through Location; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		7/27/2021		
#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021		
#3 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/13/2021		
#4 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/18/2021		
#5 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/27/2021		
#6 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents; Revisions to Drawings		9/9/2021		
#7 Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents; Revisions to Drawings		9/14/2021	Sarah Zomick	CL 9/14/21

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

September 14, 2021

ADDENDUM No. # 7

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**
   See Attachment A.

2. **Revisions to PASSPort forms:**
   See Attachment B.

3. **Revisions to Documents/Drawings:**
   See Attachment C.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Mechanical Drawings M101-104 show 44 CO Sensors, yet the Electrical Drawings E101-104 only show 8. Please correct the Electrical drawings to show correct quantity.	Quantities and locations of CO sensors are per Mechanical Drawings. Electrical Drawings indicate the first conduit run and the balance are to be daisy chained accordingly in conduit.
2	There is nothing in the specifications or the drawing indicating that the new control system will be controlling the existing VAV boxes. Please confirm or clarify.	CO sensors shall tie into the GEF Fans, see detail 3 on M-804.
3	Drawing M805, BMS architecture, shows monitoring for only some of the existing UHs. Please confirm that is the scope intention.	BMS to tie into all existing UHs. BMS architecture shows this as a typical condition. Refer to detail on M-805.
4	Schedule A says contract duration is 885 ccds. However, page 5 of the Addendum to General Conditions in Volume 3 shows a phasing plan with 4 areas respectively: 495, 520, 885, which add to 2,760 ccds or 7.5 years. What is the over expected duration of the contract we should use for general conditions such as trailers, MPT, etc. Please advise.	Total contract duration for the project is 885 ccds. The durations for phasing are concurrent.

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum is included within Round 7 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

None

Questionnaire Changes:

None

Item Grid Changes:

None

CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
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#2 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/9/2021		
#3 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/13/2021		
#4 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/18/2021		
#5 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents		8/27/2021		
#6 Revised Bid Opening date; Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents; Revisions to Drawings		9/9/2021		
#7 Questions from Bidders and Responses to Questions; Revisions to PASSPort Forms; Revisions to Documents; Revisions to Drawings		9/14/2021		
#8 Questions from Bidders and Responses to Questions; Revisions to Documents; Revisions to PASSPort Forms		9/17/2021	Sarah Zomick	CL 9/17/21

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS

September 17, 2021

ADDENDUM No. # 8

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

85021B0135 – S136-383N

DSNY BK 17/18 Garage Roof and HVAC Upgrade

This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**
   See Attachment A.

2. **Revisions to PASSPort forms:**
   See Attachment B.

3. **Revisions to Documents/Drawings:**
   See Attachment C.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-1041 or by email at CSB_projectinquiries@ddc.nyc.gov.

Richard Jones, PE CWI
Executive Director, Specifications

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	Regarding the response to Question #2 in Addendum #7: the question pertained to existing VAV boxes. Your response addressed CO Detectors, not VAV boxes. Please update your response.	As indicated on the drawings, the existing controls serving VAVs shall remain. Note that all existing VAVs are to be interlocked with individual new thermostats. All new CAVs are to be wired as per detail 3 on M-803.

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT B – REVISIONS TO THE DOCUMENTS

Not Used

DDC PROJECT #: **S136-383N**

PROJECT NAME: **DSNY BK 17/18 Garage Roof and HVAC Upgrade**

ATTACHMENT C – REVISIONS TO PASSPORT FORMS

This Addendum is included within Round 7 of the procurement.

Please note that numbering of addenda is independent of rounds.

Bid Opening Date Changes:

None

Questionnaire Changes:

None

Item Grid Changes:

None

FMS ID: **S136-383N**

THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF PUBLIC BUILDINGS
30-30 THOMSON AVENUE LONG ISLAND CITY, NEW YORK 11101-3045
TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc

Department of Design and Construction

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 **GENERAL CONSTRUCTION WORK**

DSNY 17/18 Garage Roof and HVAC Upgrade

LOCATION: **10502 Avenue D**
BOROUGH: **Brooklyn, NY 11236**
CITY OF NEW YORK

Contractor

Dated _____ , 20 _____

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____ , 20 _____