



PROJECT ID: P1CROT16A

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

LAW

VOLUME 1 OF 3

BID BOOKLET

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

New Construction of the Bronx River House

LOCATION:
BOROUGH:
CITY OF NEW YORK

1041 East 172nd Street
Bronx 10460

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Department of Parks and Recreation

Kiss + Cathcart, Architects



Date: October 1, 2012

02-129





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

DAVID J. BURNEY, FAIA
Commissioner

CAROL DIAGOSTINO
Agency Chief
Contracting Officer

November 04, 2013

CERTIFIED MAIL - RETURN RECEIPT REQUEST

BEYS SPECIALTY, INC.
2520 Coney Island Avenue
Brooklyn, NY 11223

RE: FMS ID: P-1CROT16
E-PIN: 85013B0023001
DDC PIN: 8502013PV0004C
NEW CONSTRUCTION OF THE BRONX
RIVER HOUSE
NOTICE OF AWARD

Dear Contractor:

You are hereby awarded the above referenced contract based upon your bid in the amount of \$11,827,686.00 submitted at the bid opening on April 10, 2013. Within ten (10) days of your receipt of this notice of award, you are required to take the actions set forth in Paragraphs (1) through (3) below. For your convenience, attached please find a copy of Schedule A of the General Conditions to the Contract, which sets forth the types and amounts of insurance coverage required for this contract.

- (1) Execute four copies of the Agreement in the Contracts Unit, 30-30 Thomson Avenue, 1st Floor, Long Island City, New York (IDCNY Building). A Commissioner of Deeds will be available to witness and notarize your signature. The Agreement must be signed by an officer of the corporation or a partner of the firm.
- (2) Submit to the Contracts Unit four properly executed performance and payment bonds. If required for this contract, copies of performance and payment bonds are attached.
- (3) Submit to the Contracts Unit the following insurance documentation: (a) original certificate of insurance for general liability in the amount required by Schedule A, and (b) original certificates of insurance or other proof of coverage for workers' compensation and disability benefits, as required by New York State Law. The insurance documentation specified in this paragraph is required for registration of the contract with the Comptroller's Office.





On or before the contract commencement date, you are required to submit all other certificates of insurance and/or policies in the types and amounts required by Schedule A. Such certificates of Insurance and/or policies must be submitted to the Agency Chief Contracting Office, Attention: Risk Manager, Fourth Floor at the above indicated department address.

Your attention is directed to the section of the Information for Bidders entitled "Failure to Execute Contract". As indicated in this section, in the event you fail to execute the contract and furnish the required bonds within the (10) days of your receipt of this notice of award, your bid security will be retained by the City and you will be liable for the difference between your bid price and the price for which the contract is subsequently awarded, less the amount of the bid security retained.

Sincerely,

Carol DiAgostino



Bid Tab

REVISED

Description	NEW CONSTRUCTION OF THE BRONX RIVER HOUSE		
Bid Date	4/10/2013	FMS ID	P-1CROT16
Estimated Cost	\$11,253,655.14*	PLA	Yes
Bid Security	2% of Total Bid Price	Client Agency	Dept. of Parks & Recreation
Time Allowed	548 CCD	Contract Manager	Eugene Werner
Addendum	3	Project Manager	Aloush, Maha
PIN	8502013PV0004C	E-PIN	85013B0023
Selective Bidding	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Consultant	Kiss & Cathcart, Architects

Bid Rank	Vendor	Bid Amount	Security Type
1	FRATELLO CONSTRUCTION CORP.	\$9,829,450.00	Bond
2	BEYS SPECIALTY, INC.	\$11,827,686.00	Bond
3	UTB-UNITED TECHNOLOGY INC.	\$12,143,450.00	Bond
4	PETRACCA & SONS, INC.	\$12,627,000.00	Bond
5	CALCEDO CONSTRUCTION CORPORATION	\$12,958,387.00	Bond
6	ADAM'S EUROPEAN CONTRACTING, INC.	\$13,480,000.00	Bond
7	E.W. HOWELL CO. , LLC	\$14,774,000.00	Bond
8	FORTE CONSTRUCTION CORP.	\$15,988,000.00	Bond
9	AAH CONSTRUCTION CORP	\$20,349,495.00	Bond

Sub-Contractor:

Plumbing – Vital Plumbing Inc. - \$170,000.00

HVAC – J T & T Corp. - \$808,000.00

Electrical – Ryan Electric Company, LLC. - \$1,240,000.00

Approver: Phyllis Lopez – ext. 1283

Approver: *Colby Williams*

Bid Tab

Pin: 8502013PV0004C

Page 1 of 1



Qualification Form

Project ID:

PICROT16A

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: BEYS SPECIALTY, INC
PS 26 VESTIBULE EXTENSION

Name of Project: _____

Location of Project: 4108 VICTORY BLVD STATEN ISLAND NY 10314

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

Name: NISSAR AHMAD - NYC SCHOOL CONSTRUCTION AUTHORITY

Title: PROJECT OFFICER Phone Number: 646 208 4780

Brief description of work completed: CONCRETE, MASONRY, PLUMBING, ELECTRICAL
HVAC AND WATERPROOFING

Was the work performed as a prime or a subcontractor: PRIME

Amount of Contract: 2,952,340

Date of Completion: APRIL 2009

Name of Contractor: BEYS SPECIALTY INC.,

Name of Project: CURTIS HS - ROOF/EXTERIOR MASONRY, PAVEMENT

Location of Project: STATEN ISLAND, NY

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

Name: NISSAR AHMAD - NYC SCHOOL CONSTRUCTION AUTHORITY

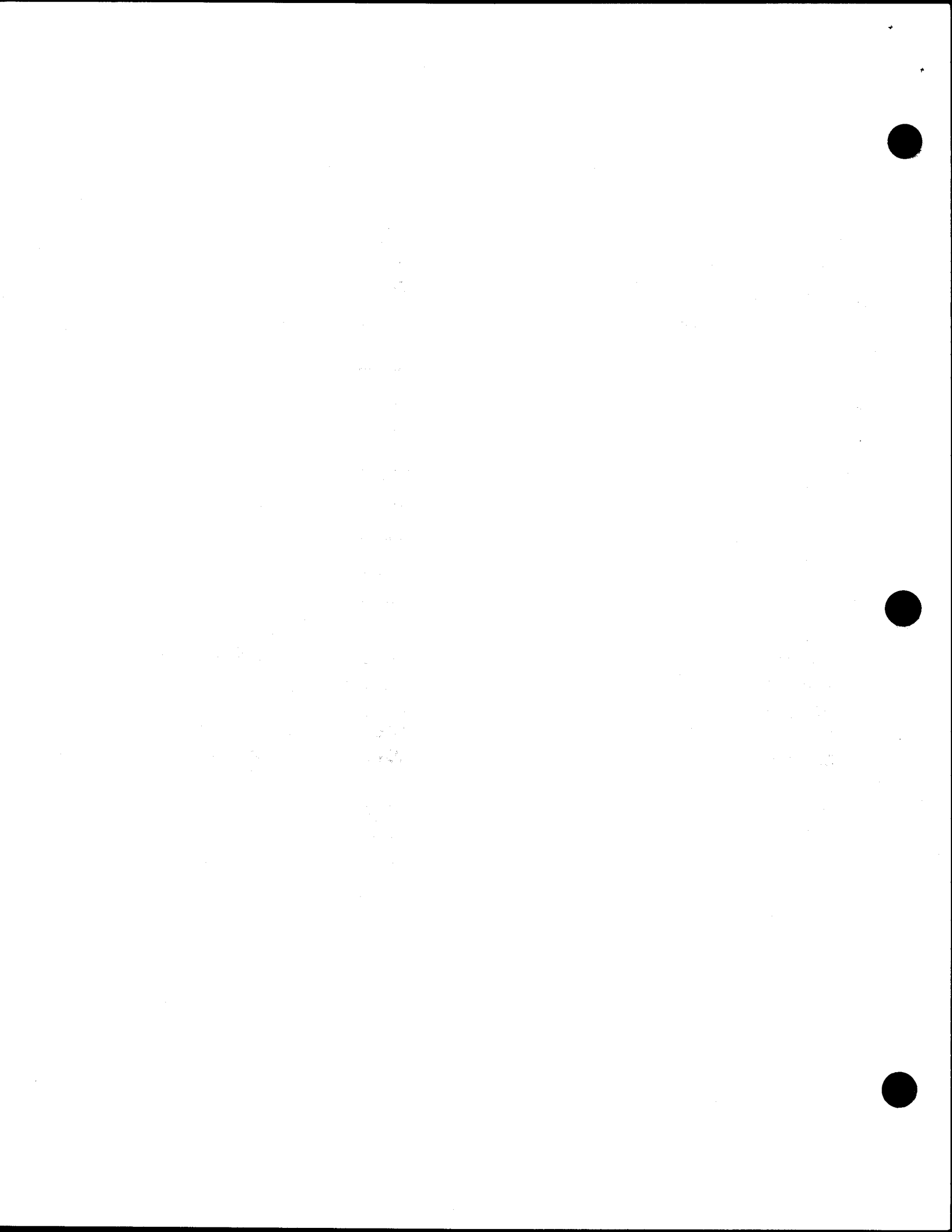
Title: PROJECT OFFICER Phone Number: 646 208 4780

Brief description of work completed: ROOF /EXTERIOR MASONRY, PAVEMENT

Was the work performed as a prime or a subcontractor: PRIME

Amount of Contract: 8,200,000

Date of Completion: JANUARY 2010



Qualification Form

Project ID:

PICROT16A

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: BEYS SPECIALTY, INC
JFK INTERNATIONAL AIRPORT BLDG 60 TWA FLIGHT CENTER

Name of Project:

Location of Project: JFK INTERNATIONAL AIRPORT, JAMAICA NEW YORK

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

Name: EMMANUEL CIMINIELLO

Title: PROJECT ENGINEER Phone Number: 917 567 6772

Brief description of work completed: SEE ATTACHED FOR ADDITIONAL INFORMATION AND PHOTOS ON THIS PROJECT.

Was the work performed as a prime or a subcontractor: PRIME

Amount of Contract: 5,713,287

Date of Completion: JUNE 2010

Name of Contractor: BEYS GENERAL CONSTRUCTION, CORP (GEORGE KOUGENTAKIS, 75% SHARE
LIC COURT HOUSE HOLDER AND PRESIDENT OF THE SUBMITTING

Name of Project: BIDDER, BEYS SPECIALTY, INC WAS

Location of Project: COURT SQUARE LIC NY PREVIOUSLY SHAREHOLDER AND PRESIDENT OF
BEYS GENERAL CONSTRUCTION, CORP.

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

Name: BRUCE EPSTEIN

Title: PROJECT ENGINEER Phone Number: 917 682 8456

Brief description of work completed: SEE ATTACHED FOR ADDITIONAL INFORMATION ON THIS PROJECT.

Was the work performed as a prime or a subcontractor: PRIME
4,445,000

Amount of Contract:

Date of Completion: DECEMBER 2007



Qualification Form

Project ID:

P1CROT16A

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: BEYS SPECIALTY, INC
Name of Project: KINGS COUNTY SUPREME COURT- RENOVATION OF 2ND AND 9TH FLOORS
Location of Project: 350 ADAMS STREET, BROOKLYN, NY

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

Name: LARRY SHIM- NYC DEPT OF DESIGN & CONSTRUCTION
Title: SR. PROJECT MGR. Phone Number: 646-772-6191

Brief description of work completed: INTERIOR REHABILITATION OF COURTROOMS, JUDGES' CHAMBERS, JURY ROOMS, CARPENTRY, SS DOORS & FRAMES, ALUMINUM STOREFRONTS, MARBLE WORK, FLOORING, PAINTING.

Was the work performed as a prime or a subcontractor: PRIME

Amount of Contract: 3,395,000

Date of Completion: JULY 2012

Name of Contractor: _____

Name of Project: _____

Location of Project: _____

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

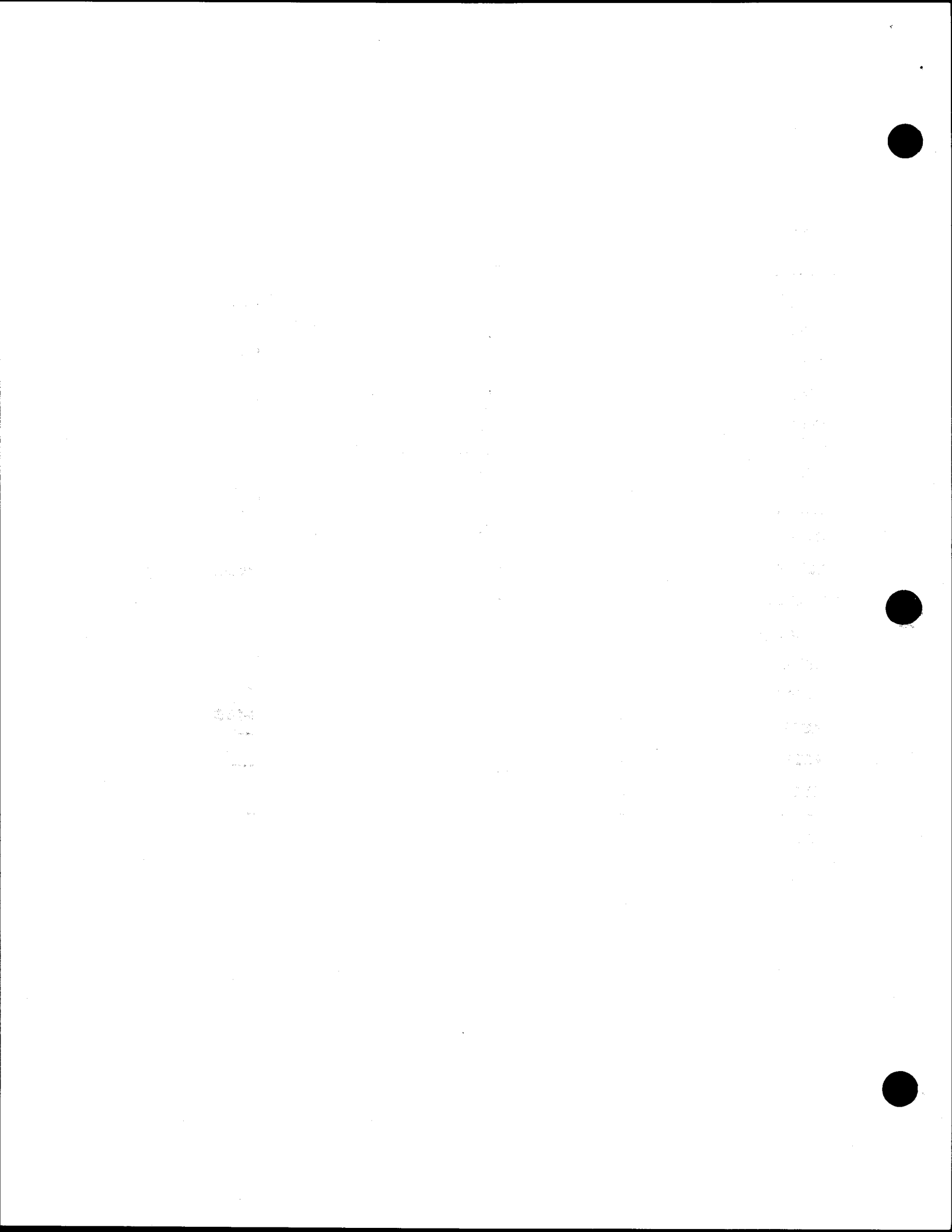
Name: _____
Title: _____ Phone Number: _____

Brief description of work completed: _____

Was the work performed as a prime or a subcontractor: _____

Amount of Contract: _____

Date of Completion: _____



NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

Project Labor Agreement -- Letter of Assent

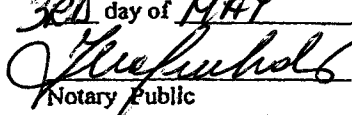
Dear:

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 BRONX RIVER HOUSE and located at 1041 E 172 ST BRONX NY (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 and local trust agreements as set forth in the Project Labor Agreement and this Agreement 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.

Dated: 05/032013 BEYS SPECIALTY, INC
 BEYS SPECIALTY, INC (Name of Contractor or subcontractor) ANNA G. KOUGENTAKIS
 (Name of CM; GC; Contractor or Higher Level Subcontractor) (Authorized Officer & Title) VICE PRESIDENT
 2520 CONEY ISLAND AVENUE, BROOKLYN NY
 (Address)
 718 627 7780 FAX 718 336 5960
 (Phone) (Fax)
 Contractor's State License # N/A

Sworn to before me this 3rd day of MAY, 2009 2013

 Notary Public

IOANNA KATSIMBRAKIS
 Notary Public, State of New York
 No. 01KA5069243
 Qualified in Richmond County
 Commission Expires Nov. 25, 2014



**BIDDER'S CERTIFICATION OF COMPLIANCE WITH
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

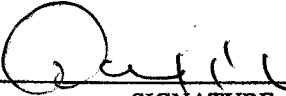
[Please Check One]


BIDDER'S CERTIFICATION

By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer 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, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.

I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: 10th DAY OF APRIL, New York
4/10/13, 20 13


SIGNATURE
GEORGE KOUGENTAKIS
PRINTED NAME
PRESIDENT
TITLE

Sworn to before me this
10th day of APR, 20 13

Notary Public

Dated: 4/10/13 IOANNA KATSIMBRAKIS
Notary Public, State of New York
No. 01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 20 14

**IRAN DIVESTMENT ACT COMPLIANCE RIDER
FOR NEW YORK CITY CONTRACTORS**

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law ("SFL") §165-a and General Municipal Law ("GML") §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the City, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

- (a) The person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- (b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the State Finance Law and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder's certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. In any case where the bidder or proposer cannot certify that they are not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The City of New York may award a bid to a bidder who cannot make the certification on a case by case basis if:

- (1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
- (2) The City makes a determination that the goods or services are necessary for the City to perform its functions and that, absent such an exemption, the City would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

BID FORM
THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

**BID FOR FURNISHING ALL LABOR AND
MATERIAL NECESSARY AND REQUIRED FOR:**

PROJECT ID: P1CROT16A

Bronx River House
1041 East 172nd Street
Bronx 10460

Name of Bidder: BEYS SPECIALTY, INC

Date of Bid Opening: 4/10/2013

Bidder is: (Check one, whichever applies) Individual () Partnership () Corporation

Place of Business of Bidder: 2520 CONEY ISLAND AVE BROOKLYN NY 11223

Bidder's Telephone Number: 718 627 4780 Bidder's Fax Number: 718 336 5960

Bidder's Email Address: gkougentakis@beysspecialty.com

Residence of Bidder (If Individual): N/A

If Bidder is a Partnership, fill in the following blanks:

Names of Partners	Residence of Partners
<u>N/A</u>	
_____	_____
_____	_____
_____	_____

If Bidder is a Corporation, fill in the following blanks:

Organized under the laws of the State of NEW YORK

Name and Home Address of President: GEORGE KOUGENTAKIS
2420 NAT'L DR BROOKLYN NY 11234

Name and Home Address of Secretary: ANNA G. KOUGENTAKIS
2420 WHITMAN DR BROOKLYN NY 11234

Name and Home Address of Treasurer: N/A

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BID FORM

BEYS SPECIALTY, INC

The above-named 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 set forth on the Affirmation included as page 17 of this Bid Booklet.

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

5. 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).

6. 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.

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.

7. 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.

8. 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.

9. 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 the Bid Schedule:

BID FORM

PROJECT ID: PICROT16A

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

A. LUMP SUM PRICE - Total price for all labor and material for all required work, excluding items (B) and (C) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For Labor

Total Price for Material Sold and Delivered

\$ _____ + \$ _____ Total Price for Item A \$ _____

B. ALLOWANCE for Part A-1 of Standing Column Well System Const. Seq. (Article 1.45 of the Addendum to General Conditions) \$17,000.00

C. ALLOWANCE for Part A-2 of Standing Column Well System Const. Seq. (Article 1.45 of the Addendum to General Conditions) \$135,000.00

TOTAL BID PRICE (Add A + B + C) (a/k/a BID PROPOSAL) \$ _____

BIDDER'S SIGNATURE AND AFFIDAVIT

WARNING!! Failure to comply with items below will result in the rejection of your bid.

* SUBCONTRACTORS: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (See Page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". Yes _____ No _____

* MWBE GOALS: You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.

Bidder: _____

By: _____ (Signature of Partner or corporate officer)

Attest: _____ Secretary of Corporate Bidder (Corporate Seal)

Affidavit on the following page should be subscribed and sworn to before a Notary Public

BID FORM

PROJECT ID: PICROT16A

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. LUMP SUM PRICE - Total price for all labor and material for all required work, excluding items (B), (C) and (D) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For Labor Total Price for Material Sold and Delivered

\$ 8,000,000 + \$ 3,660,686 Total Price for Item A \$ 11,660,686.00

B. ALLOWANCE for Part A-1 of Standing Column Well System Const. Seq. (Article 1.45 of the Addendum to General Conditions) \$17,000.00

C. ALLOWANCE for Part A-2 of Standing Column Well System Const. Seq. (Article 1.45 of the Addendum to General Conditions) \$135,000.00

D. AMOUNT for Unit Prices (from page 13-0) for extra work items \$ 15,000.00

TOTAL BID PRICE (Add A + B + C + D) \$ 11,827,686.00 (a/k/a BID PROPOSAL)

4/10/13 P8

BIDDER'S SIGNATURE AND AFFIDAVIT

WARNING!! Failure to comply with items below will result in the rejection of your bid.

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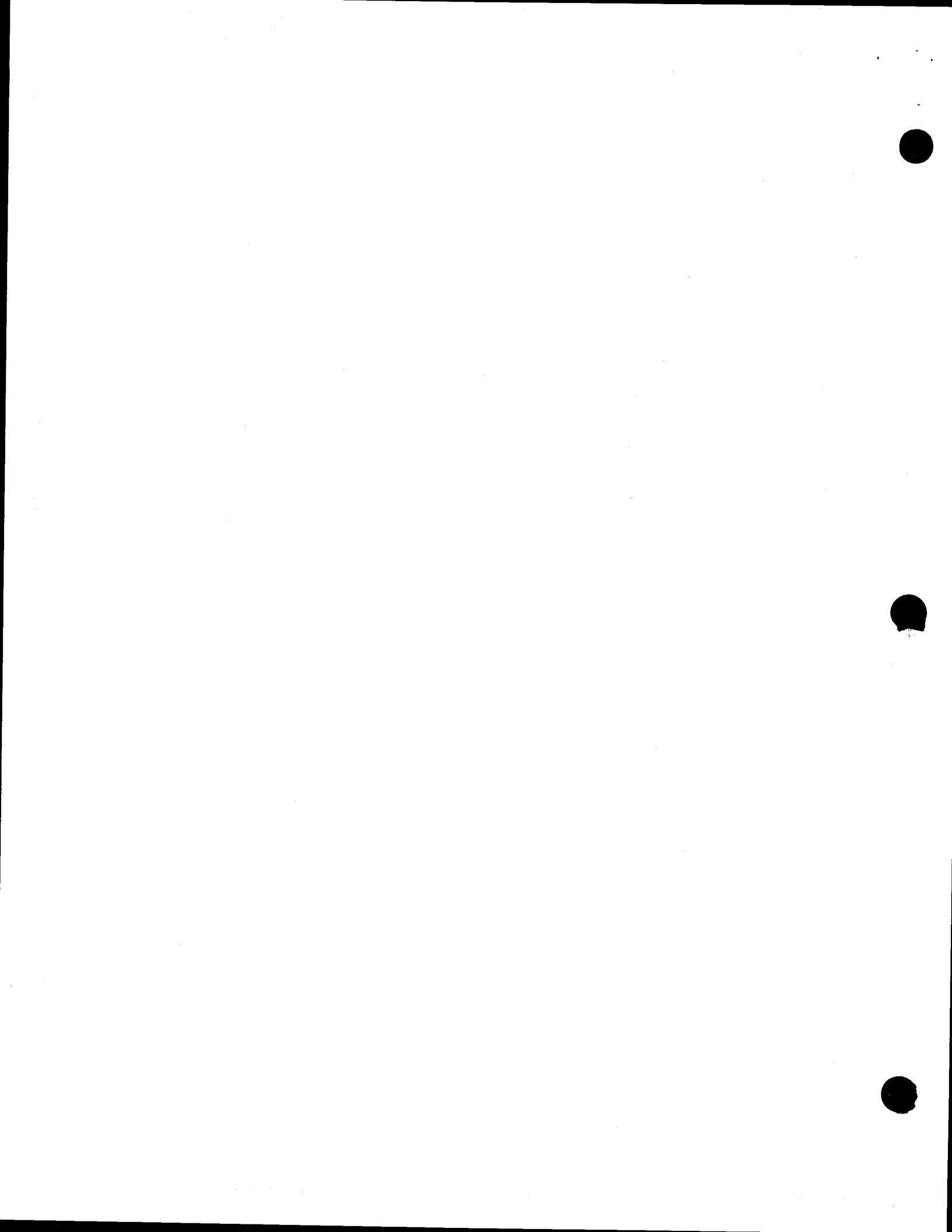
* MWBE GOALS: You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.

Bidder: BEYS SPECIALTY, INC

By: [Signature] (Signature of Partner or corporate officer)

Attest: [Signature] Secretary of Corporate Bidder (Corporate Seal)

Affidavit on the following page should be subscribed and sworn to before a Notary Public



Unit Price Schedule

Unit Price items: The items of work set forth in the Schedule below shall be performed by the contractor on a unit price basis for additional work. Such items of work shall be performed by the contractor only as directed in writing by the Commissioner.

The unit price for the items of work in the Schedule below are for EXTRA WORK ONLY i.e., work which is above and beyond that described in the Drawings and Specifications.

The bidder shall submit prices for all the items of work in the Schedule below. The bidder shall insert the total sum for all unit price items on the Bid Form, Item C - Allowance for Unit Prices. The unit price bid for each item shall include all costs and expense for the item, i.e., labor, material, overhead and profit. Quantities shown are approximate and for bid comparison purposes only. Actual amounts to be determined when the work is performed.

CSI #	Item #	Item Description	Quant.	Units	Unit Price	Total
02300	1	SHEET METAL PILING REMOVALS: Remove underground sheet pilings, where removal is necessary to install new work, as directed by the Commissioner.	40	SF	\$300	\$12,000
04500	2	TIMBER PILES: Provide additional timber pile length, over and above the 25' per pile provisional quantity in the Bid Breakdown. Include all associated pre-drilling.	3	LF	1,000	3,000

Total Amount of Unit Price Work

\$15,000*

* Insert Total amount of Unit Price Work on line C of Bid Form

Note: All quantities are approximate



BID FORM (TO BE NOTARIZED)

AFFIDAVIT WHERE BIDDERS IS AN INDIVIDUAL

STATE OF NEW YORK, COUNTY OF N/A ss:

being duly sworn says:

I am the person described in and who executed the foregoing bid, and the several matters therein stated are in all respects true.

(Signature of the person who signed the Bid)

Subscribed and sworn to before me this
____ day of _____,

Notary Public

AFFIDAVIT WHERE BIDDERS IS A PARTNERSHIP

STATE OF NEW YORK, COUNTY OF N/A ss:

being duly sworn says:

I am a member of _____ the firm described in and which executed the foregoing bid.
subscribed the name of the firm thereto on behalf of the firm, and the several matters therein stated are in all respects true.

(Signature of Partner who signed the Bid)

Subscribed and sworn to before me this
____ day of _____,

Notary Public

AFFIDAVIT WHERE BIDDERS IS A CORPORATION

STATE OF NEW YORK, COUNTY OF KINGS ss:

GEORGE KOUCENTARIS being duly sworn says:

I am the PRESIDENT of the above named corporation whose name is subscribed to and which executed
the foregoing bid. I reside at 2420 NATIONAL DR BROOKLYN NY 11234
I have knowledge of the several matters therein stated, and they are in all respects true.

[Signature]
(Signature of Corporate Officer who signed the Bid)

Subscribed and sworn to before me this
10th day of APRIL 2013

[Signature]
Notary Public

IOANNA KATSIMBRAKIS
Notary Public, State of New York
No. 01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 2014

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AFFIRMATION

The undersigned bidder affirms and declares that said bidder is not in arrears to the City of New York upon debt, contract or taxes and is not a defaulter, as surety or otherwise, upon obligation to the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except NONE

(If none, the bidder shall insert the word "None" in the space provided above.)

Full Name of Bidder: BEYS SPECIALTY, INC
Address: 2520 CONEY ISLAND AVE., BROOKLYN
City: BROOKLYN State: NEW YORK Zip Code: 11223

CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:

A - Individual or Sole Proprietorship *
SOCIAL SECURITY NUMBER

B - Partnership, Joint Venture or other unincorporated organization
EMPLOYER IDENTIFICATION NUMBER

C - Corporation
EMPLOYER IDENTIFICATION NUMBER

56 256 6527

By: [Signature]
Signature:

Title: PRESIDENT

If a corporation, place seal here

This affirmation must be signed by an officer or duly authorized representative.

* Under the Federal Privacy Act the furnishing of Social Security Numbers by bidders on City contracts is voluntary. Failure to provide a Social Security Number will not result in a bidder's disqualification. Social Security Numbers will be used to identify bidders, proposers or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying of businesses which seek City contracts.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

NOTICE TO BIDDERS

ENV. #2

SUBMISSION: The Bidder must, at the time of the bid, submit the form on the next page ("BIDDER'S IDENTIFICATION OF SUBCONTRACTORS"). This form must be submitted in a separate, sealed envelope (BID ENVELOPE #2). Failure to do so will result in the disqualification of the bid as non-responsive.

Please be advised that pursuant to GML § 101(5) the 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:

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

NOTE: This project may not involve all of the above listed subcontractors. Please see the form on the next page which indicates the subcontractors required for this Project.

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

Failure to submit the completed form on the next page ("Bidder's Identification of Subcontractors") that includes the names of subcontractors and the agreed upon amounts to be paid to such subcontractors will render the bid non-responsive.

PLEASE NOTE: for any contract that is subject to M/WBE participation goals under Local Law 129, if the bidder's intention to use its own forces to do any of the above-referenced work would result in Bidder's failure to attain the Target Subcontracting Percentage identified in the Subcontractor Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a Waiver of Target Subcontracting Percentage (Subcontractor Utilization Plan, Part III) in advance of 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 shall be returned to the bidders unopened after contract award, unless the bidder has given the agency permission to shred the form.

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 §222 (2)(e) of the Labor Law, or if the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

Project ID: PICROT16A

SUBMISSION: In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. **PLUMBING CONTRACTOR:**

MAR-SAL PLUMBING & HEATING INC. *non/MBE*
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 245,000

2. **HVAC CONTRACTOR:**

CONAIR *non/MBE*
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 885,000

3. **ELECTRICAL CONTRACTOR:**

RYAN ELECTRIC COMPANY LLC. *non/MBE*
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 1,240,000

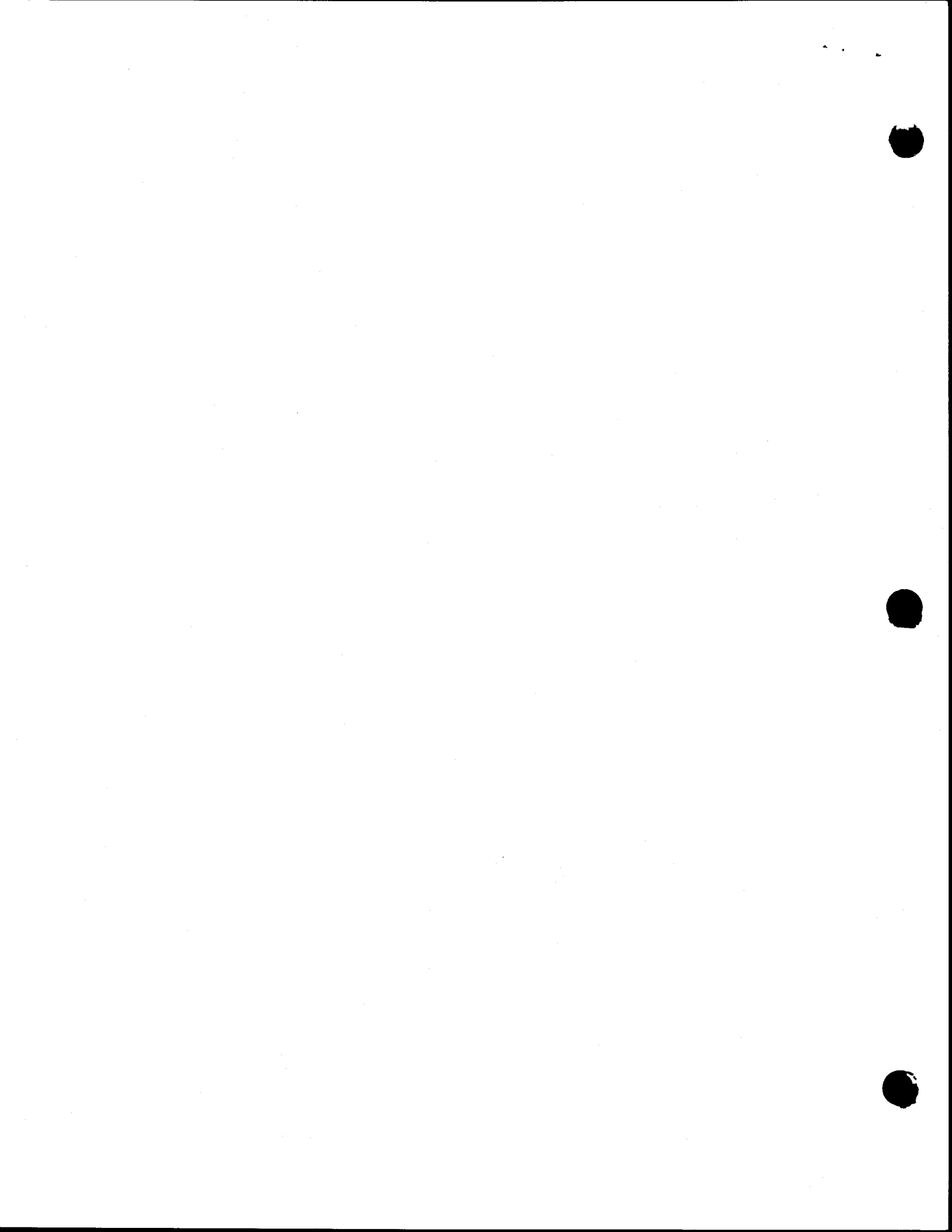
BIDDER'S SIGNATURE: The Bidder must sign this form in the space provided below:

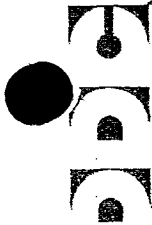
Name of Bidder: BEYS SPECIALTY INC.

By: *[Signature]*
Signature of Partner or Corporate Officer

Print Name: GEORGE KOUKENTAKIS

Title: PRESIDENT





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

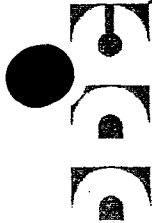
CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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 WORK							
01 000	GENERAL REQUIREMENTS							
	Mobilization	/	LS					500,000
	Fire Guards	/	LS					20,000
	Temporary Heat	/	LS					45,000
	Temporary Light and Power	/	LS					80,000
	Subtotal							645,000
01 330	LEED REQUIREMENTS							
	LEED Requirements	/	LS					160,000
	Subtotal							160,000
01 332	LEED SUBMITTALS (included w/ 01330)							
01 335	VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, PAINTS, SEALANTS AND ARCHITECTURAL COATINGS (included w/ 01330)							
01 506	CONSTRUCTION WASTE MEANAGEMENT (included w/ 01330)							
01 511	CONSTRUCTION IAQ MEANAGEMENT (included w/ 01330)							
01 810	COMMISSIONING (included w/ 01330)							
02 000	SITE CONSTRUCTION							
02 060	AGGREGATE MATERIALS- LANDSCAPE (included w/ 02300)							
02 065	STRUCTURAL SOIL							
	Structural Soil	110	CY	34	3740	42	4620	8360
	Subtotal							8360





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

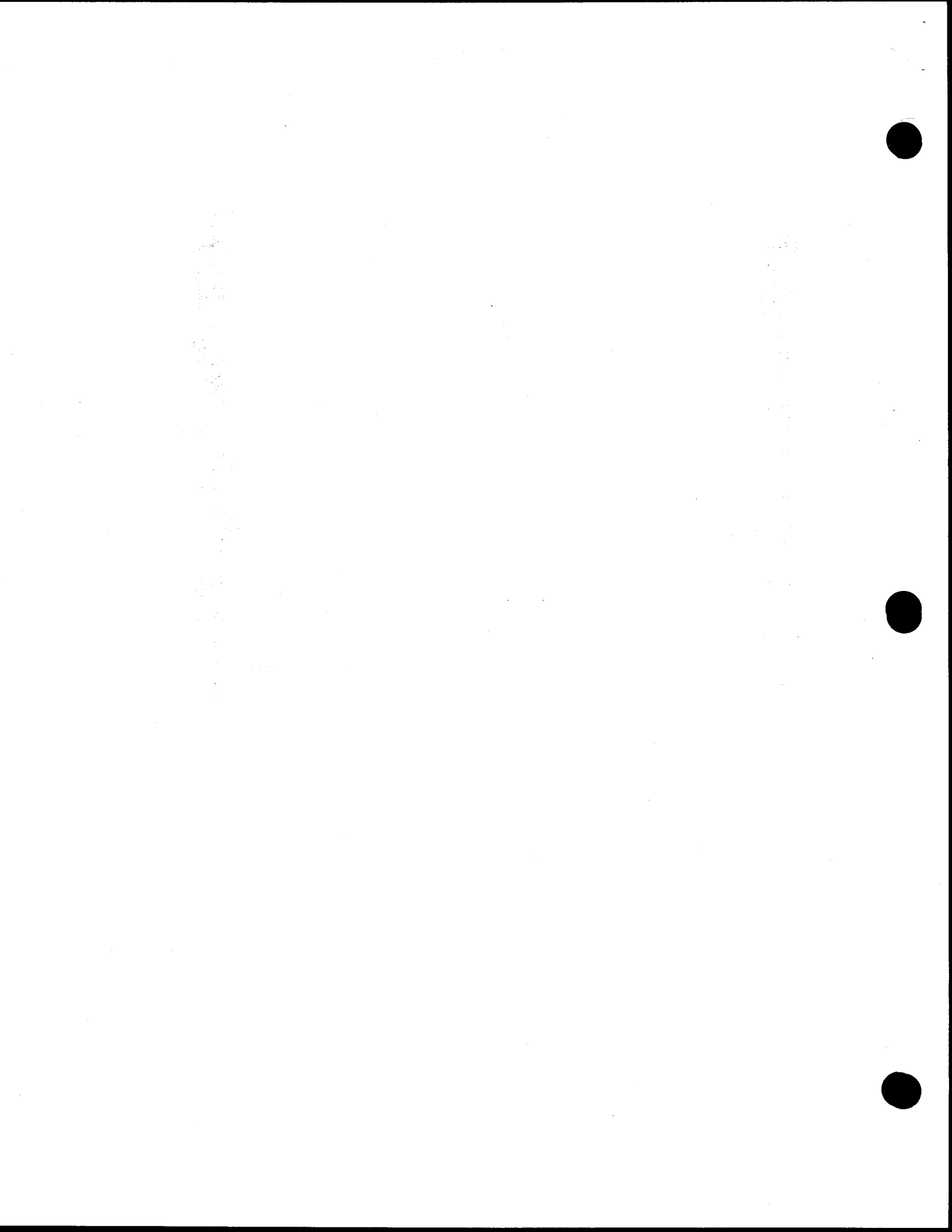
Bidder:

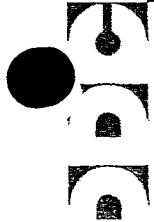
CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
02 120	HARVESTING SYSTEM							
	Storm Water Tank 10,000 GAL	1	EA	8100	8100	11,100	11,100	19,200
	Pump	1	LS					115,360
	Controller System	1	LS					152,472
	Water Quality Treatment: Filtration & UV treatment & dye injection	1	LS					112,800
	Carbon Activation Treatment	1	LS					8,064
	Fertigation System	1	LS					32,000
	Prefiltration Unit/ Hydline Separator Manhole	2	EA	4,070	8,140	2,010	4,020	12,160
	Subtotal							351,486
02 130	HARVESTING SYSTEM CONTROLS (included w/ 02120)							
02 140	HARVESTING SYSTEM FILTRATION AND TREATMENT (included w/ 02120)							
02 205	PROTECTION, DEMOLITION AND RELOCATION OF EXISTING UTILITIES							
	Removal of Sheridan Outfall, etc. (excluding excavation, shoring)	1	LS					38,400
	Subtotal							38,400
02 230	TREE PROTECTION AND TREE PRUNING							
	Preparatory Fertilizing Existing Tree	1	LS					4,032
	Preparatory Pruning Existing Tree	1	LS					35,844
	Tree Protection	1	LS					18,816
	Subtotal							26,692
02 300	EARTHWORK							
	Clear and Grub	1	LS					57,600





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

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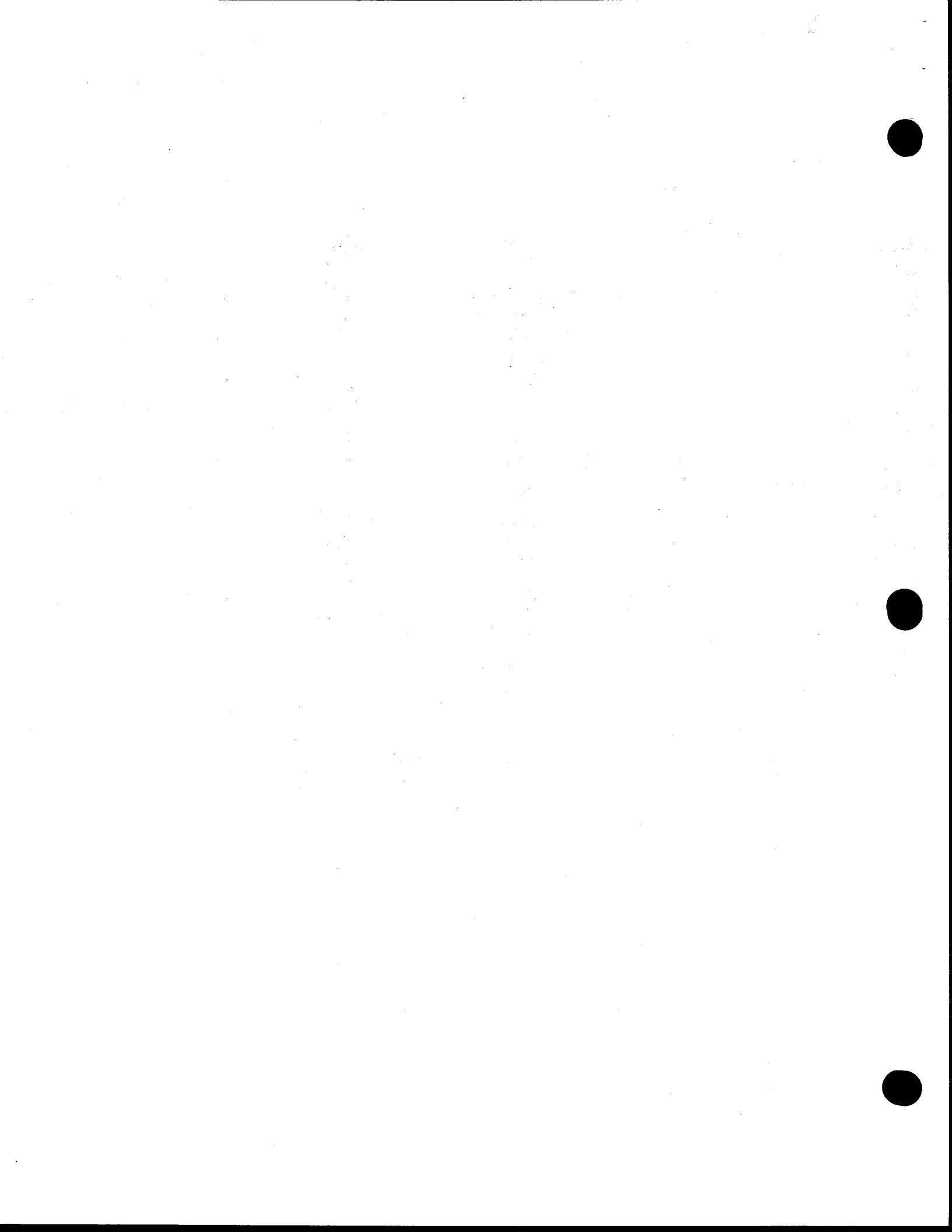
Bidder:

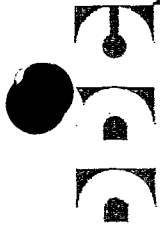
CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	Site Grading/ Leveling (Earthmoving)	580	CY	14	8,120	24	14,210	22,330
	Borrowed Fill (Truck Measured)	906	CY	26	23,556	38	34,428	57,984
	Borrowed Fill (Measured In Place)	600	CY	34	20,400	43	25,800	46,200
	Excavation and Backfill (Unclassified excavation) for Storm Lines and Sheridan Outfall	940	CY	44	41,360	58	54,520	95,880
	Fine Grade at Sod or Groundcover (Earthmoving)	3400	SF	1.70	5,780	2.12	7,140	12,920
	6" Gravel Base for Paving (Broken Stone)	170	CY	25	4,250	48	8,160	14,110
	Geotextile - Drainage	750	SY	3.40	2,550	7	5,250	7,800
	Geotextile - Separation	240	SY	3.42	816	7	1,680	2,496
	Broken Stone - Loose Measure	70	CY	35	2,450	48	3,360	5,810
	Sand	30	CY	27	810	34	1,020	1,830
	Foundation Material for Asphalt (Truck Measured)	180	CY	35	6,300	48	8,640	14,940
	Sheeting and Shoring	400	SF	28	11,200	36	14,400	25,600
	Sheeting and Shoring (Trenching Utilities to CS and Spray Controls)	600	SF	15	9,000	23	13,800	22,800
	Dewatering	1	LS				76,800	76,800
	Subtotal							\$1,651,100
02 316	PNEUMATIC EXCAVATION							
	Hand and/or Pneumatic Excavation	70	CY	79	5,530	100	7,000	12,530
	Subtotal							\$12,530
02 370	EROSION CONTROLS							
	Catch Basin Silt Sack	9	EA	2400	21,600	1568	14,112	35,712
	Temporary Silt Fence	1500	LF	2.42	3,630	4.00	6,000	9,600
	Stabilized Construction Entrance	180	SY	22.60	4,068	35	6,300	10,368
	Subtotal							\$55,680
02 371	GABION RETAINING WALLS							
	Stone Gabions 18"X18"X 30" H. including Stake Supports	65	LF	60	3,900	61	3,965	7,865
	Recycled Plastic Lumber (RPL) Edging	65	LF	30	1,950	31	2,015	3,965
	Subtotal							\$11,830





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

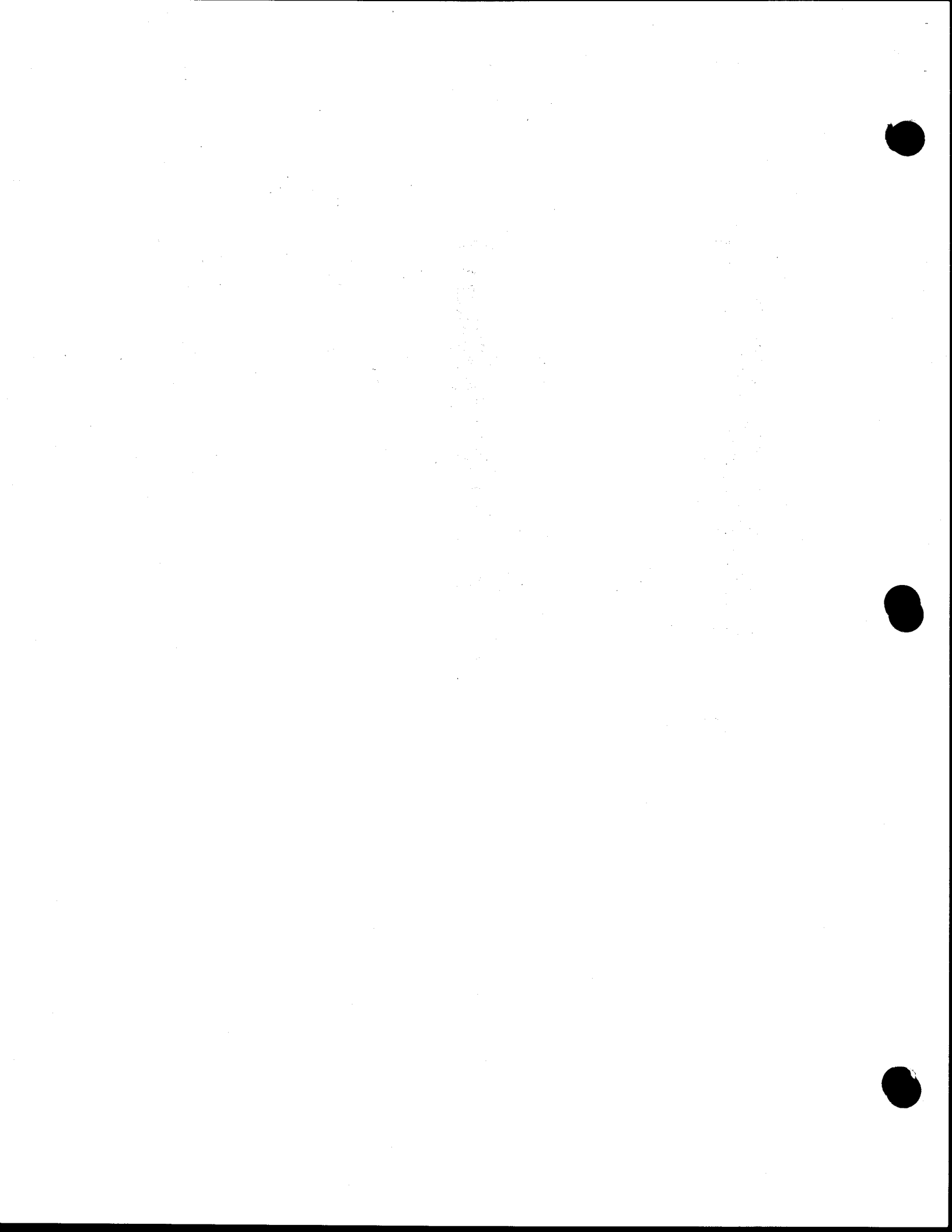
Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
02 375	BOULDERS Provide and Place Boulders (including Edging)	1	LS					15,360 15,360
	Subtotal							
02 455	TIMBER PILES Wood Piles (25' Long) Predrilled Mobilization/ Demobilization Dewatering	1,725 1 1	LF LS LS	175	301,875	210	264,250	664,125 138,400 251,200 14,053,725
	Subtotal							
02 510	WATER DISTRIBUTION Type K Copper Tubing -1 1/2" Dia. (2.4) Precast Concrete Water Vault Precast Above-Ground RPZ Cement-Lined Ductile Iron Water Pipe -3" Dia. Cement-Lined Ductile Iron Water Pipe -4" Dia. Cement-Lined Ductile Iron Water Pipe -6" Dia. Cement-Lined Ductile Iron Water Pipe -8" Dia. Cement-Lined Ductile Iron Water Pipe-12" Dia. Curb and Property Line Valves- 1-1/2" Dia. Gate Valve- Mechanical Joint 3" Dia. Gate Valve- Mechanical Joint 8" Dia. Cast Iron Valve Box- 5-1/4" Dia. Fire Hydrant w/ Fenders	75 1 1 50 75 250 700 40 2 2 4 1 2	LF EA EA LF LF LF LF LF SET EA EA EA EA	48 4100 31200 27 32 38 41 50 1200 610 560 1400 610	2600 4800 31200 1350 2400 9500 28700 2000 14800 1220 2240 1400 1280	60 5500 5500 37 38 45 61 65 1488 926 848 1544 926	4500 15500 5500 1850 2850 11250 42700 21600 2976 1852 13392 1544 1852	8100 9600 8700 3200 5250 29750 71400 4600 5376 3072 5632 2944 3072 157,696
	Subtotal							
02 521	DECOMMISSION GROUNDWATER WELL Decommission Groundwater Well	2	EA	3100	6200	4452	8904	15,104 15,104
	Subtotal							





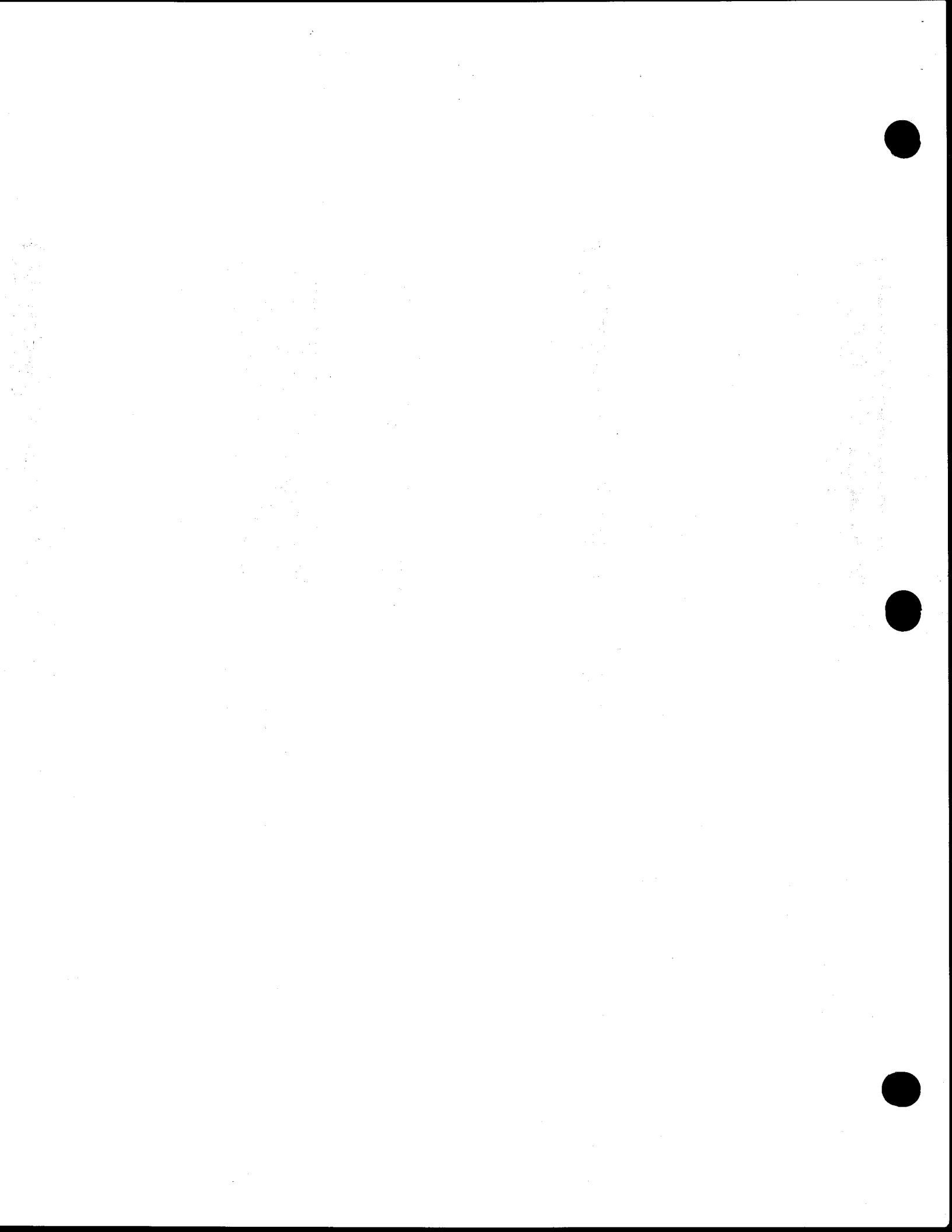
NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse
Location: 1041 East 172nd Street, Bronx, NY 10460
Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A
Sponsor Agency: Dept of Parks and Recreation

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
02 530	SANITARY SEWERAGE							
	Precast Concrete Structures	4	EA	1560	6240	2408	9632	15872
	Ductile Iron Sewer Pipe- 6" Dia.	250	LF	138	35000	43	11250	20750
	Ductile Iron Sewer Pipe- 8" Dia.	400	LF	23	1560	51	20400	36000
	Ductile Iron Sewer Pipe- 12" Dia.	85	LF	50	4250	65	5525	9775
	Concrete- Encased High Density Force Main Pipe- 1.25" Dia.	4	EA	810	3240	1238	4952	8192
	DCV Assembly and Water Meter w/ Remote- 8" Dia.							889 814
	Subtotal							
02 550	NATURAL GAS DISTRIBUTION							
	Gas Service Main- 2" Dia.	385	LF	26	10010	32	12320	22330
	Subtotal							22330
02 580	ELECTRICAL SITEWORK							
	4" PVC Coated RGS Conduit		LF					
	3" PVC Coated RGS Conduit		LF					
	2" PVC Coated RGS Conduit		LF					
	1-1/2" PVC Coated RGS Conduit		LF					
	#500 KCMIL Wire		LF					
	#4/0 AWG Wire		LF					
	#2/0 AWG Wire		LF					
	#1/0 AWG Wire		LF					
	#2 AWG Wire		LF					
	#6 AWG Wire		LF					
	#10 AWG Wire		LF					
	Property Line Box (Remove and Replace Existing)		EA					
	Temporary Electric Service Cabinet		EA					
	Pullbox		EA					
	DOT Lightpole w/ 2 Luminaires		EA					
	DOT Photo Cell Assembly and Control Cabinet Connections		EA					
	Electric Heater and Wiring for DCV Vault		EA					
	Exterior Cabinets for Relocated CS (Comfort Station)		LS					





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

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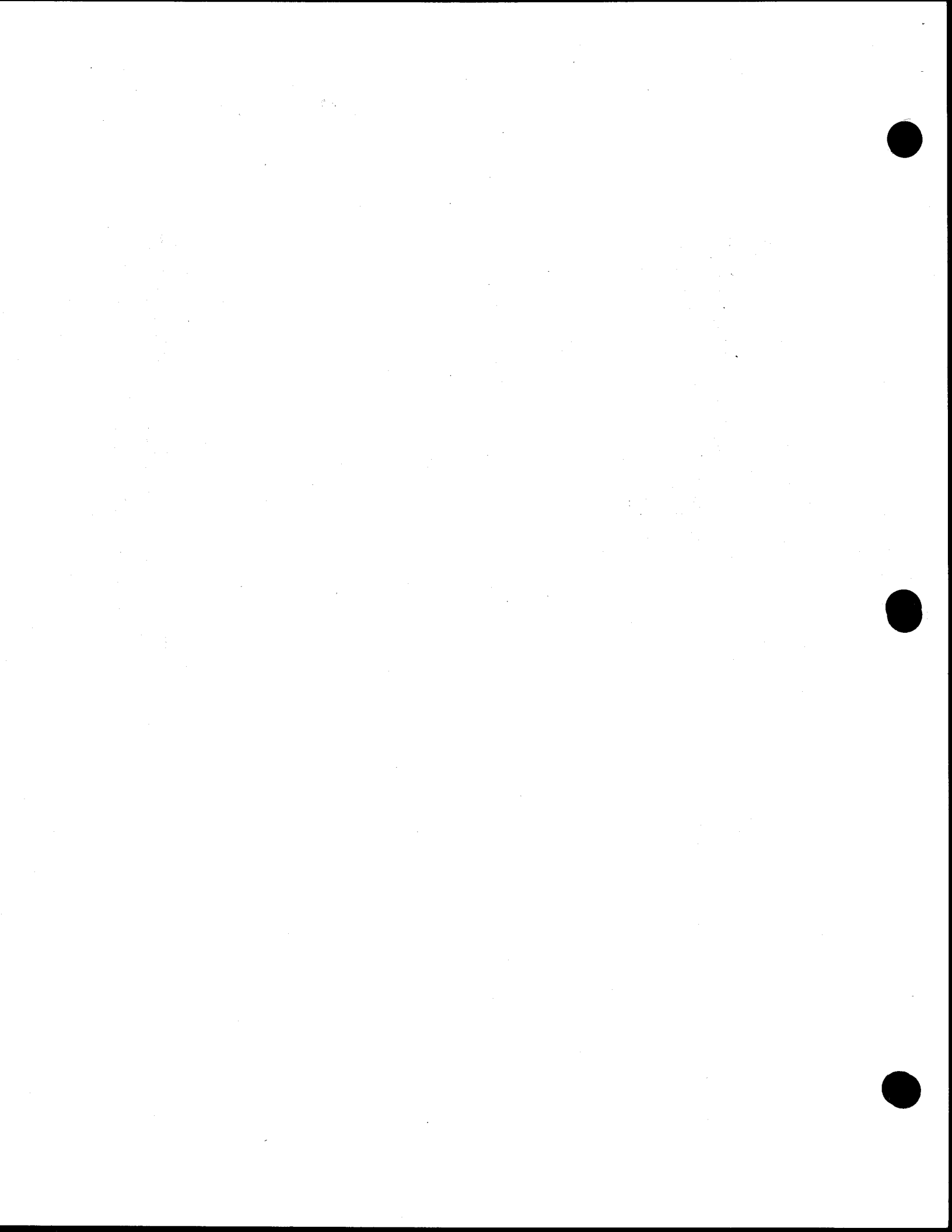
Bidder:

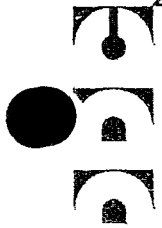
CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	Telephone Conduit -4" Dia.		LF					81,809.00
	Subtotal							
02 630	STORM DRAINAGE							
	10" Dia. Dip	60	LF	41	2,460	49	2,910	5,400
	6" Dia. Dip	165	LF	35	5,775	48	7,920	13,695
	6" Dia. Slotted Polyethylene Pipe	265	LF	29	7,685	41	10,865	18,550
	Clean, Flush and Test	1	LS					10,840
	Clear Existing Storm/ Sanitary Sewer Pipe	140	LF	16	2,240	22	3,080	5,320
	Clear Existing Drainage Structure	4	EA	110	440	412	1,648	2,088
	Adjust Top of Utility Structure to Grade	3	EA	150	450	618	1,854	2,304
	Precast Concrete Structures	5	EA	1600	8000	2368	11,840	19,840
	Parks Leaf Manhole Cover and Frame	2	EA	940	1,880	1,545	3,090	4,970
	Parks Leaf Catch Basin Cover and Frame	4	EA	810	3,240	1,802	7,208	8,448
	Reinforced Concrete Pipe- 12" Dia.	10	LF	61	610	180	1,800	1,410
	Reinforced Concrete Pipe- 36" Dia.	110	LF	150	16,500	170	18,700	25,200
	Slotted Polyethylene Pipe	65	LF	26	1,690	38	2,470	4,160
	Stormwater Treatment	1	LS					119,200
	Subtotal							225,785
02 631	TRENCH DRAINS							
	SS Trench Drain w/ SS Grate (Exterior)	80	LF	33	2,640	44	3,520	6,160
	Trench Drain and Cover in Boat Storage (Interior)	57	LF	33	1,881	44	2,508	4,389
	Subtotal							819,549
02 721	AGGREGATE BASE COURSES (Included w/ 02300)							
02 731	SANITARY PUMP STATION							
	Sewage Ejector Pump/ Pit	1	LS					419,200
	Subtotal							419,200





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

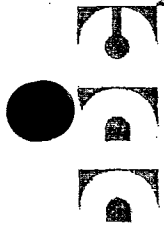
CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
02 740	ASPHALT PAVING							
	Restoration of Street Pavement	60	SY	75 ⁰⁰	4500	98	5880	10380
	Detectable Warning for Ped. Ramp	120	SF	12 ⁰⁰	1440	13 ⁰⁰	1620	3060
	Steel Faced Concrete Curb	240	LF	14 ⁰⁰	3408	21 ⁰⁰	5040	8448
	Concrete Curb	24	CY	320	7680	448	10756	18436
	Full Depth Asphalt Pavement	1012	SY	62	62744	82	82984	145728
	Roadwork to Upgrade Water Connection per DEP	1	LS	42	42			42
	New Asphalt in Parking Lot (Replace Permeable)	1710	SY	39 ⁴⁰	67374	47	80370	147744
	Subtotal							\$12,208
02 750	CONCRETE PAVEMENT							
	Colored Reinforced Concrete Pavement	11	SY	135	1485	153	1683	3168
	5" Poured Concrete Paving (Including Rebar and EJ at Boat Plaza)	420	SF	9 ⁸⁰	4214	12 ⁰⁰	5160	9374
	Cement Concrete Pavement	287	SY	61	17507	77	22099	39606
	Subtotal							\$52,148
02 760	PAVEMENT MARKINGS							
	Thermoplastic HFPRM ADA Parking Symbol	2	EA	132	260	254	508	768
	Thermoplastic HFPRM Parking Lines- 4" Width	360	LF	4 ⁰⁰	1440	8	2880	4320
	Subtotal							\$5,088
02 761	UNIT PAVEMENTS							
	Precast Architectural Concrete Pavers	2170	SF	5 ²⁰	11284	11	23870	35154
	2" Stone Dust	820	SF	8 ²⁰	6724	11	9020	15744
	Granite Pavers on Asphalt Base	51	SY	390	19890	416	21216	41106
	Detectable Warning for Pedestrian Ramp <i>See above</i>	—	SF					—
	River Cobble Pavement	260	SF	11	2860	12	3120	5980
	Stone Border (at Parking Lot Median)	33	LF	5 ²⁰	1716	54	1782	2498
	Steel Edging	180	LF	8 ⁰⁰	1440	11	1980	3420
	Subtotal							\$10,916





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse
Location: 1041 East 172nd Street, Bronx, NY 10460
Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
02 771	STONE CURBS AND STEPS Granite Edging	35	LF	49	1,715	40	1,400	3,115 8,315
	Subtotal							
02 796	NATURAL STONE POROUS PAVING SYSTEM Inserts at Boat Plaza	1	LS					16,576 15,457.6
	Subtotal							
02 810	IRRIGATION AND CONTROLLER SYSTEM Drip Irrigation System Complete (w/ Controller) Vertical Irrigation System Complete	1 3	LS LS					9,000 7,040 8,177.040
	Subtotal							
02 821	METAL BARRIER GATES Metal Barrier Fence	2	EA	4200	8,400	4700	9,400	17,800 8,7,800
	Subtotal							
02 825	RANGE FENCE Range Fence- 4' High	2200	LF	5 ⁰⁰	11,000	4 ⁵⁰	8,800	19,800 7,19,800
	Subtotal							
02 840	TIMBER BARRIER RAIL Timber Barrier Rail- One Rail (Type C)	176	LF	65	11,440	50	8,800	20,240 24,640
	Subtotal							
02 871	BICYCLE RACK Bicycle Racks	15	EA	140	2,100	200	3,300	5,400 7,5,400
	Subtotal							
02 872	PRECAST CONCRETE BENCH Custom Curved Concrete Bench	1	LS					8,064 8,8,064
	Subtotal							





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

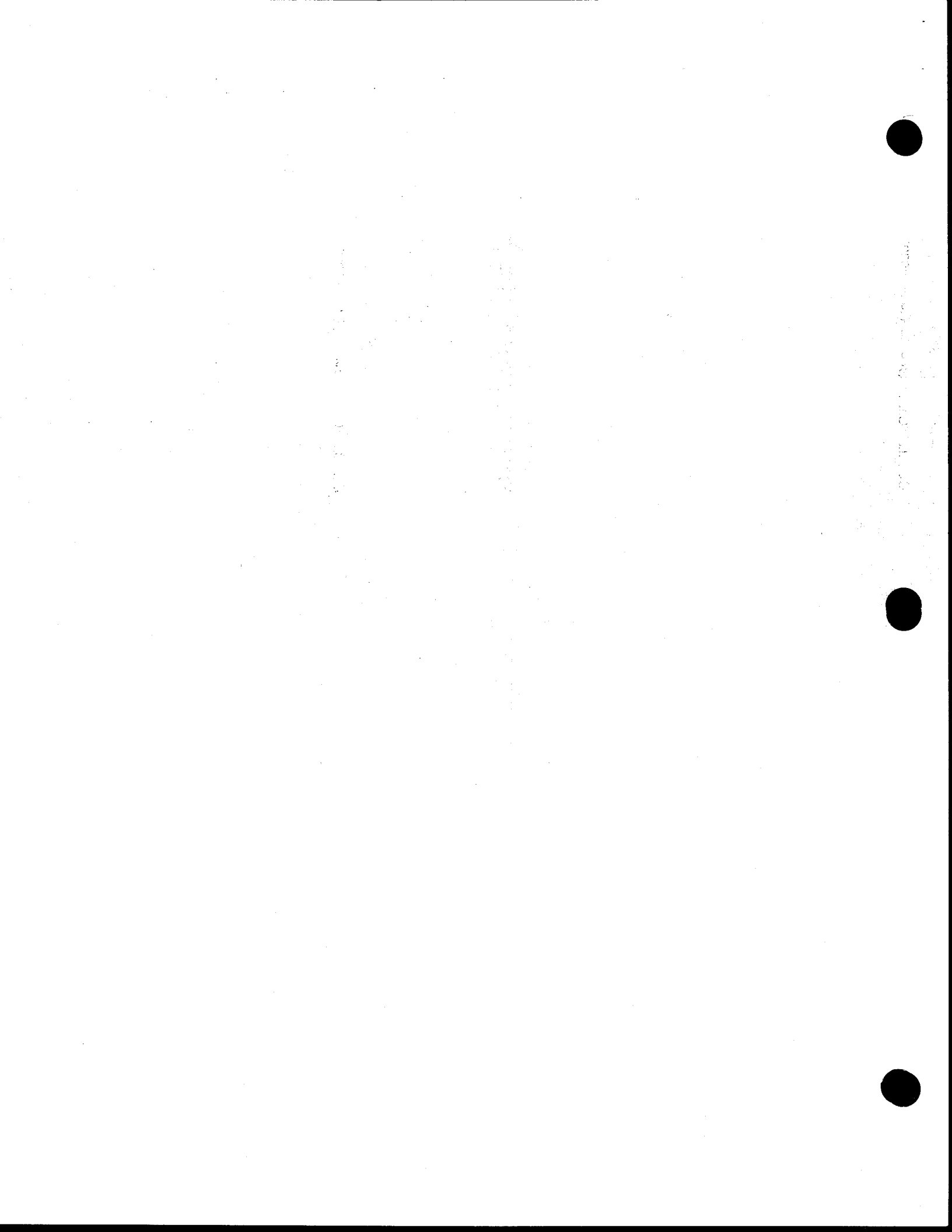
Project: Bronx River Boathouse
Location: 1041 East 172nd Street, Bronx, NY 10460
Bidder:

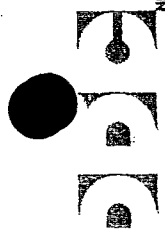
CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
02 890	TRAFFIC SIGNAGE							
	Steel Drive Rail	4	EA	1100	4400	950	3800	8200
	ADA Signs	2	EA	1400	2800	1400	2800	5600
	Miscellaneous Expenses	1	LS					5504
	Subtotal							\$19304
02 910	TOPSOIL							
	Imported Topsoil (Seeded and Sodded)	40	CY	41	1640	42	1680	3320
	Topsoil for Seeded and Sodded Areas	630	CY	41	25830	42	26460	52290
	Topsoil for Planting Pits and Beds	140	CY	41	5740	42	5880	11620
	Topsoil for Infiltration Swale	65	CY	41	2665	42	2730	5395
	Subtotal							\$79625
02 920	LAWNS AND GRASSES							
	Sod without Compost	23620	SF	0.20	7084	0.20	6144	13228
	Construct Lawn	110	SY	1	110	6	660	1430
	Subtotal							14662
02 930	PLANTING							
	Trees:							
	Plants- Gleditsia Triacanthos Honey Locust 4"-6" Cal.	5	EA	520	2600	408	2040	4640
	Plants- Nyssa Sylvatica, Black Tulepo 4"-6" Cal.	N/A	EA					
	Plants- Sassafras Albidum, Sassafras 4"-6" Cal.	2	EA	406	812	330	330	792
	Plants- Acer Rubrum 'Red Sunset' Red Maple	6	EA	520	3120	408	2448	5568
	Nyssa Sylvatica, Black Gum		EA					
	Multistemmed trees:							
	Plants- Amelanchier Canadensis, Shadbush Serviceberry 3 1/2" Cal.	1	EA	276	276	230	230	506
	Plants- Amelanchier Canadensis, Shadblow Serviceberry, 8'-10' HT.	N/A	EA					
	Plants- Magnolia Virginiana, 'Moonglow' Sweetbay Magnolia, 8'-10' HT.	7	EA	294	2058	250	1750	3808





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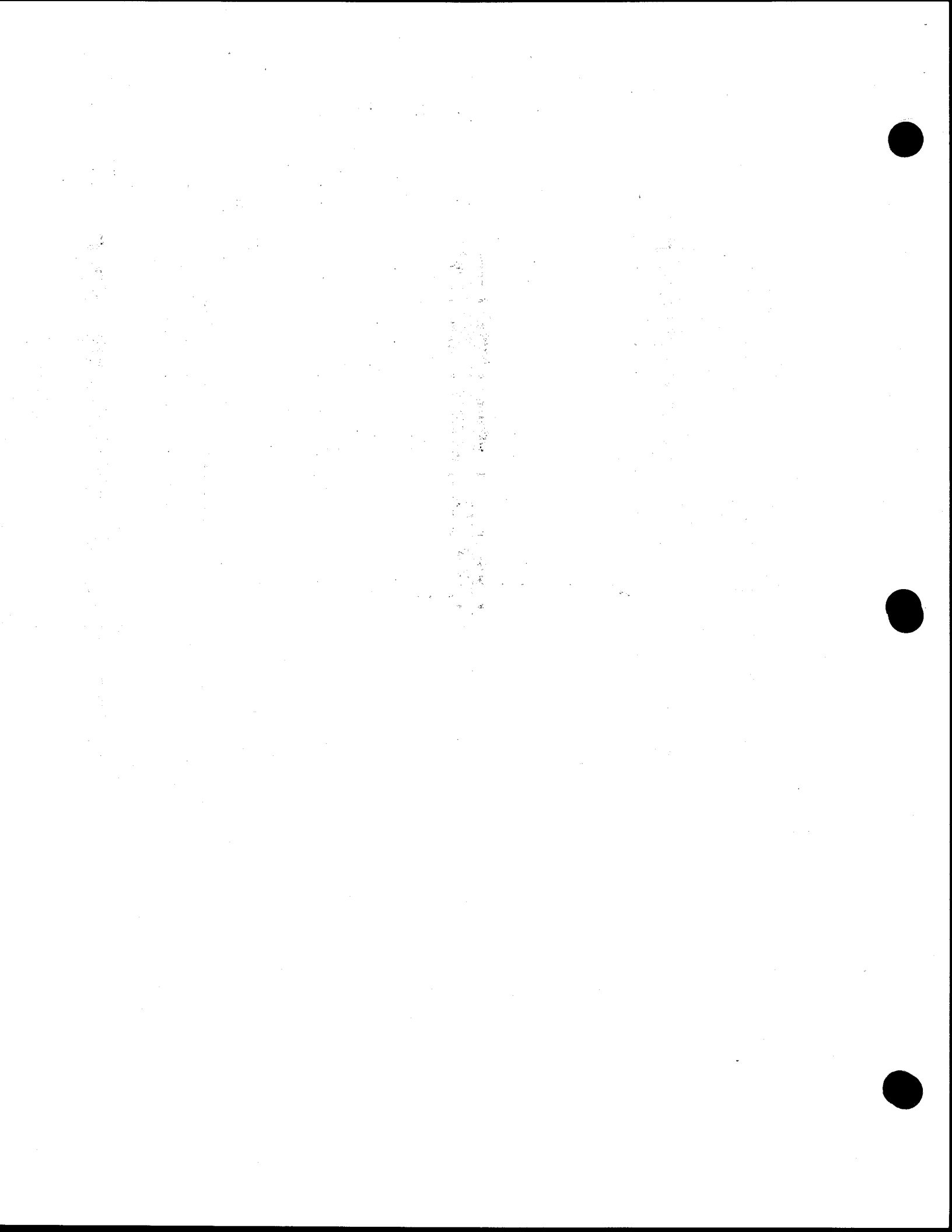
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	Large Shrubs:							
	Plants- Clethra Alnifolia, Sweet Pepperbush-10 Gal.	3	EA	51	153	35	105	258
	Plants- Cornus Sericea 'Cardinal', Redosier Dogwood-10 Gal.	22	EA	51	1122	35	770	1,892
	Plants- Myrica Pennsylvanica, Northern Bayberry, 10 Gal., 4' HT.	N/A	EA					
	Plants- Cornus Sericea, Redosier Dogwood- 10 Gal.	N/A	EA					
	Plants- Viburnum Acerifolium Mapleleaf Viburnum- 10 Gal.	N/A	EA					
	Clethra Alnifolia 'Ruby Speic', Summersweet	22	EA	39	858	27	594	1,452
	Aronia Arbutifolia 'Brilliantissima' Red Chokeberry	11	EA	39	429	26	286	715
	Small Shrubs:							
	Plants- Ilex Glabra 'Compacta', Inkberry- 3 Gal.	191	EA	39	7449	26	4966	12,415
	Plants- Ilex Glabra 'Nordic', Nordic Compact Inkberry- 3 Gal.	112	EA	46	5152	27	3024	8,176
	Plants- Itea Virginica, Sweetspire- 3 Gal.	10	EA	35	350	25	250	600
	Plants- Rosa Virginica, Virginia Rose- 3 Gal.	182	EA	35	6370	25	4550	10,920
	Plants- Symphoricarpos Albus, Snowberry 3 Gal.	6	EA	32	192	29	172	324
	Plants/ Shrubs- Myrica Pennsylvanica, Northern Bayberry	112	EA	51	5712	35	3920	9632
	Plants/ Shrubs- Rhus Glabra, Smooth Sumac	64	EA	51	3264	35	2240	5504
	Plants/ Shrubs- Sambucus Canadensis, Common Elderberry	13	EA	51	663	35	455	1118
	Plants/ Shrubs- Vaccinium Angustifolium, Lowbush Blueberry	315	EA	32	10080	22	6930	17,010
	Vines:							
	Plants- Campsis Radicans, Trumpet Creeper- 3 Gal.	10	EA	58	580	38	380	960
	Plants- Clematis Montana 'Alexander Clematis', 6'-8' Tendrils	7	EA	52	364	35	245	609
	Plants- Parthenocissus Quinquefolia, Virginia Creeper- 3 Gal.	47	EA	52	2444	35	1645	4089
	Plants- Parthenocissus Tricuspidata, Boston Ivy- 3 Gal.	32	EA	57	1824	35	1120	2944
	Perennials:							
	Plants- Allium Christopii, Persian Onion		EA					
	Plants- Astilbe Chinensis, Maggie Daley Asilbe- 2 Gal.	63	EA	18	1134	12	756	1890
	Plants- Campanula Latifolia, Sarastro Bell Flower- 2 Gal.	57	EA	18	1026	12	684	1710
	Plants- Coreopsis Lanceolata 'Golden Gain', Tickseed- 2 Gal.	19	EA	18	342	12	228	570
	Plants- Echinacea Paradoxa, Yellow Coneflower- 2 Gal.	27	EA	18	486	12	324	810
	Plants- Coreopsis Lanceolata 'Golden Gain', Tickseed- 2 Gal.	147	EA	18	2646	12	1764	4410
	Plants- Echinacea Purpurea Purple Coneflower- 2 Gal.	262	EA	18	4716	12	3144	7860





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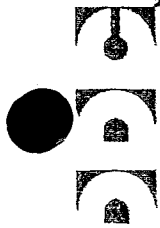
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	Plants/ Perennials- Rudbeckia Hirta 'Indian Summer', Black-Eyed Susan		EA					
	Geranium Malculatum 'Expresso', Geranium 'Expresso'- 2 Gal.	277	EA	18	4,986	12	3,324	8,310
	Salvia X Superba, Sage- 2 Gal.	57	EA	18	1,026	12	684	1,710
	Grasses:							
	Carex Grayi, Gray's Sedge	155	EA	15	2,325	10	1,550	3,875
	Deschampsia Cespitosa, Tufted Hairgrass- 3 Gal.	76	EA	24	1,824	16	1,216	3,040
	Muhlenbergia Capillaris 'Lenca' Poink Muhly Grass- 2 Gal.	64	EA	19	1,216	13	832	2,048
	Panicum Virgatum, Red Switch Grass- 3 Gal.	587	EA	24	13,608	16	9,072	22,680
	Sporobolus Heterolepis, Prairie Dropseed	259	EA	24	6,216	16	4,144	10,360
	Ferns:							
	Matteuccia Struthiopteris, Ostrich Fern- 2 Gal.	34	EA	19	646	13	442	1,088
	Polystichum Acrostichoides, Christman Fern- 2 Gal.	38	EA	19	722	13	494	1,216
	Groundcover:							
	Vinca Minor Bowles, Periwinkle- 1 Qt.	347	EA	7	2,429	4	1,388	3,817
	Bulbs:							
	Plants/ Bulbs- Lillium Alnicifolium, Tiger Lily	235	EA	5	1,175	3	705	1,880
	Shredded Bark Mulch	108	SY	25	2,625	20	2,100	4,725
	Compost (Truck- Measured)	64	CY	40	2,560	43	2,752	5,312
	Plants in Planter Pockets (per pocket)	14	EA	49	686	46	644	1,330
	Subtotal							\$183,373
02 931	VERTICAL WALL PLANTER PANTELS							
	Vertical Wall Panels (Various Sizes Cut in Field)	80	SF	10	800	9	720	1,520
	Subtotal							\$1,520
03 000	CONCRETE							
03 300	CAST IN PLACE CONCRETE							
	Concrete Pile Caps	6.5	CY	444	2886	580	3770	6,656
	Concrete Grade Beams	177	CY	444	78,588	580	102,660	181,248
	Epoxy-Coated Reinforcement		LS	Included in price of concrete				
	12" Concrete Knee Wall	6	CY	444	2,664	580	3,480	6,144





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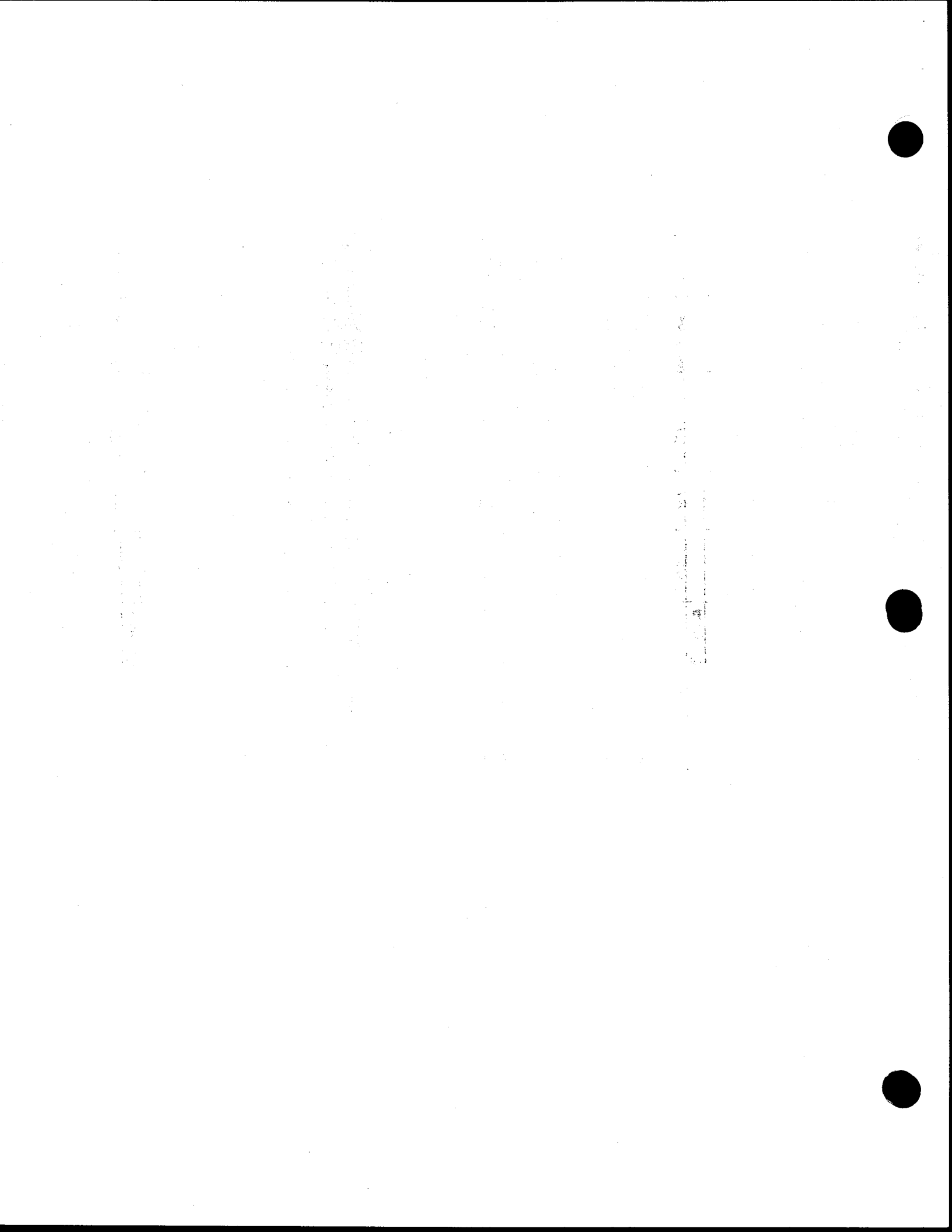
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	Vertical Concrete Footings for Green Screen Fence Posts	12	EA	215	2580	284	3408	5988
	Concrete Footings for Sloped Green Screen Fence Posts	23	EA	215	4945	284	6592	11477
	7" Structural Slab	7100	SF	1150	81650	1352	95800	177500
	Reinforced Concrete Beam over Door Openings 10"X18"	41	LF	33	1353	44	1804	3157
	6" Gravel Base (Broken Stone)	120	CY	31	3720	52	6240	9960
	Radiant Piping in Topping Slab (included with 15000)							
	Subtotal							8102,960
03 320	CONCRETE FLOOR TOPPING							
	3" Topping Slab (Excludes Boathouse)	43	CY	310	13330	522	22446	35776
	Subtotal							35776
03 700	CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS							
	Concrete (Landscape) Steps	1	CY	530	530	750	750	1280
	6"X 12" Concrete Perimeter Curb	126	LF	24	3024	34	4284	7308
	8"X 24" Concrete Curb for Railings	83	LF	19	1577	26	2158	3735
	Concrete Footing for East Plaza Wall	12	CY	444	5328	580	6960	12288
	6"-16" Concrete for East Plaza Wall	17.6	CY	444	7770	580	10150	17920
	Concrete Slab Footing for Bench	1	CY	444	444	580	580	1024
	Reinforced Concrete Steps	1	LS	31	31	52	780	1020
	Average Concrete	15	CY	31	465	52	780	1245
	Subtotal							896720
04 000	MASONRY							
04 225	AUTOCLAVED AERATED CONCRETE UNITS							
	Reinforced ACC Blocks at Exterior Walls -12" Thick	3370	SF	18	60660	28	94360	155020
	Reinforced ACC Blocks at Interior Partitions -12" Thick	1400	SF	18	25200	28	39200	64400
	Miscellaneous Grouts, Mortar, Bond Beams, etc.	1	LS					31,944
	Subtotal							825,464





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05 000	METALS							
05 450	CHAIN LINK MECHANICAL ENCLOSURE							
	Chain Link Fence Mechanical Enclosure (including Gates and Locks)	535	SF	85 ⁰⁰	45,475	120 ⁰⁰	64,200	109,675
	Chain Link Fence Horizontal Roof	345	SF	55	18,975	99	34,155	53,130
	Subtotal							\$162,805
05 500	MISCELLANEOUS METALS							
	Roof Ladder- 16' High	1	EA	3,900	3,900	5,700	5,700	9,600
	Miscellaneous Steel Angles, Lintels, Brackets, etc.	1	LS					7,680
	1 1/2" SS 2-Pipe Handrail- 34" High	14	LF	149	2,086	120	1,680	3,766
	Bollards in Boat House (interior)	10	EA	390	3,900	442	4,420	8,320
	Steel Pipe Bollard- 30" High (in boat plaza)	4	EA	390	1,560	442	1,768	3,328
	Removable Steel Pipe Bollard	3	EA	600	1,800	424	1,272	3,072
	Green Screen Steel Framing/ Mesh Panels including Swing Gates (20' High at Building/ 23' High at Sloped Screen)	9588	SF	49 ⁸⁰	469,812	48	460,224	930,036
	Security Grilles at Monitor/ Clerestory Windows	620	SF	34 ⁸⁰	21,576	42	26,040	47,616
	Subtotal							\$1,013,418
06 000	WOOD AND PLASTICS							
06 126	WOOD TRUSSES							
	Wood Truss Joists	16,990	SF	11 ⁰⁰	186,120	24 ⁰⁰	355,320	541,440
	Subtotal							\$541,440
06 200	CARPENTRY							
	Rough Framing, Blocking, Door Install	1	LS					4,736
	Subtotal							\$4,736
06 400	ARCHITECTURAL WOODWORK							
	Plywood Tops over Closets	155	SF	2 ⁴²	372	4 ⁰⁰	620	992
	Timber Framing for Roof Monitors	560	SF	8 ²⁸	4,592	11 ⁰⁰	6,160	10,752
	2" T&G Wood Plank at Roof- Flat	4530	SF	11 ⁶⁰	52,548	14	63,420	115,968





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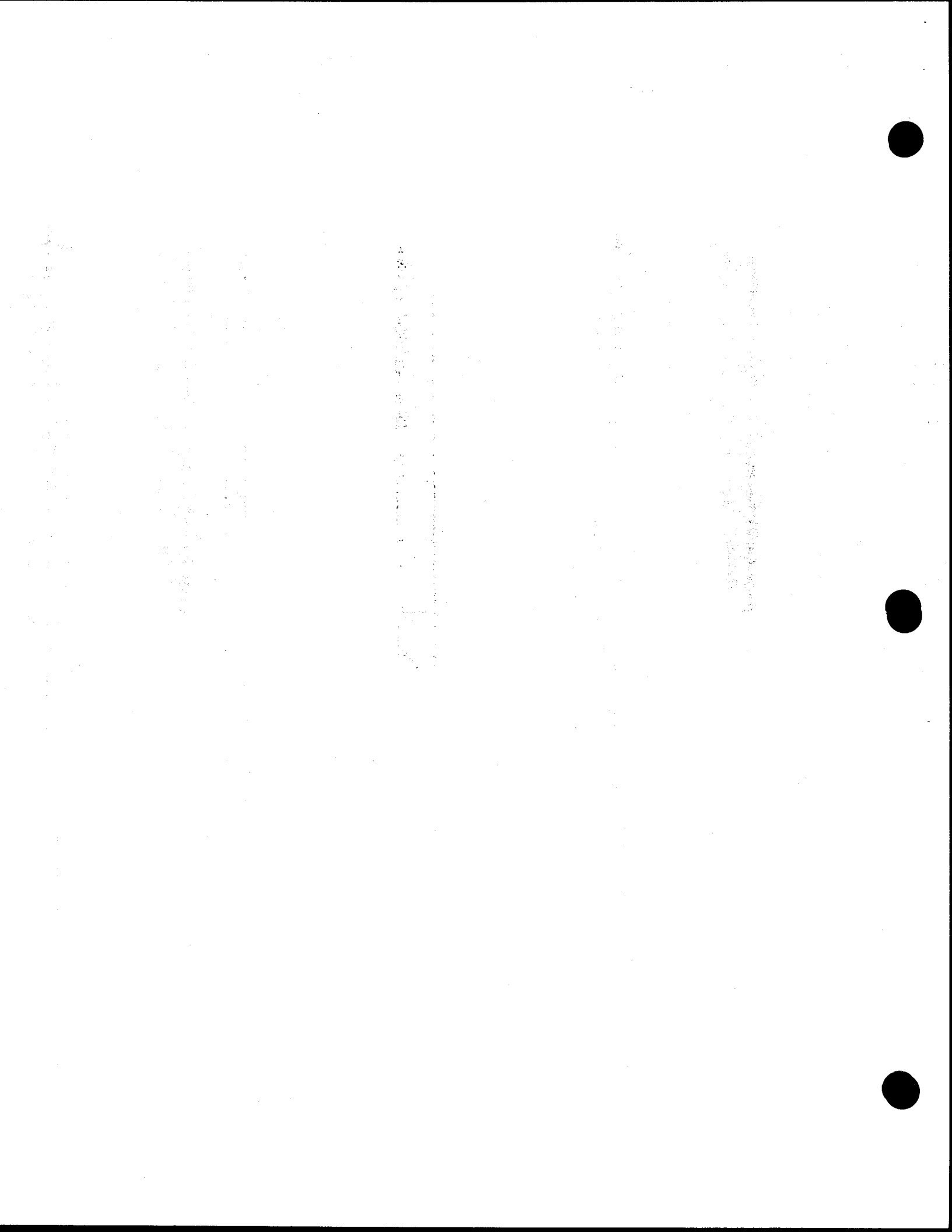
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	Ext. Plywood at Sloped Clerestory Roof	10500	SF	2.25	23,625	5.00	52,500	69,375
	Reception Desk	1	LS					16,368
	Millwork at Pantry	1	LS					10,680
	Miscellaneous Carpentry (Wood Blocking, Closet Shelves, Rods, etc.)	1	LS				16,243	5,193
	Subtotal							227,911
07 000	THERMAL AND MOISTURE PROTECTION							
07 130	SHEET MEMBRANE WATERPROOFING	7850	SF	5.00	39,275	6.00	43,500	89,375
	Waterproof Membrane (Under Slab)							883,378
	Subtotal							
07 180	TRAFFIC COATING SYSTEM	1820	SF	5.00	2,730	3.00	5,460	8,190
	Boat Storage Floor and Base	280	SF	1.50	420	3.00	1,800	1,260
	Mechanical Room Floor and Base							89,450
	Subtotal							
07 210	BUILDING INSULATION	4700	SF	2.40	11,280	2.70	12,690	23,970
	3" High Density EPS Insulation (excludes Boathouse)							
	8" High Density EPS Rigid at IRMA Roof (No Slope)							
	Vapor Barrier and 4" EPS Insulation/ CDX Composite Panel (at Roof Monitors - All Surfaces)							
	Subtotal							23,970
07 211	SPRAYED THERMAL INSULATION	3,900	SF	4.80	18,720	6.00	23,790	42,510
	Spray Thermal Insulation (12' High)							472,510
	Subtotal							
07 450	CEMENT BOARD RAINSCREEN SYSTEM	4280	SF	4.20	17,976	7.30	31,244	49,220
	Exterior Cement Rainscreen including wood furring and accessories							49,220
	Subtotal							49,220





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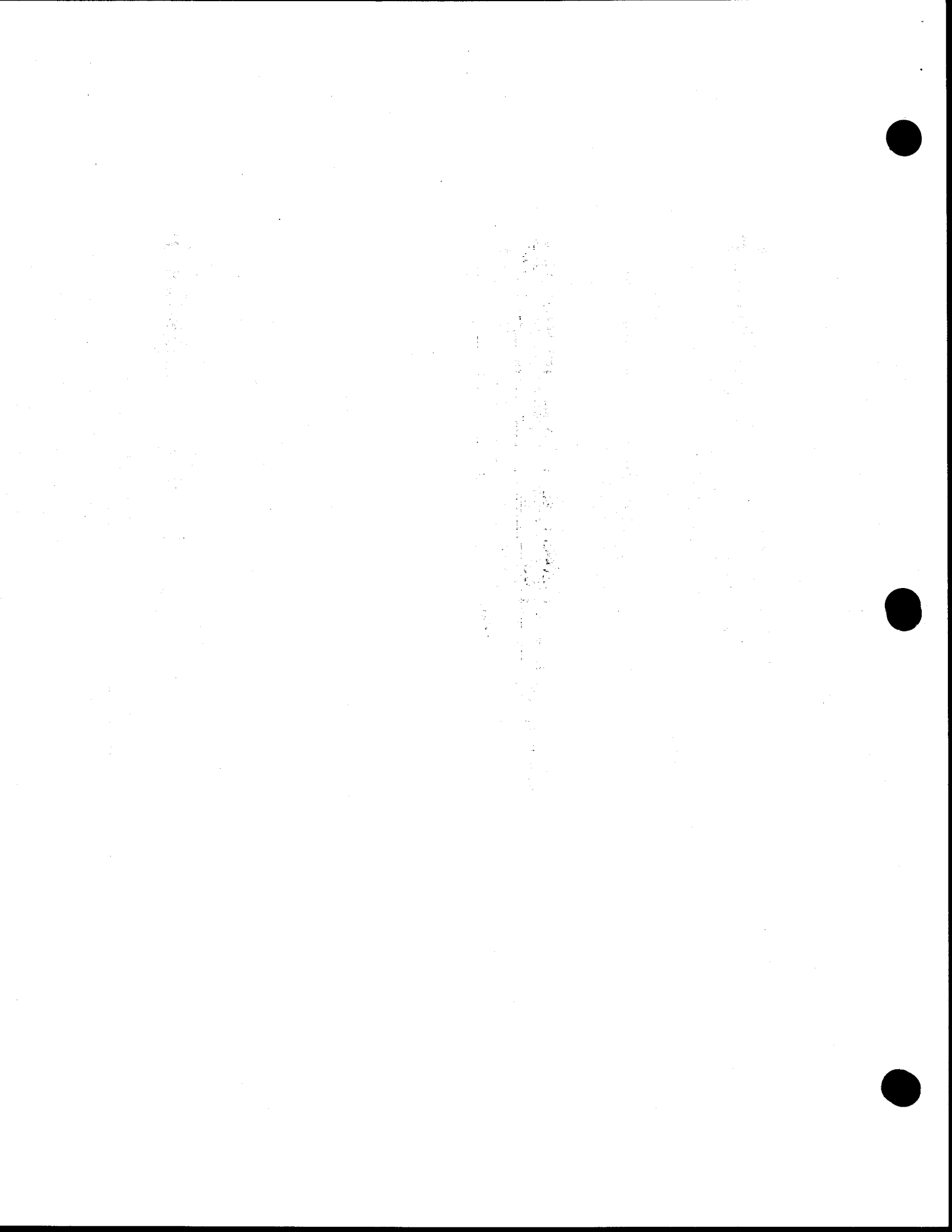
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07 541	ROOF WATERPROOFING SYSTEM Membrane (Seamless MAA w/ Fleece) including ballast and drainage mat/ filter fabric Inside of Parapets Subtotal	7820 890	SF SF	6 ¹⁰ / ₁₀ 6 ¹⁰ / ₁₀	47,702 5,129	8 ⁰⁰ / ₁₀₀ 8 ⁰⁰ / ₁₀₀	62,560 7,120	110,262 12,549 122,811
07 542	WATERPROOFING SYSTEM FOR WALLS Spray-Applied Waterproofing Spray-Applied Waterproofing at Monitors (all sides) Waterproofing Furring and other Penetrations Subtotal	5330 3040 1	SF SF LS	6 ¹⁰ / ₁₀ 6 ¹⁰ / ₁₀	32,513 18,544	8 ⁰⁰ / ₁₀₀ 8 ⁰⁰ / ₁₀₀	42,640 24,320	75,153 42,864 54,992 117,309
07 600	SHEET METAL WORK Roof Accessories (Caps, Flashings, etc.) Subtotal	350	SF	12 ¹² / ₁₀₀	4,235	16 ¹² / ₁₀₀	5,635	9,870
07 610	SHEET METAL ROOFING SS Seam Roof Subtotal	3,140	SF	28 ⁰⁰ / ₁₀₀	87,804	29 ⁰⁰ / ₁₀₀	91,060	180,864 186,864
07 700	ROOF SPECIALTIES AND ACCESSORIES Roof Hatch/ Roof Specialties Subtotal	1	EA	3,420	3,420	3,108	3,108	6,528 6,528
07 840	FIRESTOPS AND SMOKESEALS Miscellaneous Firestopping Subtotal	1	LS					25,248 25,248
07 900	JOINT SEALERS Miscellaneous Caulking and Sealants Subtotal	380	SF	8 ⁰⁰ / ₁₀₀	3,116	11 ⁰⁰ / ₁₀₀	4,180	7,296 7,296





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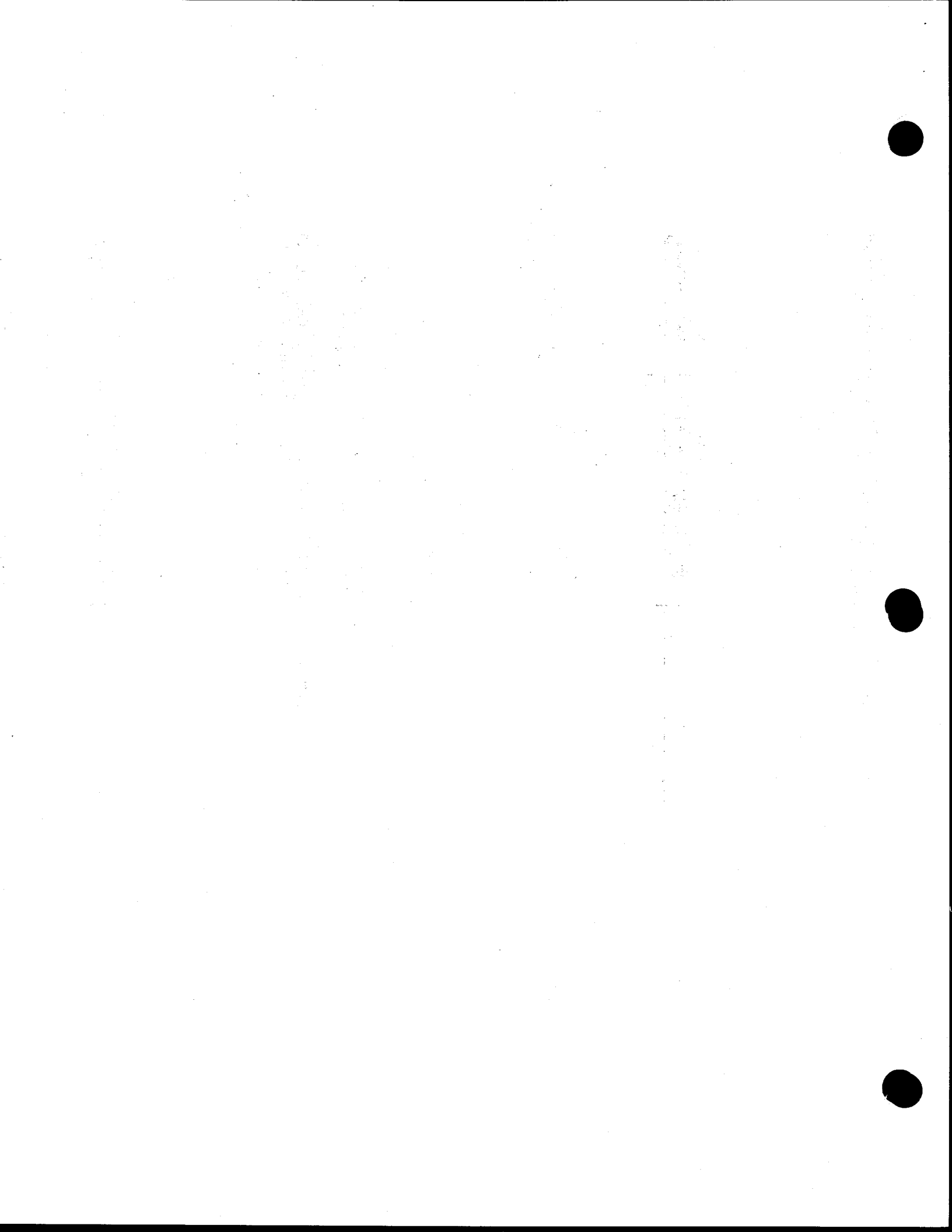
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08 000	DOORS AND WINDOWS							
08 100	STEEL DOORS AND FRAMES							
	HM Interior with Vision Panel - Single	5	EA	1,840	9,200	12.32	6,160	15,360
	HM Interior with Vision Panel - Double	2	PR	3,680	7,360	2,164	4,928	12,288
	HM Interior with Sidelight- Large Door (Vestibule)	1	EA	6,272	6,272	2,688	2,688	8,960
	HM Interior Closet Door - Single	12	EA	1,830	21,960	986	11,832	33,792
	HM Interior Closet Door - Double	5	PR	3,660	18,300	1,972	9,860	28,160
	Subtotal							89,856
08 300	ACCESS DOORS							
	Access Doors	1	LS					13,840
	Subtotal							13,840
08 330	ROLL UP DOORS							
	Roll Up Overhead Door Opaque Slats - 20'X13'	2	EA	29,120	58,240	15,680	31,360	89,600
	Roll Up Overhead Door Opaque Slats - 10'X13'	1	EA	17,470	17,470	9,410	9,410	26,880
	Motors on Roll Up Doors	3	EA	2,490	7,470	1,350	4,050	11,520
	Subtotal							128,000
08 340	ROLL UP GRILLES							
	Roll Up Mesh Doors In Screen	6	EA	5,240	31,440	28.24	16,944	48,384
	Motors on Roll Up Doors	6	EA	374	2,244	202	1,212	3,456
	Subtotal							51,840
08 410	ALUMINUM SWINGING ENTRANCE DOORS							
	Glass Entrance Door 8'-8" High - Single	2	EA	6,272	12,544	2,688	5,376	17,920
	Subtotal							17,920
08 480	ALUMINUM FRAMED FOLDING DOORS							
	Bi-Fold Glass Entrance Doors - Double	2	PR	6,140	12,880	3,160	6,320	19,200
	Subtotal							19,200





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08 520	ALUMINUM WINDOWS							
	Roof Monitor Windows (fixed and operable)	670	SF	68	45,560	54	36,180	81,740
	Operable Crank Groups for Roof Monitors	20	EA	210	4,200	140	2,800	7,000
	Operable Windows and Motors	20	EA	240	4,800	160	3,200	8,000
	Aluminum/ Glass Windows	440	SF	68	29,920	54	23,760	53,680
	Subtotal							150,420
08 700	FINISH HARDWARE							
	Finish Hardware	24	EA	1,030	24,720	442	10,608	35,328
	Subtotal							35,328
08 800	GLASS AND GLAZING							
	HM Glazed Transom Panels 6'X2'	2	EA	1,830	3,660	286	1,972	5,632
	Aluminum/ Glass Door Sidelites	7	EA	3,577	25,039	1,927	13,489	38,528
	Subtotal							44,160
09 000	FINISHES							
09 250	GYPSONUM DRYWALL							
	Gypsum Board Partitions (Stud/ Gyp./ Gyp.)	4990	SF	16 ⁰⁰	79,840	19 ⁰⁰	94,810	174,650
	Gypsum Board Partitions (Double Stud/ Gyp./ Gyp.)	420	SF	17 ⁰⁰	7,140	18 ⁰⁰	7,570	14,710
	Gypsum Board Furring at ACC Walls (12' High)	3,860	SF	3 ⁵⁰	13,510	4 ⁰⁰	16,212	29,722
	Batt Insulation		SF					
	Gypsum Board Ceiling	225	SF	8 ⁰⁰	1,800	11	2,475	4,275
	Gypsum Board Fascia	85	SF	18 ⁰⁰	1,530	33	2,805	4,335
	Gypsum Board Light Cove	N/A	SF					
	Subtotal							233,557
09 310	CERAMIC TILE							
	Ceramic Tile Floor	355	SF	8	2,840	13	4,615	7,455
	Ceramic Tile	45	LF	5	225	8	360	585
	Ceramic Tile Wall - 8' High	790	SF	9	7,110	15	11,850	18,960
	Subtotal							22,000





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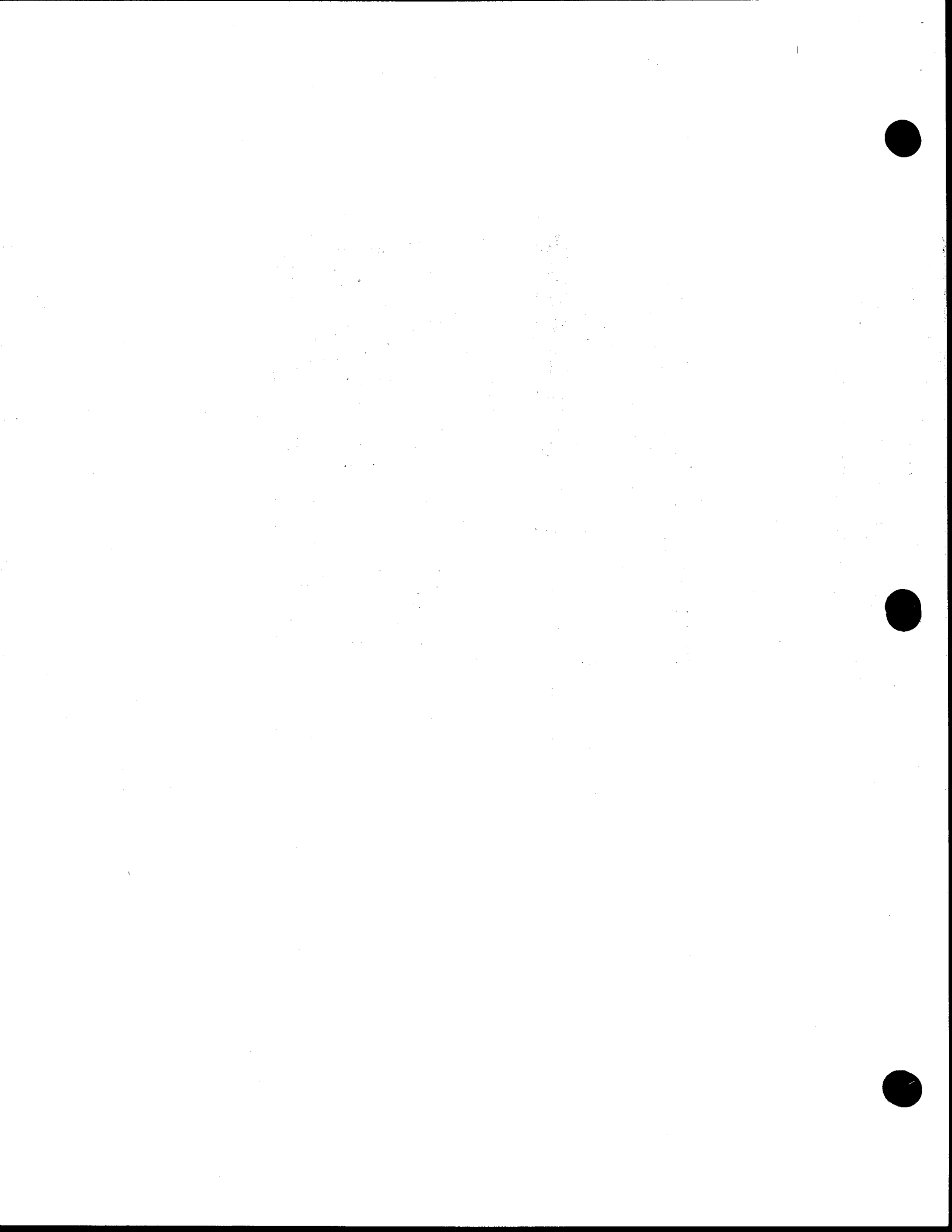
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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
09 510	ACOUSTIC PANEL CEILINGS ACT Ceiling	185	SF	8 ⁰⁰	1,480	13 ⁰⁰	2,405	3,885 8,385
	Subtotal							
09 660	RESILIENT TILE FLOORING Rubber Floor Rubber Base	3,445 750	SF LF	5 ⁰⁰ 3 ⁰⁰	18,225 2,250	8 ⁰⁰ 4 ⁵⁰	29,160 3,375	47,385 5,625 853,010
	Subtotal							
09 681	CARPET Carpet	145	SY	30	435	44	638	1,073 8,473
	Subtotal							
09 900	PAINTING AND FINISHING Paint Gyp. Walls Paint Gyp. Ceilings Paint Doors and Frames Stain Wood-Deck and Trusses	14,570 2,340 31 1	SF SF LVS LS	0 ⁷⁰ 0 ⁸⁰ 40	10,199 1,872 1,240	1 ⁵⁰ 1 ⁸⁰ 88	21,855 4,212 2,728	32,054 6,084 3,968 119,200 516,306
	Subtotal							
10 000	SPECIALTIES							
10 100	VISUAL DISPLAY BOARDS Marker Board and Bulletin Board	1	LS					82,560 57,560
	Subtotal							
10 260	CORNER GUARDS Corner Guards	6	EA	46	276	76	456	732 8,732
	Subtotal							
10 400	SIGNAGE Signage and Graphics	1	LS					86,400





NEW YORK CITY DEPARTMENT OF
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Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	Exterior Building Sign Type X	1	LS					52,600
	Subtotal							52,600
10 500	LOCKERS							
	Metal Lockers, Half Height	14	EA	162	2268	108	1512	3780
	Subtotal							3780
10 522	FIRE EXTINGUISHERS AND CABINETS							
	Fire Extinguishers and Cabinets	2	LS	423	846	294	588	1434
	Subtotal							1434
10 800	TOILET ACCESSORIES							
	Individual Mirror	3	EA	106	318	86	258	576
	Toilet Tissue Dispenser	4	EA	197	788	161	644	1432
	Sanitary Napkin Disposal	3	EA	228	678	184	552	1230
	Sanitary Napkin Vendor	3	EA	218	654	179	537	1191
	Paper Towel Dispenser/ Disposal	4	EA	190	760	156	624	1384
	Toilet Seat Cover Dispenser	3	EA	183	549	150	450	999
	Soap Dispenser	3	EA	127	381	103	309	690
	Grab Bar 24"	3	EA	50	150	40	120	270
	Grab Bar 36"	3	EA	42	126	35	105	231
	Coat Hook	4	EA	53	212	43	172	384
	Shower Cubicle (with seat, rod, bar and all accessories)	1	EA	535	535	438	438	973
	Diaper Changing	1	EA	317	317	259	259	576
	Subtotal							9936
11 000	EQUIPMENT							
11 132	PROJECTION SCREEN							
	Projection Screen (manual)	1	LS					26,400
	Subtotal							26,400





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11 450	APPLIANCES							
	Refrigerator	1	EA					2,688
	Microwave	1	EA					576
	Subtotal							3,264
12 000	FURNISHINGS							
12 480	FLOOR MATS AND FRAMES							
	Recessed Floor Mat at Vestibule	84	SF	54 ⁰²	4536 ⁰²	66 ⁰²	5544 ⁰²	819080
	Subtotal							819080
13 000	SPECIAL CONSTRUCTION							
13 650	PHOTOVOLTAIC SYSTEM							
	Solar Panels		EA					
	225 Amp AC Combiner Panel		EA					
	SB Inverters (Including Nema 3R DC Disconnects)		EA					
	Nema 3R AC Disconnects		EA					
	12x6x6 Nema 1 Pull		EA					
	Nema 3R Pass-Thru Box		EA					
	Nema 3R Pull Boxes		EA					
	2 1/2" GRC		LF					
	3/4" GRC		LF					
	4/0 AWG		LF					
	6 AWG		LF					
	10 AWG		LF					
	DAS System		LS					
	Miscellaneous Accessories		LS					
	Testing/ Balancing		LS					
	Subtotal							819972





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13 845	RESOURCE MONITORING DISPLAY Building Monitoring System (includes Wall-Mounted Monitor)		LS					
	Subtotal							\$149,072
15 000	MECHANICAL							
15 000	SPECIAL REQUIREMENTS FOR MECHANICAL AND ELECTRICAL (included w/ 15600)							
15 050	SEISMIC RESTRAINTS FOR ISOLATED AND UNISOLATED EQUIPMENT (Included w/ 15810)							
15 100	GENERAL PROVISIONS FOR PLUMBING							
	Water Heater:							
	WH - 40 Gal.	1	EA					8428
	WH - 20 Gal.	1	EA					8,064
	Circ. Pump - 20 GPM	1	EA					1,485
	Domestic Water (Potable Water):							
	2" Dia.	90	LF					6739
	1 1/2" Dia.	100	LF					5,606
	1" Dia.	30	LF					1,031
	3/4" Dia. - 1/2" Dia.	610	LF					26,497
	Domestic Water (Not Potable Water):							
	2" Dia.	120	LF					10,650
	1 1/2" Dia.	70	LF					5,076
	1" Dia.	110	LF					5,097
	3/4" Dia.	190	LF					9,818
	1/2" Dia.	20	LF					665
	1 1/2" RPZ	1	EA					5,632
	Water Meter Valve Ass. 1 1/2" Dia.	1	EA					4,557
	Sanitary Waste And Vent (Buried):							
	4" Dia.	210	LF					31,696





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	2" Dia.	240	LF					22,093
	1 1/2" Dia.	1	LF					
	Sanitary Waste And Vent (Above):							
	4" Dia.	50	LF					1,724
	3" Dia.	1	LF					
	2" Dia. and smaller	260	LF					22,815
	4" House Trap	1	EA					1,062
	Sanitary & Storm Clean-Out Storm (Above):	3	EA					4,173
	2 1/2" Dia.	1	LF					
	2" Dia.	240	LF					20,224
	System ID / Valve Tags	1	LS					4,864
	Excavation, Backfill, Cutting & Patching	1	LF					
	Clean-Up Requirements	1	LS					6,656
	Misc Job Expenses	1	LS					32640
	Subtotal							225,049
15 110	PIPE, TUBE AND FITTINGS FOR PLUMBING WORK (Included w/ 15100)							
15 120	VALVES FOR PLUMBING WORK							
	Plumbing Valves And Specialties (All Systems)	1	LS					28,272
	Site Piping, Valves, Gates	1	LS					22,272
	Subtotal							50,544
15 130	HANGERS AND SUPPORTS FOR PLUMBING WORK (Included w/ 15100)							
15 150	INSULATION FOR PLUMBING WORK							
	Potable & Non-Potable Water Pipe	1100	LF					23,690
	Storm Water Horizontal Pipe	240	LF					5,120
	Subtotal							28,810





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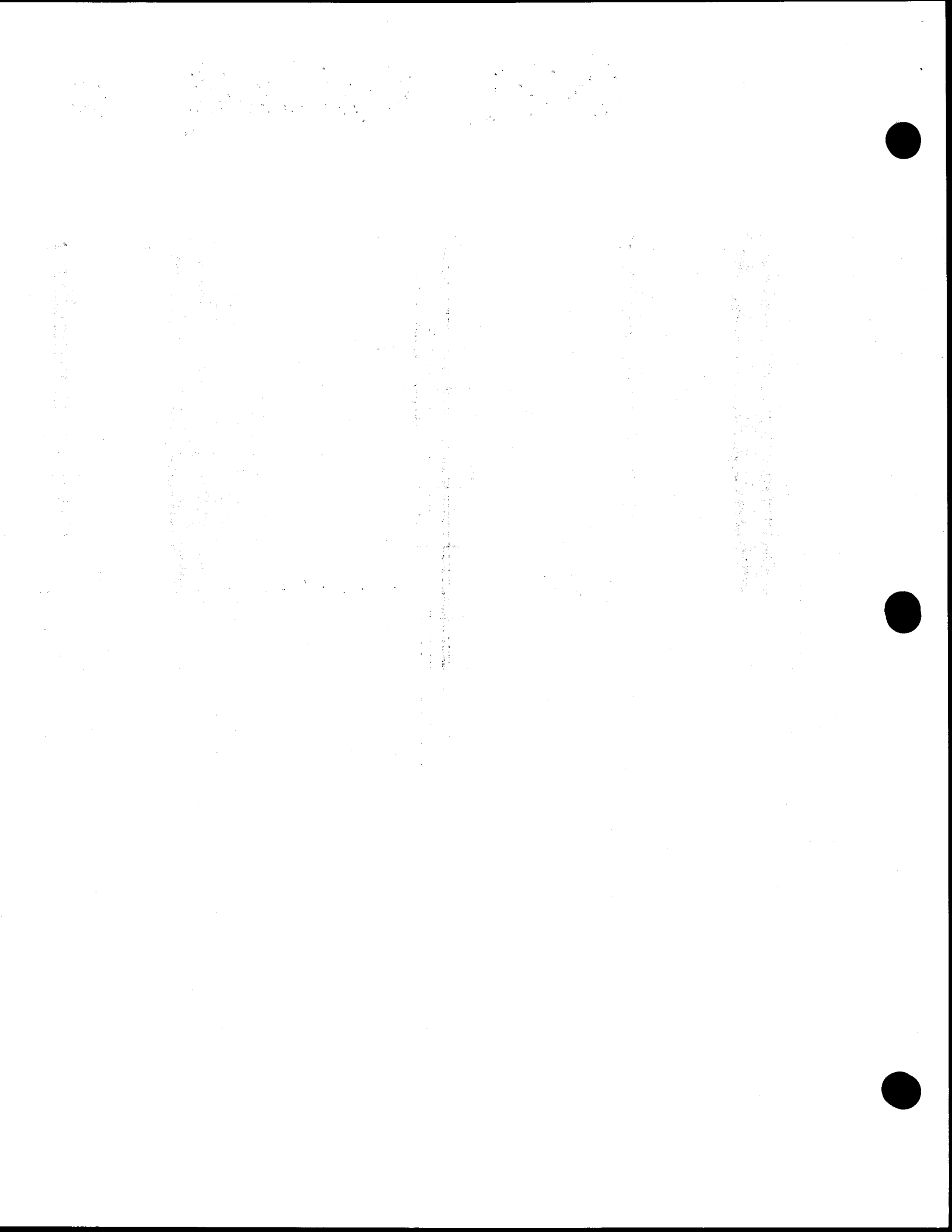
Project: Bronx River Boathouse
Location: 1041 East 172nd Street, Bronx, NY 10460
Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
15 160	PLUMBING EQUIPMENT, SPECIALTIES AND ACCESSORIES							
	Roof Drains 2" Dia.	12	EA					27,904
	Floor Drains 3" Dia.	10	EA					23,680
	Trench Drains (Plumbers Connection Only)	3	EA					2,789
	Vtr 4" Dia.	4	EA					3,574
	Hose Bibbs	5	EA					3,712
	3/4" NFWH	-	EA					
	3/4" NFHB	2	EA					1,817
	Subtotal							64,476
15 300	PLUMBING FIXTURES AND TRIMS							
	Plumbing Fixtures:							
	Water Closet	4	EA					3,705
	Water Closet Flush Valve Wall Hang, Handicapped	4	EA					2,893
	Lavatory	1	EA					3,200
	Lavatory Wall Hang, Handicapped	3	EA					9,600
	Sink (Boat House)	1	EA					2,061
	Shower	2	EA					6,400
	Service Sink	1	EA					4,557
	Pantry Sink	1	EA					2,368
	Electrical Water Cooler (ADA)	1	EA					3,507
	Fixtures Rough-In	14	EA					5,130
	Fixture Distribution and Handling	14	LS					5,752
	Subtotal							48,978
15 320	DOMESTIC HOT WATER HEATERS (Included w/ 15100)							
15 380	TESTING AND ADJUSTMENTS							
	Clean, Flush and Test	1	LS					9,472
	Subtotal							9,472





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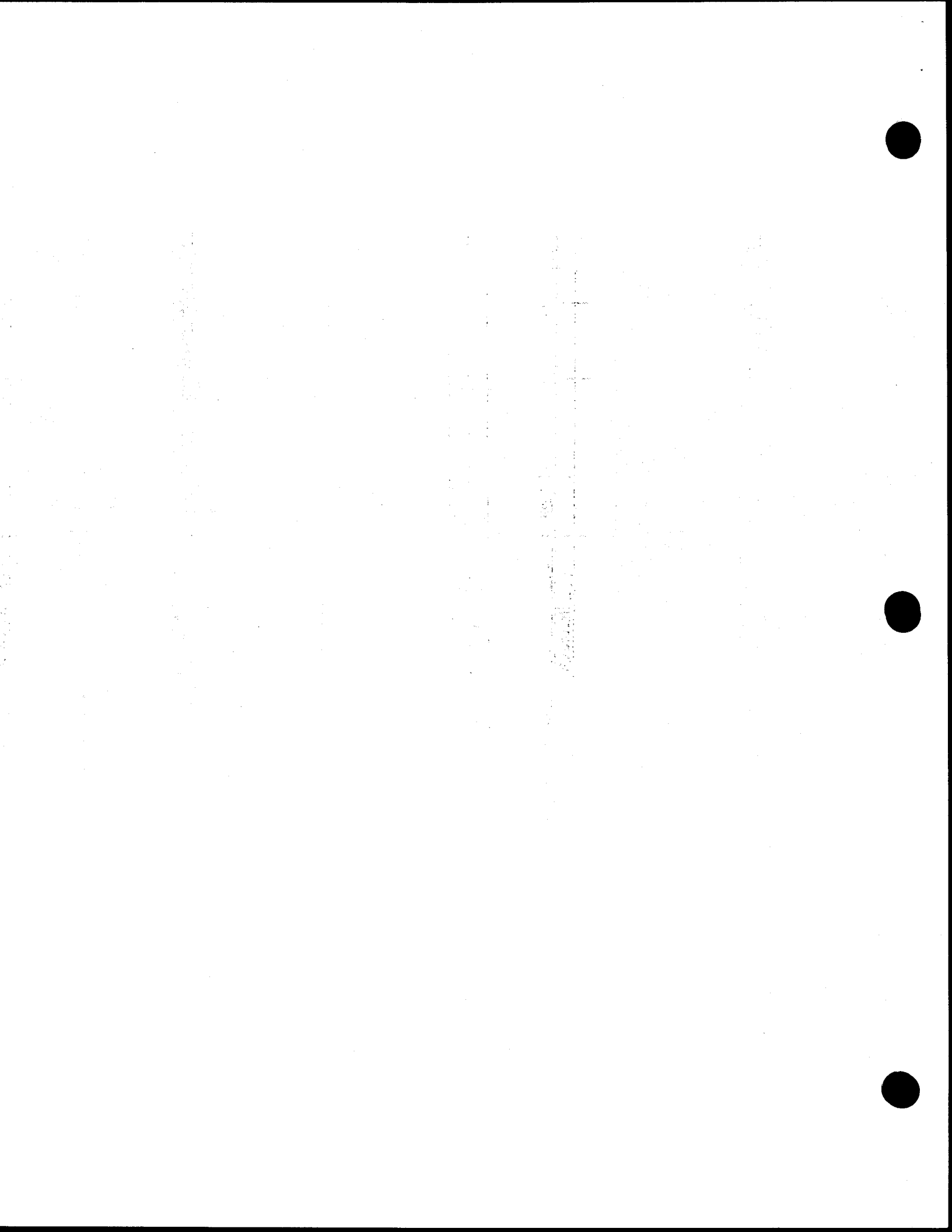
Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
15 390	MANUFACTURERS FOR PLUMBING WORK (Included w/ 15100)							
15 452	DOMESTIC HOT WATER TEMPERATURE MAINTENANCE SYSTEM (Included w/ 15100)							
15 600	GENERAL PROVISIONS FOR MECHANICAL WORK							
	GWS/R:							
	3" Dia (Supply / Return) - HDPE		LF					
	1-1/2" Dia (Bypass) to Storm Drainage System		EA					
	Gate Valves - 3" Dia		EA					
	Gate Valves - 1-1/2" Dia		EA					
	Balancing Valves - 1-1/2" Dia		EA					
	Control Valves - 1-1/2" w/ Aquastat		EA					
	Thermometers and Gages		EA					
	ET-2 Expansion Tank (Heat Exchanger Loop) - 21 Gal.		EA					
	Pipe Sleeves - 3"		EA					
	Excavation & Backfill (excluding Sheathing)		LF					
	Controls		LS					
	Clean, Flush and Test		LS					
	Miscellaneous System Requirements		LS					
	Expansion Tanks:							
	ET-1 Expansion Tank (Heat Pump Loop) - 22 Gal		EA					
	Air Separator:							
	AS-1 Air Separator (Heat Pump Loop)		EA					
	AS-2 Air Separator (Heat Exchanger Loop)		EA					
	Water Storage Tanks:							
	ST-1 (Chilled Water System) - 120 Gal		EA					
	ST-2 (Hot Water System) - 120 Gal		EA					
	Equipment Hook-Up:							
	ACU-1		EA					





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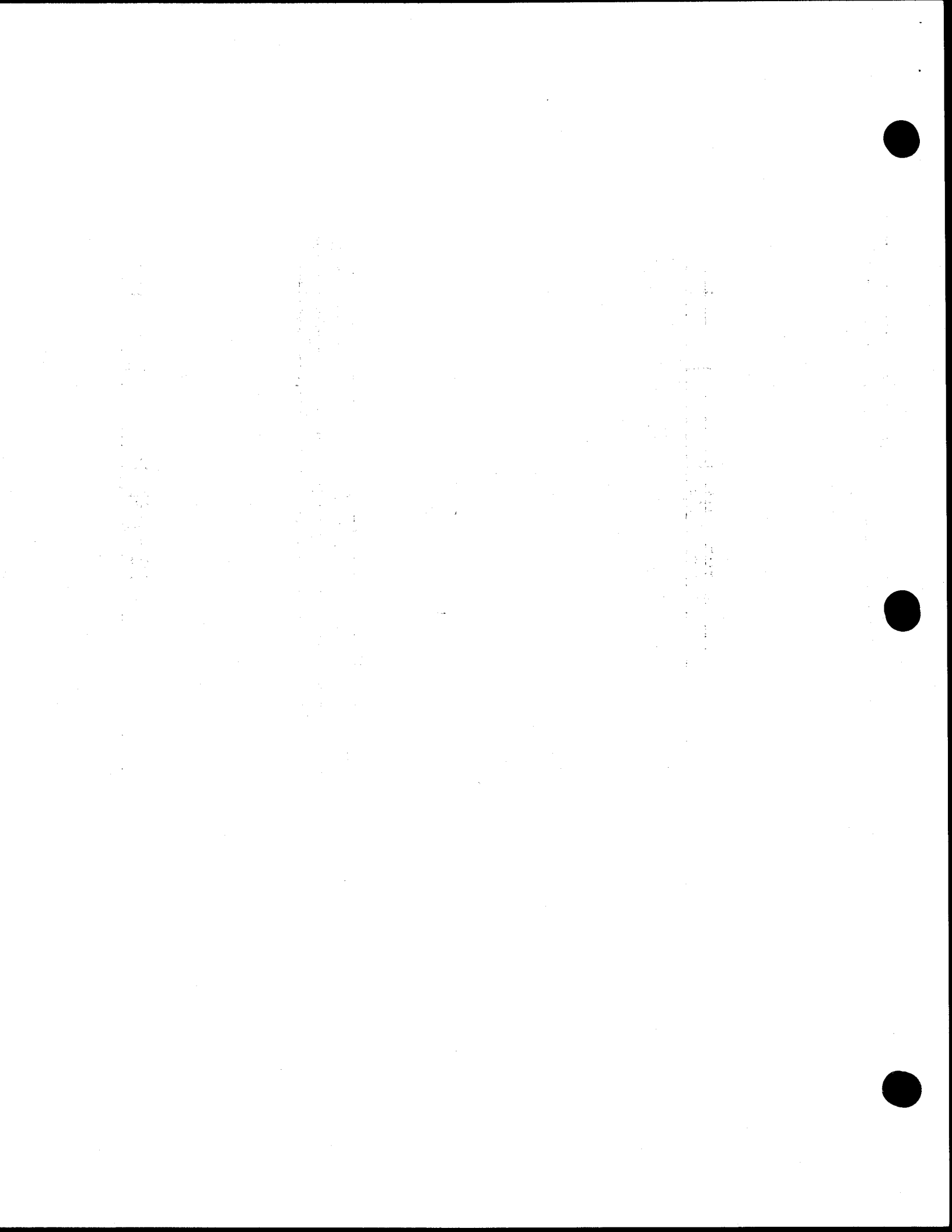
Bidder:

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
	Air Side System:							
	Gal. Steel Duct Work		LBS					
	Air Devices		EA					
	Volume Dampers		EA					
	Backdraft Damper		EA					
	FD/AD		SF					
	Smoke Detector (AHU)		EA					
	Acoustical Lining		SF					
	VAV Boxes - 200 CFM		EA					
	VAV Boxes - 400 CFM		EA					
	VAV Boxes - 700 CFM		EA					
	VAV Boxes - 1200 CFM		EA					
	VAV Boxes - 1800 CFM		EA					
	VAV Boxes - 2400 CFM		EA					
	VAV Boxes - 3500 CFM		EA					
	Sound Attenuator at VAV Boxes		EA					
	SA-1, SA-2 Sound Attenuator at AHU Unit		CFM					
	HVAC System Control:							
	ACU-1		EA					
	HVAC Fans		EA					
	Hot Water Unit Heater		EA					
	Cabinet Unit Heaters		EA					
	Heat Pump		EA					
	Water Pump		EA					
	Plate & Frame Heat Exchanger		EA					
	CO2 Sensor		EA					
	Zone Control (including Room & Radiant Thermostat, etc.)		EA					
	Miscellaneous Dampers		LS					
	Miscellaneous Control Requirements		LS					
	Smoke Purge		LS					
	Steel Support (HVAC)		LS					
	VFDs		HP					





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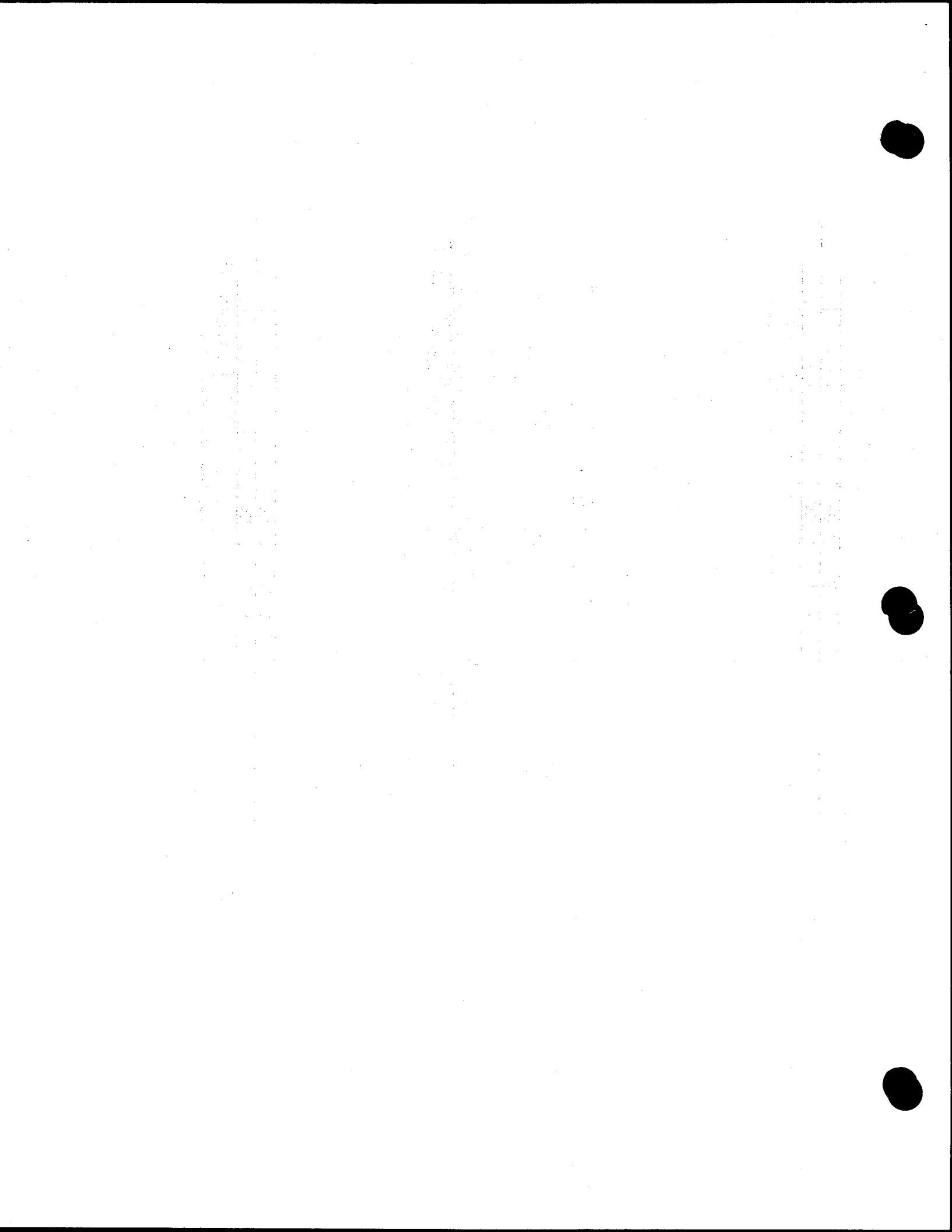
Bidder:

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
	Equipment Concrete Pads & Curb (AHU)		LS					
	Cutting, Patching & Fire Stopping		LS					
	Flexible Connection		LS					
	System ID / Valve Tags		LS					
	Miscellaneous		LS					
	Subtotal							\$ 392,600
15 710	HEAT EXCHANGERS							
	Plate & Frame Heat Exchanger HX-1, 2 - 90 GPM		EA					
	Plate & Frame Heat Exchanger Equipment Hook-Up		EA					
	Subtotal							\$ 12,800
15 735	PUMPS FOR MECHANICAL WORK							
	Water Pumps:							
	P-1, 2 - 90 GPM, 3 HP (Well Water), VFD		EA					
	Hook-Up Pumps		EA					
	P-3, 4 - 90 GPM, 1 HP (Heat Pump Loop), VFD		EA					
	P-5, 6 - 66 GPM, 3/4 HP (AHU Loop), VFD		EA					
	P-7, 8 - 36 GPM, 1/2 HP (Radiant Loop), VFD		EA					
	P-9, 10 - 90 GPM, 3 HP (HX Water Loop), VFD		EA					
	Heat Pumps:							
	HP-1, 2, 3, 4 - 22.5 GPM, 111 MBH, (2) Compressor, 208V		EA					
	Water Pump Equipment Hook-Up		EA					
	Heat Pump Equipment Hook-Up		EA					
	Subtotal							\$ 38,400
15 745	OUTDOOR AIR HANDLING UNITS							
	AHU-1 - 8400 CFM, 7.5 HP, R.F. 7.5 HP, Cooling/ Heating, 328 MBH, 65.4 GPM		EA					
	Subtotal							\$ 87,060
15 748	COILS (included w/ 15600)							





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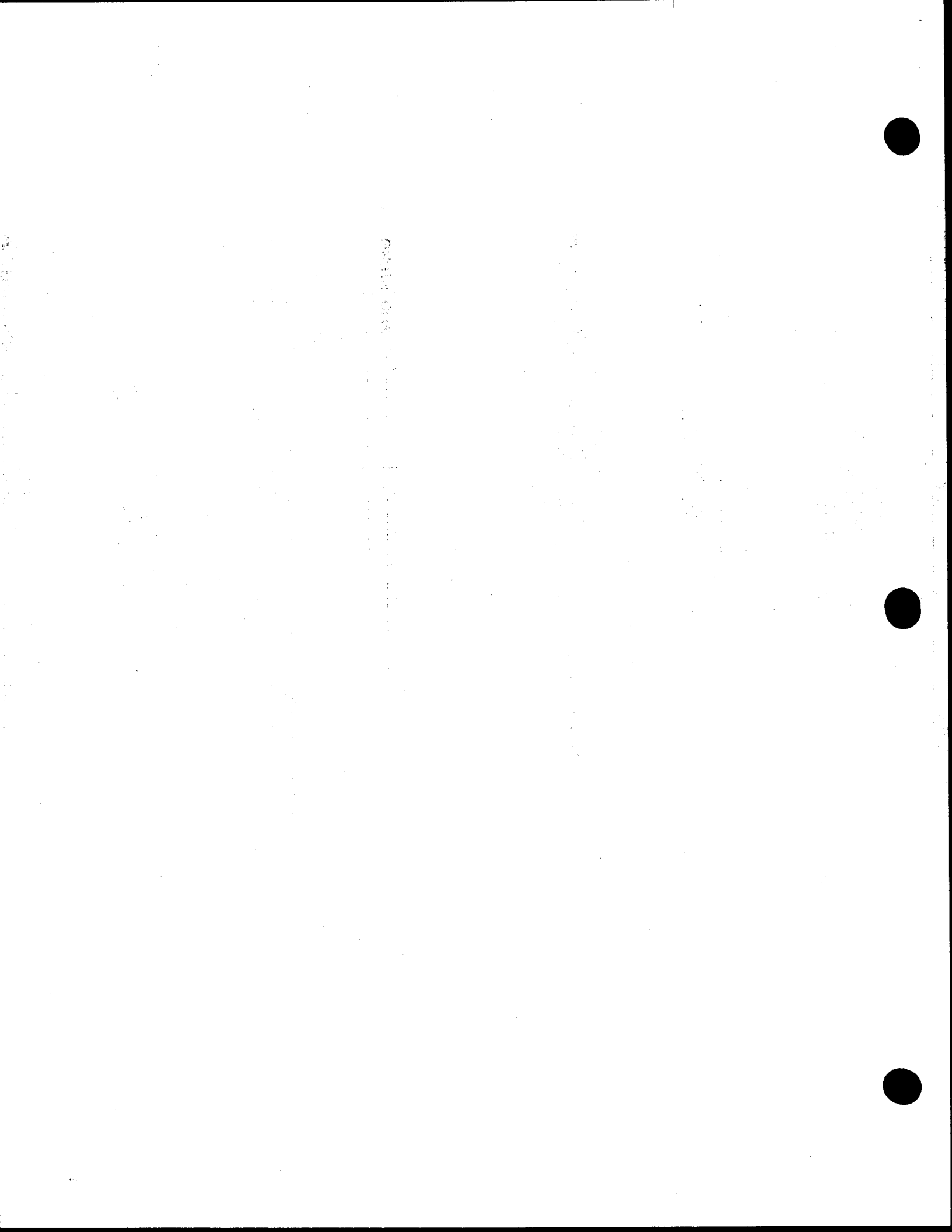
Bidder:

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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
15 750	AIR FILTERS (Included w/ 15600)							
15 754	DUCT TERMINAL UNITS (Included w/ 15600)							
15 760	FANS							
	EF-1, 2 - 150 CFM, 1/6 HP		EA					
	EF-3 - 50 CFM, 1/6 HP		EA					
	HVAC Fans Equipment Hook-Up		EA					
	Subtotal							\$5,120
15 770	UNIT HEATERS							
	HWH-1, 2 - 2000 CFM, 8.22 GPM, 1/3 HP		EA					
	Hot Water Unit Heater Equipment Hook-Up		EA					
	Subtotal							\$3,840
15 771	CABINET HEATERS							
	CUH - 8.1 MBH, 230 CFM, 120 V, 1/15 HP		EA					
	Cabinet Unit Heaters Equipment Hook-Up		EA					
	Subtotal							\$5,120
15 774	RADIANT HEATING HYDRONIC PIPING							
	Radiant Heat Manifold:							
	Manifold 1 - 58534 BTUH, 10 LOOPS		EA					
	Manifold 2 - 63346 BTUH, 13 LOOPS		EA					
	Manifold 3 - 15599 BTUH, 4 LOOPS		EA					
	Radiant Heat Manifold Equipment Hook-Up		EA					
	Subtotal							\$25,600
15 801	MECHANICAL SPECIALTIES (Included w/ 15600)							





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15 810	VIBRATION ISOATION Vibration Isolation & Seismic Bracing		LS					\$19,200
	Subtotal							
15 815	WATER TREATMENT AND CLEANING Water Treatment System (Shot Feeder) Glycol Feed (Shot Feeder)		EA EA					\$6,400
	Subtotal							
15 820	PIPING FOR MECHANICAL GWS/R: 3" Dia 2 1/2" Dia 2" Dia 1 1/2" Dia 1 1/4" Dia 3/4" Dia Radiant Loop S/R 3/4" Dia AVG Condensate Drain Pipe & Specialties		LF LF LF LF LF LF LF LS					\$371,200
	Subtotal							
15 830	VALVES FOR MECHANICAL (included w/ 15600)							
15 840	SHEET METAL DUCTWORK (included w/ 15600)							
15 850	INSULATION FOR MECHANICAL WORK Pipe Duct		LF SF					\$64,000
	Subtotal							
15 860	HEAT PUMPS (included w/ 15600)							





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15 870	EARTH COUPLING WELLS (refer to Article 1.45 of the Addendum to General Conditions for more information)							
	Part A-1 Allowance as per Article 1.45							
	Part A-2 Allowance as per Article 1.45							
	Part B		LS					
	Part C		LS					
	Subtotal							\$ 89,600
15 900	TESTING AND BALANCING							
	Testing and Balancing		LS					
	Subtotal							\$ 19,880
15 960	DIRECT DIGITAL CONTROL SYSTEM (Included w/ 15600)							
16 000	ELECTRICAL							
16 000	GENERAL PROVISIONS FOR ELECTRICAL WORK							
	Switchgear:							
	Service End Box		EA					
	800A Main Distribution Panel		EA					
	400A Panel		EA					
	225A Panel		EA					
	800A Service Disconnect Switch		EA					
	400A Disconnect Switch		EA					
	Meter & CT Cabinet		EA					
	Panel Mounting Assemblies		EA					
	Feeders:							
	4" PVC		LF					
	4" Conduit		LF					
	2" Conduit		LF					
	3/4" Conduit		LF					
	500 MCM		LF					
	300 MCM		LF					





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	3/0 AWG		LF					
	2 AWG		LF					
	3 AWG		LF					
	4 AWG		LF					
	6 AWG		LF					
	10 AWG		LF					
	Branch Circuit Requirements:							
	Single Receptacles, WP		EA					
	Duplex Receptacles		EA					
	Floor Duplex Receptacle		EA					
	GFI Receptacles		EA					
	Quad Receptacles		EA					
	Single Pole Light Switches		EA					
	3-Way Light Switches		EA					
	Standard Dimmer		EA					
	Three Way Dimmer		EA					
	Occupancy Sensor		EA					
	Dedicated Duplex REC		EA					
	Daylight Sensor - Photocell		EA					
	Switching Power Module and Bus Supply		EA					
	Door Bell		EA					
	Door Release w/ Intercom		EA					
	Control Panel for Daylight Harvesting		EA					
	Time Clock Panel		EA					
	Wiremold		LF					
	Wiremold Coupling		EA					
	Wiremold End Fitting		EA					
	1" PVC		LF					
	2 1/2" Conduit		LF					
	1" Conduit		LF					
	3/4" Conduit		LF					
	12 AWG		LF					

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for the company's financial health and for providing a clear audit trail.

2. The second part of the document outlines the specific procedures for recording transactions. It details the steps from initial receipt to final entry in the accounting system, ensuring that all necessary information is captured and verified.

3. The third part of the document addresses the role of the accounting department in monitoring and controlling the company's financial resources. It highlights the need for regular reviews and reports to management to ensure that the company is operating within its budget and financial goals.

4. The fourth part of the document discusses the importance of maintaining up-to-date financial statements. It explains how these statements provide a snapshot of the company's financial position at any given time and are essential for decision-making by management and investors.

5. The fifth part of the document concludes by summarizing the key points discussed and reiterating the commitment to transparency and accuracy in all financial reporting.





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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
	Mechanical Requirements:							
	VFDs (F.B.O.)		EA					
	30A Nema 4X Disconnect		EA					
	VAV Boxes		EA					
	Electric Water Cooler		EA					
	Hot Water Heaters		EA					
	Cabinet Unit Heaters		EA					
	Air Handling Unit		EA					
	Exhaust Fans		EA					
	Well Pumps		EA					
	Pumps		EA					
	Water Tank Pump		EA					
	Heat Pumps		EA					
	1 1/4" PVC		LF					
	1" PVC		LF					
	1" Conduit		LF					
	4 AWG		LF					
	8 AWG		LF					
	10 AWG		LF					
	3/4" Conduit		LF					
	12 AWG		LF					
	Intercom System		LS					
	Clock System (Wiring Only)		EA					
	Cutting and Patching		LS					
	Electrical Requirements for Supplemental Heating		LS					
	Misc Job Expenses		LS					
	Subtotal							\$632,820
16 111	RACEWAYS AND INSTALLATION COMPONENTS (included w/ 16000)							
16 123	WIRE AND CABLE (600 VOLTS) (included w/ 16000)							





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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
16 141	WIRING DEVICES AND INSTALLATION COMPONENTS (Included w/ 16000)							
16 170	GROUNDING AND BONDING (Included w/ 16000)							
16 180	POWER, CONTROL AND ALARM WIRING SYSTEM (Included w/ 16000)							
16 426	DISTRIBUTION SWITCHBOARDS (Included w/ 16000)							
16 440	SAFETY AND DISCONNECT SWITCHES (Included w/ 16000)							
16 470	PANELBOARDS- LIGHTING AND DISTRIBUTION (Included w/ 16000)							
16 510	LIGHTING FIXTURES							
	Lighting Fixture Type "R1"		EA					
	Lighting Fixture Type "R4"		EA					
	Lighting Fixture Type "R5"		EA					
	Lighting Fixture Type "R6"		LF					
	Lighting Fixture Type "R6A"		EA					
	Lighting Fixture Type "R7"		EA					
	Lighting Fixture Type "R8" & "R8A"		EA					
	Lighting Fixture Type "R9"		EA					
	Lighting Fixture Type "R10"		LF					
	Lighting Fixture Type "R11" & "R11A"		LF					
	Exit Lights		EA					
	Emergency Ballasts		EA					
	3/4" Conduit		LF					
	12 AWG		LF					
	Subtotal							329,000





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

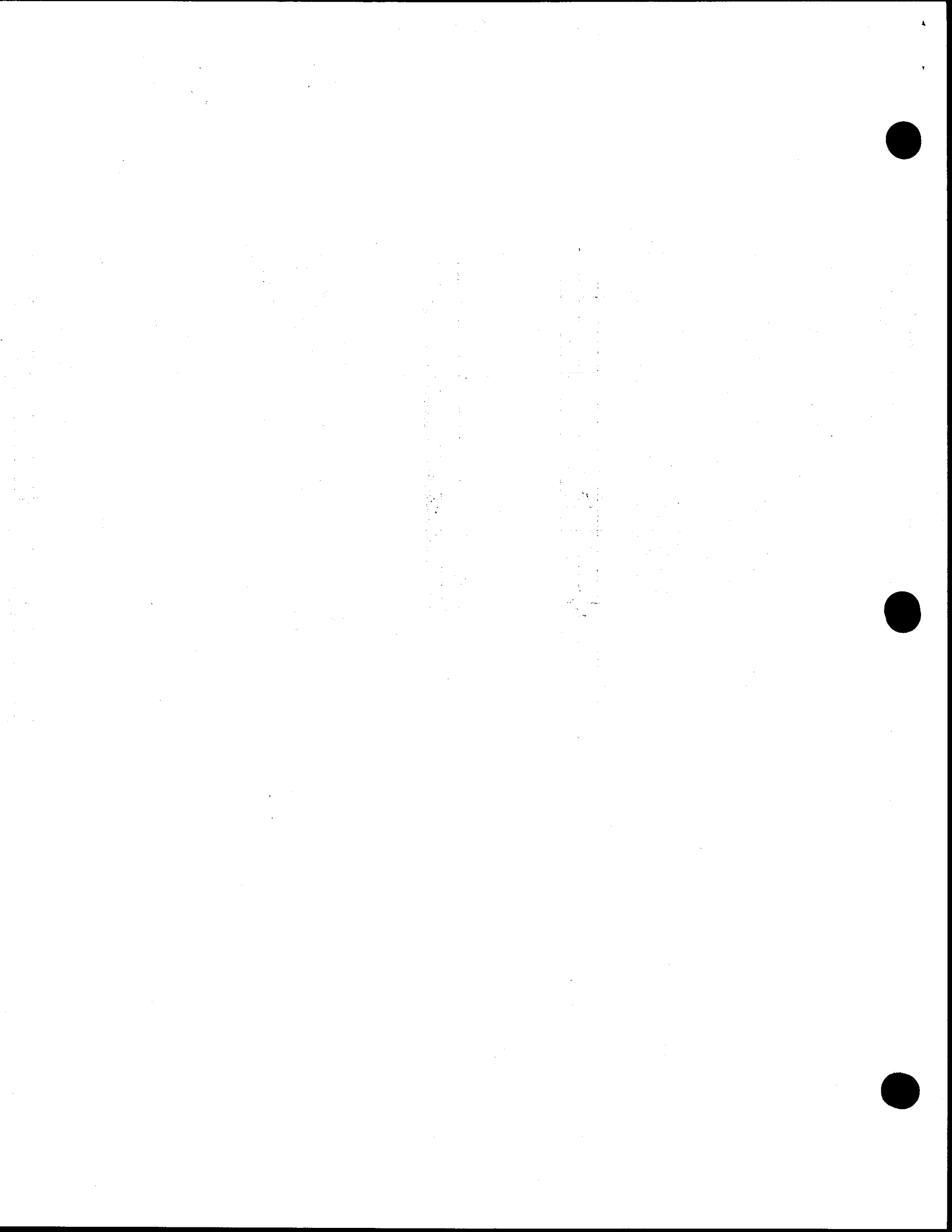
Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
16 721	FIRE ALARM AND SMOKE DETECTION SYSTEM							
	Fire Alarm Control Panel		EA					
	Fuse Cut Out		EA					
	Combination Horn/ Strobe		EA					
	Strobe Lights		EA					
	Pull Stations		EA					
	Smoke Detector		EA					
	Duct Detector		EA					
	Bells (Trouble, Alarm, Sprinkler)		EA					
	3/4" Conduit		LF					
	12 AWG		LF					
	Subtotal							\$250,300
16 741	EMPTY RACEWAY SYSTEM (TELEPHONE AND COMPUTER DATA)							
	Tel/ Data System (Clear Path Only):							
	Wall Ports		EA					
	Subtotal							52,100
16 902	ELECTRIC CONTROLS AND RELAYS (Included w/ 16000)							
16 903	CEILING FANS							
	Ceiling Fans		LS					
	Subtotal							\$41,080
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK							1,160,686





(2)

The City of New York

SCHEDULE B: Subcontractor Utilization Plan -Part I: Agency's Target

This page to be completed by contracting agency

Contract Overview

Pin # 8502013PV0004C FMS Project ID#: P1CROT16A

Project Title Bronx River House

Contracting Agency Department of Design and Construction

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

Contact Person James A. Cerasoli Title _____

Telephone # (718) 391-1549 Email cerasoli@ddc.nyc.gov

Project Description (attach additional pages if necessary)

This Project consists of the construction of a new one-story Park headquarters structure, consisting of a pre-drilled, pile-supported timber foundation, concrete grade beams and slab, load-bearing masonry AAC exterior and interior walls with wood trusses and wood roof deck, an exterior metal fence with mesh infill, coiling overhead doors and gates, drip irrigation, plumbing, heating, ventilation and electrical. The project includes rainwater harvesting system, lighting controls, crystalline roof-mounted photovoltaic panels and associated balance of system, data acquisition system (DAS) and lobby display, ground-sourced standing column wells (SCW) and heat pumps, radiant slab hydronic heating. Sitework includes the construction of a parking lot, signage, fencing, paths, pavement, lawn and planting materials, precast vaults, underground utilities and site electrical. The project includes compliance with relevant USGBC LEED 2.2 NB green building requirements.

(1) ✓ **Target Subcontracting Percentage**

Percentage of total contract dollar value that agency estimates will be awarded to subcontractors in amounts under \$1 million for construction and professional services.

20 %

Subcontractor Participation Goals
 Complete and enter total for each, Construction or Professional Services or both (if applicable).

Group	Construction	Professional Services
Black American	Unspecified %	%
Hispanic American	Unspecified %	%
Asian American	Unspecified %	No Goal
Caucasian Female	No Goal	%
Total Participation Goals (2)	40 %	(3) %

Note: For this procurement, individual ethnicity and gender goals are not specified. The Total Participation Goals for construction subcontracts may be met by using Black American, Hispanic American or Asian American firms or any combination of such firms.



Tax ID #: 662566927

PIN#: 8502013PV0004C

SCHEDULE B - Subcontractor Utilization Plan - Part II: Bidder/Proposer Subcontracting Plan

This page and the next (Part II herein) are to be completed by the bidder/proposer. **AFFIRMATIONS; Bidder/proposer must check applicable boxes below, affirming compliance with M/WBE requirements.**

Bidder/proposer AFFIRMS or DOES NOT AFFIRM [statement below]

It is a material term of the contract to be awarded that, with respect to the total amount of the contract to be awarded, bidder/proposer will award one or more subcontracts for amounts under one million dollars, sufficient to meet or exceed the Target Subcontracting Percentage (as set forth in Part I) unless it obtains a full or partial waiver thereof, and it will award subcontracts sufficient to meet or exceed the Total Participation Goals (as set forth in Part I) unless such goals are modified by the Agency.

- Bidder/proposer AFFIRMS that it intends to meet or exceed the Target Subcontracting Percentage (as set forth in Part 1); or
- AFFIRMS that it has obtained a full/partial pre-award waiver of the Target Subcontracting Percentage (as set forth in Part I) and intends to award the modified Target Subcontracting Percentage, if any; or
- DOES NOT AFFIRM

Section I: Prime Contractor Contact Information

Tax ID # 56 2566527 FMS Vendor ID # _____

Business Name BEYS SPECIALTY INC. Contact Person ANNA KOUGENTAKIS

Address 2590 CONEY ISLAND AV, BROOKLYN, NY 11223

Telephone # (718) 627-7780 Email AKOUGENTAKIS@BEYSPECIALTY.COM

Section II: General Contract Information

1. Define the industry in which work is to be performed.

- Construction includes all contracts for the construction, rehabilitation, and/or renovation of physical structures. This category does include CM Build as well as other construction related services such as: demolition, asbestos and lead abatement, and painting services, carpentry services, carpet installation and removal, where related to new construction and not maintenance.
- Professional Services are a class of services that typically require the provider to have some specialized field or advanced degree. Services of this type include: legal, management consulting, information technology, accounting, auditing, actuarial, advertising, health services, pure construction management, environmental analysis, scientific testing, architecture and engineering, and traffic studies, ai, similar services.

a. Type of work on Prime Contract (Check one):

b. Type of work on Subcontract (Check all that apply):

- Construction Professional Services Construction Professional Services Other

2. What is the expected percentage of the total contract dollar value that you expect to award to all subcontracts?

60 %

3. Will you award subcontract(s) in amounts below \$ 1 million for construction and/or professional services contracts within the first 12 months of the notice to proceed on the contract?

Yes No

Section III: Subcontractor Utilization Summary

IMPORTANT: If you do not anticipate that you will subcontract at the target level the agency has specified, because you will perform more of the work yourself, you must seek a waiver of the Target Subcontracting Percentage by completing p. 9).

Step 1:	Subcontracts under \$1M (4) (construction/professional services)	Total Bid/Proposal Value	Calculated Target Subcontracting Percentage
Calculate the percentage (of your total bid) that will go towards subcontracts under \$1M for construction and/or professional services	<u>2,365,537.20</u>	<u>\$11,827,686</u>	<u>20</u> %

- Subcontracts under \$1M (construction/professional services): Enter the value you expect to award to subcontractors in dollars for amounts under \$1 million for construction and/or professional services. This value defines the amount that participation goals apply to, and will be entered into the first line of Step 2.
- Total Bid/Proposal Value: Provide the dollar amount of the bid/proposal.
- Calculated Target Subcontracting Percentage: The percentage of the total contract dollar value that will be awarded to one or more subcontractors for amounts under \$1 million for construction and/or professional services. This percentage must equal or exceed the percentage listed by the agency on page 1, at line (1).

NOTE: The "Calculated Target Subcontracting Percentage" MUST equal or exceed the Target Subcontracting Percentage listed by the agency on Page 6, Line (1).



Fax ID #: 562566527

PIN#: 8502013PV0004C

SCHEDULE B - cont.

Calculate value of subcontractor participation goals

Subcontracts under \$1M
(construction/professional services)

3. Copy value from Step 1, line (4) - the total value of all expected subcontracts under \$1M for construction and/or professional services

\$ 2,365,537.20

3. * From line a. above, allocate the dollar value of "Subcontracts under \$1M" by Construction and Professional Services,

Construction Professional Services

* If all subcontracts under \$1M are in one industry, enter '0' for the industry with no subcontracts.

* Amounts listed on these lines should add up to the value from line a.

Subcontracts under \$1M by industry \$ 2,365,537.20 \$ 0

* For Construction enter percentage from line (2) from Page 6.

* For Professional Services enter percentage from line (3) from Page 6.

5. * Total Participation Goals Percentages must be copied from Part I, lines (2) and (3).

Total Participation Goals x 40 % x 0 %

1. Value of Total Participation Goals \$946,214.88

Step 3:

Subcontracts in Amounts Under \$1 M Scope of Work - Construction

EXCAVATION - \$300,000 (MBE)
ASPHALT - \$200,000 (MBE)
METALS - \$300,000 (MBE)
CARPENTRY - \$200,000 (MBE)

Enter brief description of type(s) of subcontracts in amounts under \$1M anticipated, by type of work, not by names of subcontractor.

DOORS & HARDWARE - \$65,537.20
FLOORING - \$100,000.00
ROOF DECK & ROOF FRAMING - \$600,000.00
WINDOWS - \$280,000.00
CONCRETE - \$390,000.00

Enter brief description of type(s) of subcontracts in amounts under \$1M anticipated, by type of work, not by names of subcontractor.

Subcontracts in Amounts Under \$1 M Scope of Work - Professional Services

MBE SUBCONTRACT AMOUNT \$1,000,000

Total subcontract amount: \$2,365,537.20

Section IV: Vendor Certification and Required Affirmations

I hereby 1) acknowledge my understanding of the M/WBE requirements as set forth herein and the pertinent provisions of Local Law 129 of 2005, and the rules promulgated thereunder; 2) affirm that the information supplied in support of this subcontractor utilization plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE requirements of this Contract and the pertinent provisions of Local Law 129 of 2005, 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 subcontract(s) sufficient to meet the Target Subcontracting Percentage (unless a waiver is obtained), and the Vendor will award subcontract(s) sufficient to meet the Total Participation Goals unless such goals are modified by the Agency; and 5) agree and affirm, if awarded this contract the Vendor intends to make all reasonable, good faith efforts to meet the Target Subcontracting Percentage, or if the Vendor has obtained a waiver, the Vendor intends to meet the modified Target Subcontracting Percentage, if any, and the Vendor intends to solicit and obtain the participation of M/WBEs so as to meet the Total Participation Goals unless modified by the Agency.

Signature George Kougentakis ✓
Name GEORGE KOGENTAKIS ✓

Date 04/10/2013 ✓
Title PRESIDENT ✓



BID BOND 1
FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, Beys Specialty, Inc.
2520 Coney Island Avenue, Brooklyn, NY 11223

hereinafter referred to as the "Principal", and Westchester Fire Insurance Company
10 Exchange Place, 13th Floor, Jersey City, NJ 07302

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% Amt 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 _____

Bronx River Houses - New Construction - E-PIN: 85013B0023/DDC PIN: 8502013PV0004C

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.



BID BOND 2

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to him 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 13th day of February, 2013.

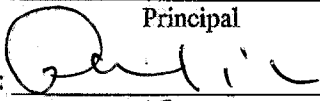
(Seal)

Beys Specialty, Inc.

(L.S.)

Principal

By:

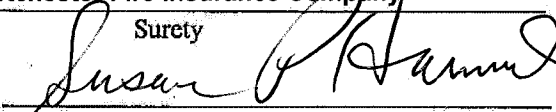

GEORGE KOUGENTARIS, PRESIDENT

(Seal)

Westchester Fire Insurance Company

Surety

By:


Susan P. Hammel, Attorney-in-Fact

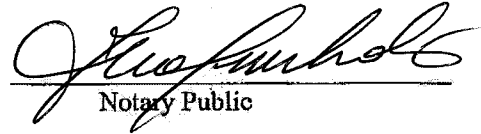


BID BOND 3

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of KINGS ss:
On this 10th day of APRIL, 2013, before me personally came
GEORGE KOUGENTAKIS to me known, who, being by me duly sworn, did depose and say
that he resides at 2420 NAT'L DE BROOKLYN NY 11223
that he is the PRESIDENT of BETS SPECIALTY, INC
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.

IOANNA KATSIMBRAKIS
Notary Public, State of New York
No. 01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 2014


Notary Public

N/A

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

N/A

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

AFFIX ACKNOWLEDGMENTS AND JUSTIFICATION OF SURETIES



ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

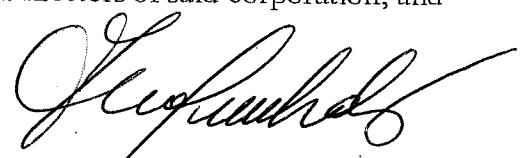
STATE OF New York

COUNTY OF KINGS

SS:

On this 10th day of APRIL, 2013 before me personally came GEORGE KOUBENTAKIS to me known, who, being by me duly sworn did depose and say that he resides at 2420 NAT'L DR BROOKLYN NY that he is the PRESIDENT of BOYS SECURITY INC 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 the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

IOANNA KATSIMBRAKIS
Notary Public, State of New York
No. 01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 2014


Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

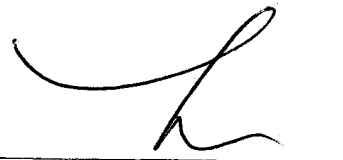
COUNTY OF Nassau

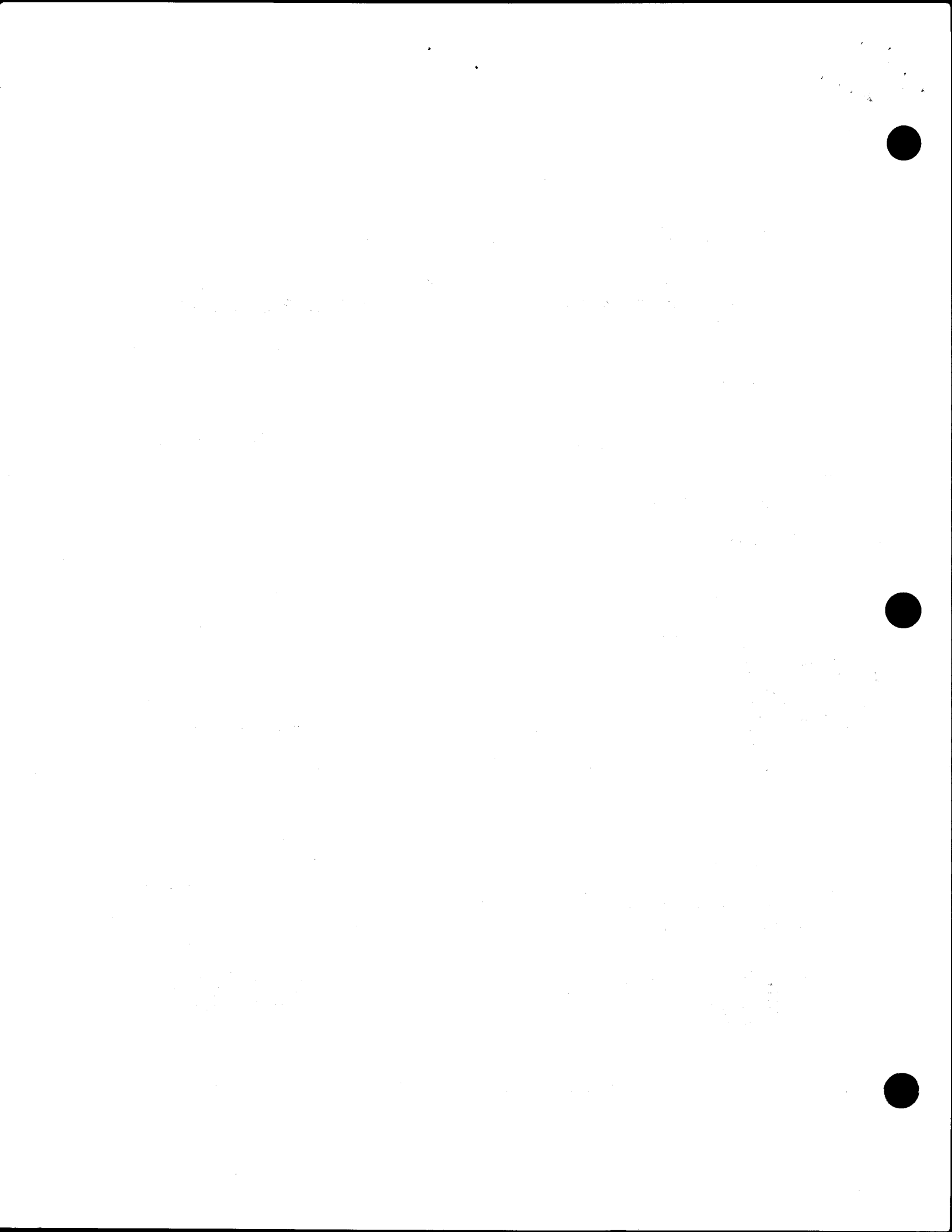
SS:

On this 13th day of February, 2013, before me personally came Susan P. Hammel to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Westchester Fire Insurance Company the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and 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 Resolutions thereof.

LYNN ANN INFANTI
Notary Public, State of New York
No. 011N6004351
Qualified in Suffolk County 2014
Commission Expires March 23,

My commission expires _____


Notary Public



Power of Attorney

WESTCHESTER FIRE INSURANCE COMPANY

Know all men by these presents: That WESTCHESTER FIRE INSURANCE COMPANY, a corporation of the Commonwealth of Pennsylvania pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

Does hereby nominate, constitute and appoint Joseph Sforzo, Robert M Kempner, Robert W O'Kane, Susan P Hammel, all of the City of PLAINVIEW, New York, each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Five million dollars & zero cents (\$5,000,000.00) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office.

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the Corporate seal of the said WESTCHESTER FIRE INSURANCE COMPANY this 16 day of October 2012.

WESTCHESTER FIRE INSURANCE COMPANY




Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA ss.

On this 16 day of October, AD 2012 before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the WESTCHESTER FIRE INSURANCE COMPANY to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company, that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.




Notary Public

I, the undersigned Assistant Secretary of the WESTCHESTER FIRE INSURANCE COMPANY, do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 13th of February 2013




William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER October 16, 2014.

006838571

WESTCHESTER FIRE INSURANCE COMPANY - NAIC# 10030

FINANCIAL STATEMENT

DECEMBER 31, 2011

ADMITTED ASSETS

BONDS	
SHORT - TERM INVESTMENTS	\$2,125,068,507
STOCKS	21,324,395
REAL ESTATE	0
CASH ON HAND AND IN BANK	0
PREMIUM IN COURSE OF COLLECTION*	38,878,940
INTEREST ACCRUED	49,457,492
OTHER ASSETS	18,572,101
TOTAL ASSETS	167,396,134
	<u>\$2,420,497,569</u>

LIABILITIES

RESERVE FOR UNEARNED PREMIUMS	\$187,860,407
RESERVE FOR LOSSES	1,095,977,796
RESERVE FOR TAXES	2,747,690
FUNDS HELD UNDER REINSURANCE TREATIES	5,745,573
OTHER LIABILITIES	23,542,126
TOTAL LIABILITIES	<u>1,315,873,590</u>

CAPITAL: 70,000 SHARES, \$71.43 PAR VALUE	5,000,100
CAPITAL: PAID IN	289,280,640
AGGREGATE WRITE-INS FOR SPECIAL SURPLUS FUNDS	112,002,723
SURPLUS (UNASSIGNED)	698,340,516
SURPLUS TO POLICYHOLDERS	<u>1,104,623,979</u>
TOTAL	<u>\$2,420,497,569</u>

(*EXCLUDES PREMIUM MORE THAN 90 DAYS DUE.)

STATE OF PENNSYLVANIA

COUNTY OF PHILADELPHIA

John P. Taylor, being duly sworn, says that he is Vice President of Westchester Fire Insurance Company and that to the best of his knowledge and belief the foregoing is a true and correct statement of the said Company's financial condition as of the 31 st day of December, 2011.

Sworn before me this April 17, 2012

[Signature]
Vice President

[Signature]
Notary Public

August 8, 2015
My commission expires

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Diane Wright, Notary Public
City of Philadelphia, Philadelphia County
My Commission Expires Aug. 8, 2015
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES



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.

1. Bidder Information:

Company Name: BEYS SPECIALTY, INC

DDC Project Number: P1CROT16A

Company Size: Ten (10) employees or less
 X Greater than ten (10) employees

 yes Company has previously worked for DDC

2. Type(s) of Construction Work

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

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 contractor may obtain its EMR by contacting its insurance broker or the NCCL. If the contractor cannot obtain its EMR, it must submit a written explanation as to why.



The Contractor 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
2011	0.92	0.92
2012	0.87	0.87
2013	0.86	0.86

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the 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:

no Contractor has received a willful violation issued by OSHA or New York City Department of Buildings (NYCDOB) within the last three years.

no Contractor has had an incident requiring OSHA notification within 8 hours (i.e., fatality, or hospitalization of three or more employees).

The Occupational Safety and Health Act (OSHA) of 1970 requires employers with ten or more employees, on a yearly basis to complete and maintain on file the form entitled "Log of Work-related Injuries and Illnesses". This form is commonly referred to as the OSHA 300 Log (OSHA 200 Log for 2001 and earlier).

The OSHA 300 Log must be submitted for the last three years for contractors with more than ten employees.

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

The contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three 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 300 Log. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty weeks per year.

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



YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
2010	69,289.20	0
2011	66,983.28	0
2012	51,701.22	3.87

If the 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 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)

no Contractor previously audited by the DDC Office of Site Safety.

DDC Project Number(s): _____

no Accident on previous DDC Project(s).

_____ Fatality or Life-altering Injury on DDC Project(s) within the last three years.
 [Examples of a life-altering injury include loss of limb, loss of a sense (e.g., sight, hearing), or loss of neurological function].

Date: 04/29/2013

By: _____
 (Signature of Owner, Partner, Corporate Officer)

Title: ANNA G. KOUGENTAKIS, VICE PRESIDENT



A. PROJECT REFERENCES - SIMILAR CONTRACTS COMPLETED BY THE BIDDER

List all contracts substantially completed within the last 4 years similar to the contract being awarded, 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
<i>Please see attached</i>					



PROJECT TITLE

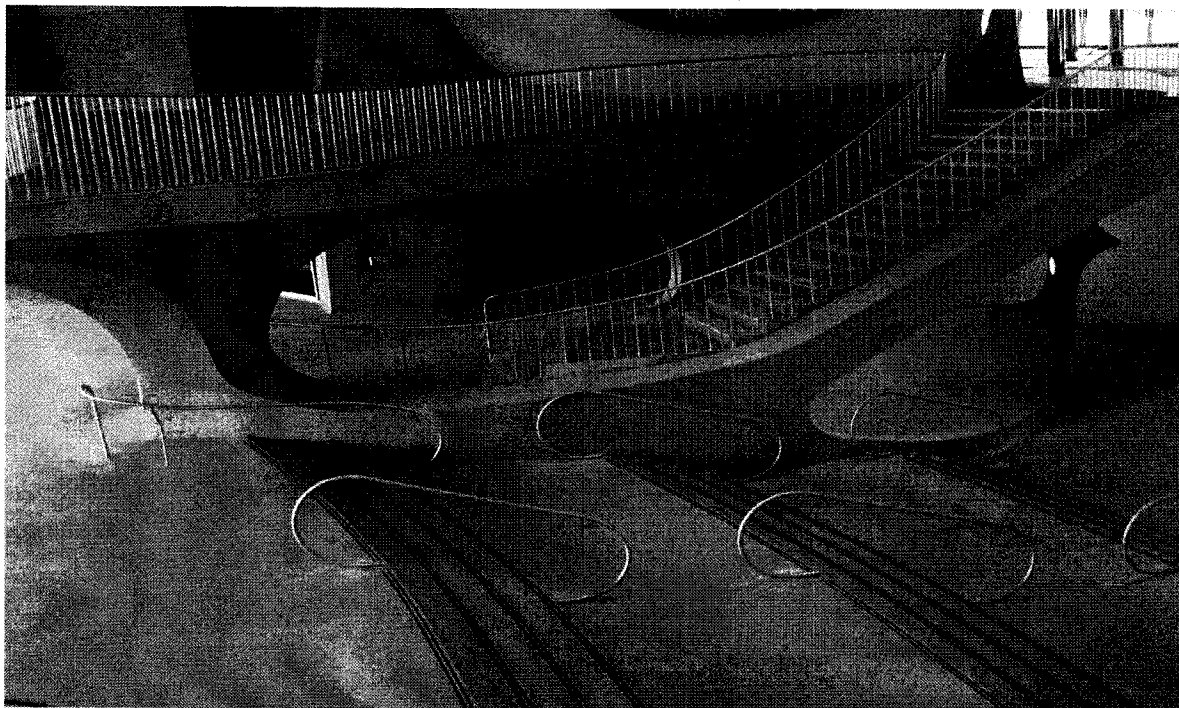
JFK INTERNATIONAL AIRPORT BUILDING 60 TWA FLIGHT CENTER

LOCATION

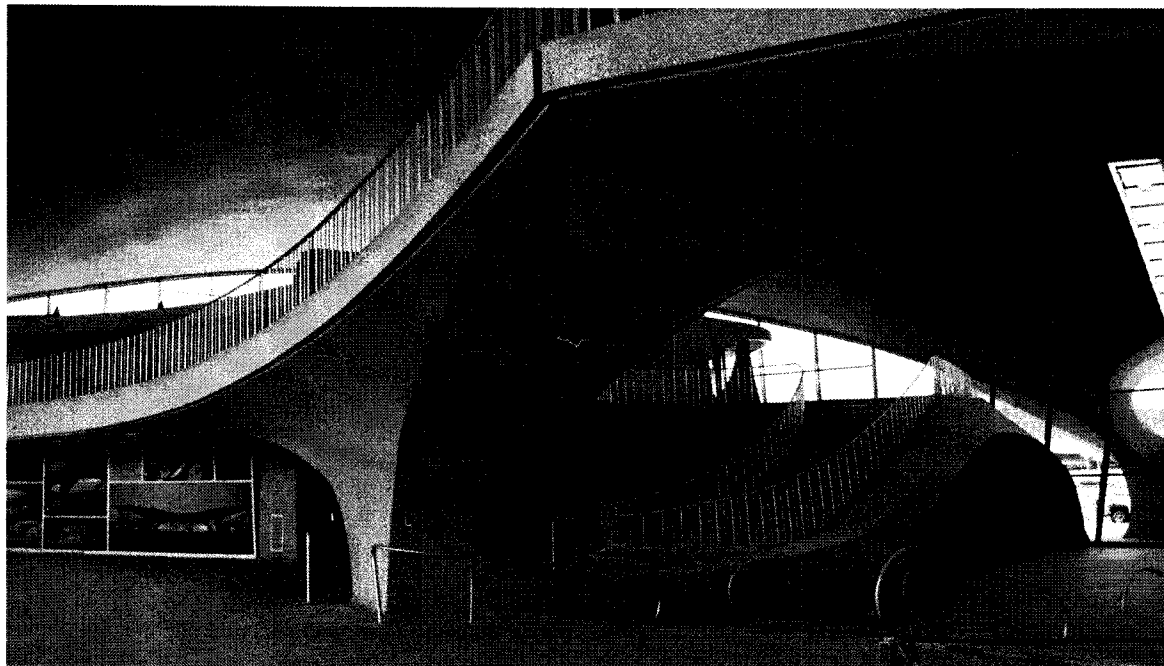
JAMAICA, NEW YORK

OWNER/AGENT

THE PORT AUTHORITY OF NY & NJ

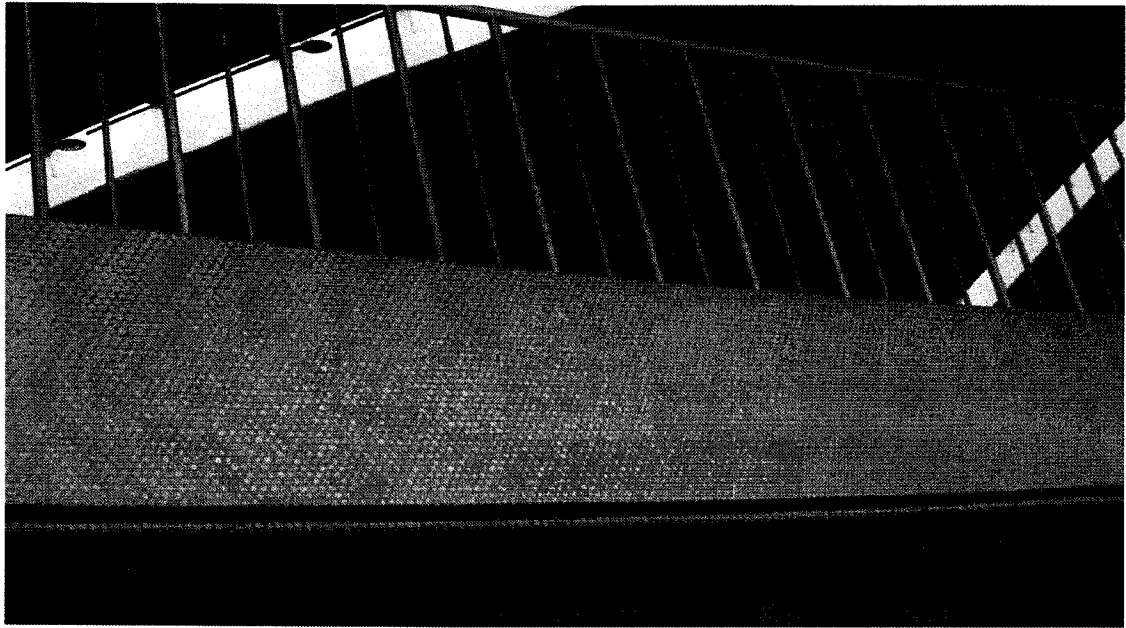


THE TWA TERMINAL AT JOHN F. KENNEDY INTERNATIONAL AIRPORT WAS DESIGNED BY WORLD RENOWNED ARCHITECT EERO SAARINEN AND CONSTRUCTED BETWEEN 1956 AND 1962. IT WAS USED BY TWA AS THEIR MAIN TERMINAL UNTIL THE LATE 1990S. IN THE YEARS IT WAS IN USE, IT HAD BEEN THROUGH DIFFERENT REPAIR STAGES AND THE DESIGN HAD BEEN ALTERED. IN 2009 BEYS WAS AWARDED THE CONTRACT TO RESTORE THE INTERIOR OF THE TERMINAL TO ITS ORIGINAL CONDITION. THE WORK PRIMARILY CONSISTED OF, BUT WAS NOT LIMITED TO, RESTORATION OF THE TILE WORK THAT COVERED ALMOST ALL THE FLOOR, WALL AND CEILING AREAS. APPROXIMATELY 1.5 MILLION PIECES OF TILE WERE USED TO PERFORM REPAIRS, WITH THE REPAIRS RANGING IN SIZE FROM REPLACING ONE PIECE OF TILE TO ONE TO TWO SQUARE FEET OF TILE.

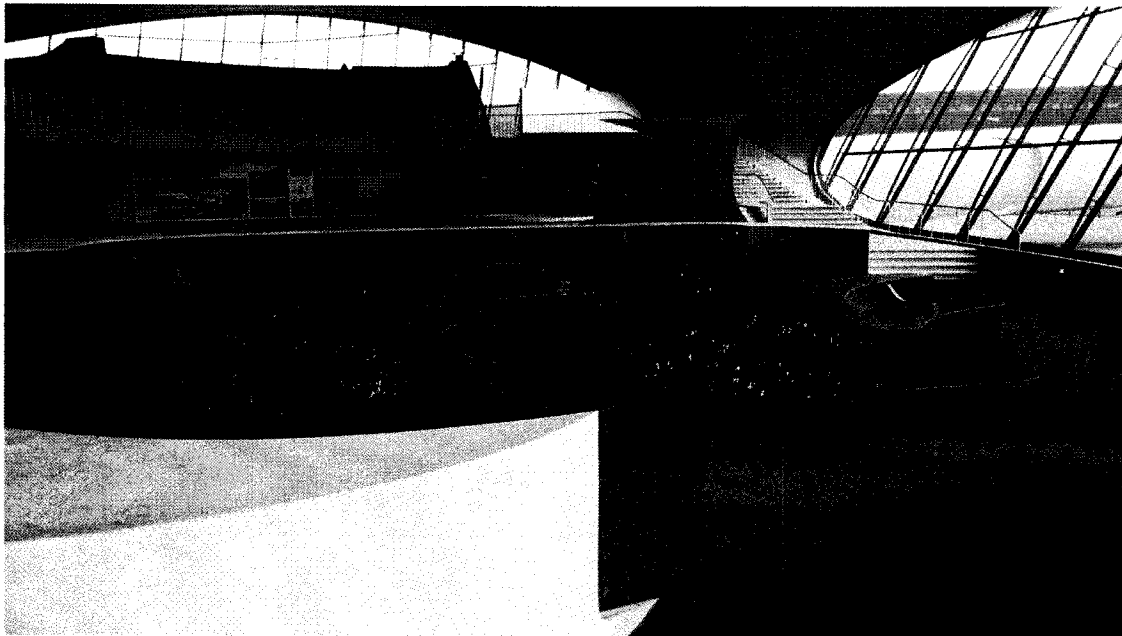




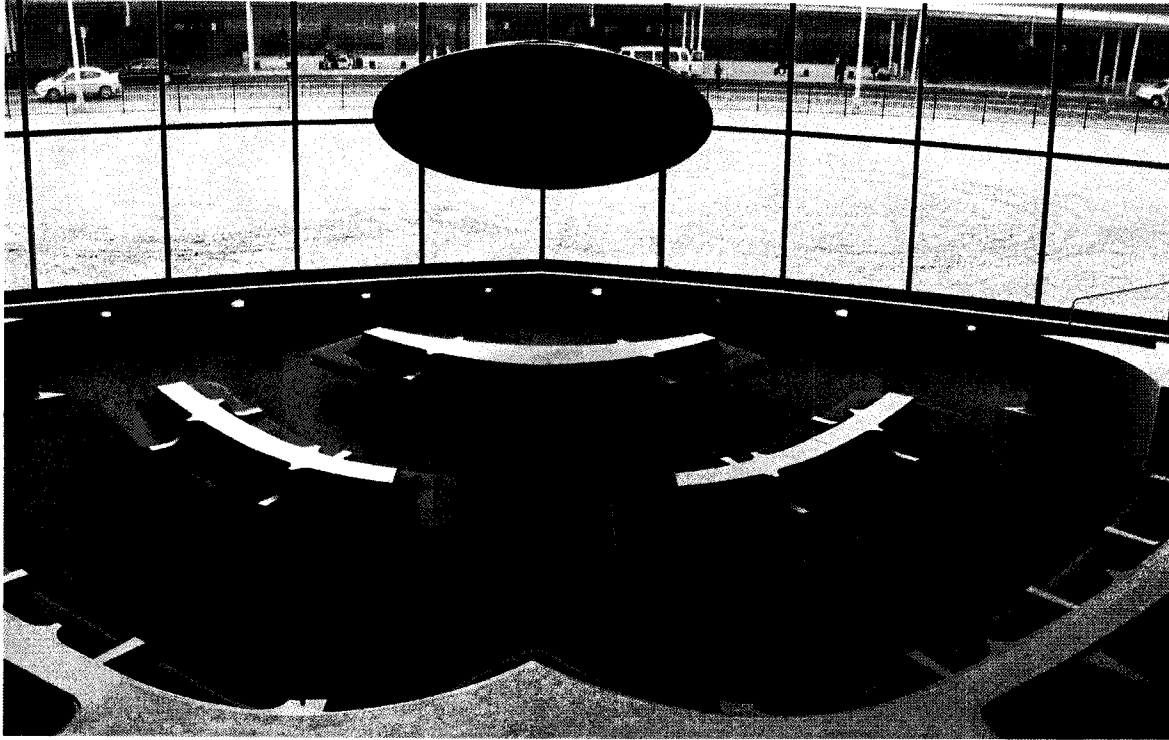
PRIOR TO BEGINNING THE TILE REPAIRS, BEYS FIRST HAD TO LOCATE TILE TO MATCH THE EXISTING IN TERMS OF SIZE AND COLOR. BEYS WORKED WITH ITS TILE SUPPLIER AND THE PROJECT ARCHITECTS UNTIL A MATCH WAS ACHIEVED.



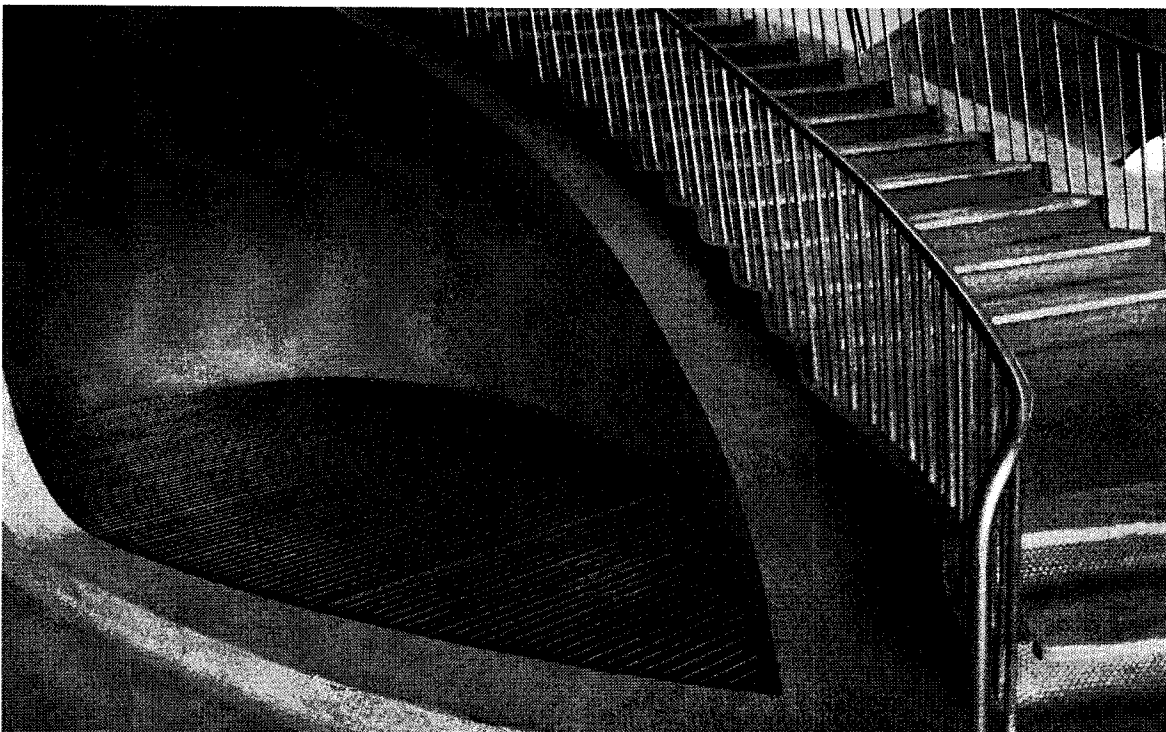
BEYS WAS TASKED WITH DESIGNING AND CONSTRUCTING THE CUSTOM BANQUETTE SEATING AND UPHOLSTERED BENCHES, ARMED ONLY WITH PHOTOS OF THE ORIGINAL FURNISHINGS. THE SEATING FRAMING WAS CONSTRUCTED OF WOOD AND SUPPORTED BY STEEL ANCHORED INTO THE CONCRETE. THE CUSTOM UPHOLSTERY FABRICS, INCLUDING THE CARPET, WERE DESIGNED AND MANUFACTURED TO MATCH THE TWA CUSTOM RED COLOR.



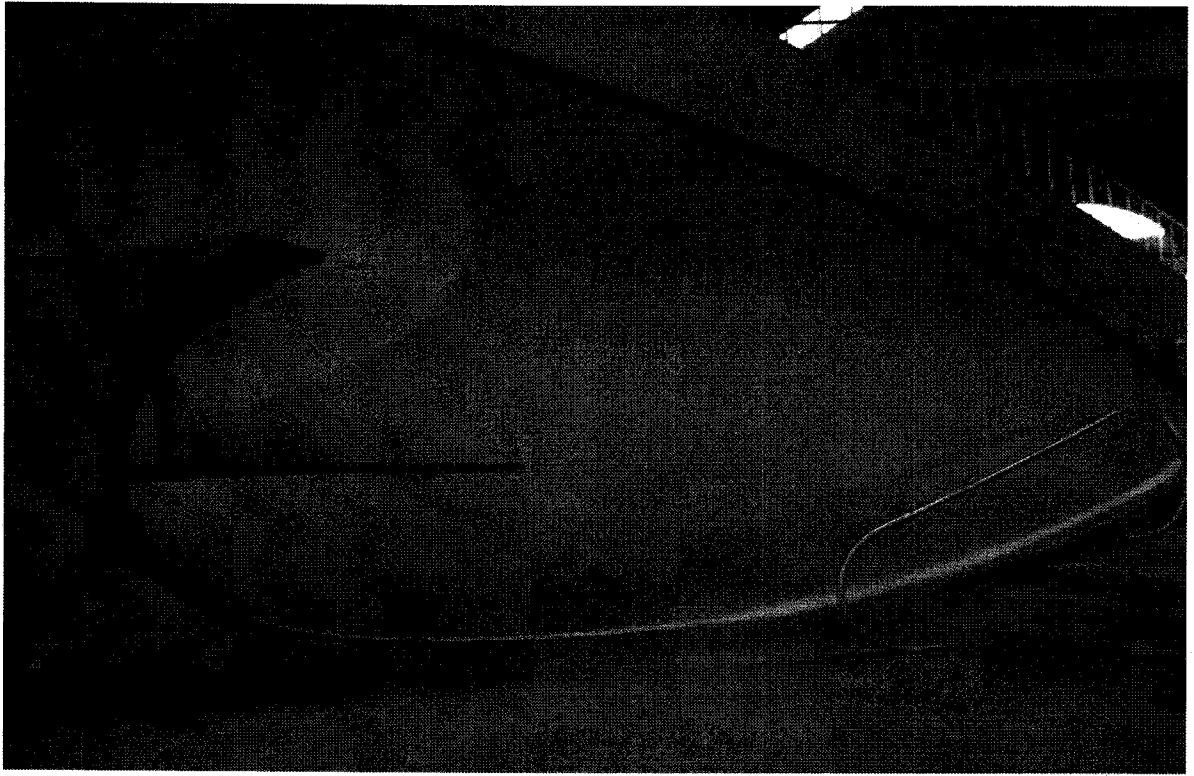




BEYS ALSO PERFORMED THE REPAIR AND RE-FINISHING OF EXISTING ALUMINUM RAILS THAT WERE TO BE SALVAGED. NEW RAILINGS WERE FABRICATED TO MATCH THE ORIGINAL RAILINGS THAT HAD BEEN REPLACED BY STAINLESS STEEL RAILS DURING PREVIOUS RENOVATIONS. GRILLS WERE REPLACED AND INSTALLED IN VARIOUS SIZES AND SHAPES TO MATCH THE ORIGINAL.







JFK INTERNATIONAL AIRPORT
BUILDING 60 TWA FLIGHT CENTER
ADDITIONAL PHOTOS



COMPLETED CONTRACTS

Provide information for the four largest contracts bidder has completed within the past five years. Do not include contracts still in progress. Indicate whether applicant firm performed work as a prime contractor, subcontractor or as part of a joint venture.

NOTE: IF REQUIRED, PLEASE MAKE ADDITIONAL COPIES OF THIS SHEET.

X PRIME CONTRACTOR _____ SUBCONTRACTOR
_____ JOINT VENTURE WITH: _____

FACILITY/PROJECT NAME: PS 10

STREET ADDRESS/CITY/STATE/ZIP 511 7TH AVENUE, BROOKLYN NY 11215

OWNER/AGENCY: NYC SCHOOL CONSTRUCTION AUTHORITY

NAME OF OWNER'S/AGENCY'S PROJECT MANAGER: JEFF SIMMONS TELEPHONE: 46 208 4944

SURETY COMPANY: VANGUARD BONDING COVERAGE

AGENT: BOB KEMPNER TELEPHONE: 516 349 1333

BONDING AMOUNT: \$ 100%

CONTRACT AWARD AMOUNT: \$ 1,887,500 CONTRACT NO.: _____

TOTAL VALUE OF CHANGE ORDERS: \$ _____

SCHEDULED START DATE: 6/25/07 SCHEDULED COMPLETION DATE: 3/20/08

ACTUAL START DATE: 6/25/07 ACTUAL COMPLETION DATE: 04/16/08 JUSTIFIED TIME EXTENSION WAS OBTAINED.

CONSTRUCTION MANAGER/ARCHITECT: _____

STREET ADDRESS: 96 MORTIN STREET NYC 10014

REFERENCE FAMILIAR WITH PERFORMANCE: AMMAN AND WHITNEY TELEPHONE: _____

PRIME CONTRACTOR: (IF APPLICANT FIRM WORKED AS SUB) N/A ANTE ZUBAC 212 462 8525

REFERENCE: N/A TELEPHONE: _____

\$ VALUE AND DESCRIPTION OF WORK PERFORMED:

WITH YOUR WORK FORCE - \$ VALUE: 10% DESCRIPTION: CARPENTRY, SECTIVE DEMO AND PAINTING

BY SUBCONTRACTORS - \$ VALUE 90% DESCRIPTION: MASONRY - ROOFING

IF ADDITIONAL SPACE IS REQUIRED, USE THE REVERSE SIDE OF THIS PAGE.

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COMPLETED CONTRACTS

Provide information for the four largest contracts bidder has completed within the past five years. Do not include contracts still in progress. Indicate whether applicant firm performed work as a prime contractor, subcontractor or as part of a joint venture.

NOTE: IF REQUIRED, PLEASE MAKE ADDITIONAL COPIES OF THIS SHEET.

PRIME CONTRACTOR SUBCONTRACTOR

JOINT VENTURE WITH: _____

FACILITY/PROJECT NAME: BAYARD RUSTIN HUMANITIES HS (MANHATTAN)

351 WEST 18TH STREET NEW YORK NY 10011

STREET ADDRESS/CITY/STATE/ZIP
NYC SCHOOL CONSTRUCTION AUTHORITY

OWNER/AGENCY: _____

NAME OF OWNER'S/AGENCY'S PROJECT OFFICER CELL 917 418 6549
PROJECT MANAGER: _____ TELEPHONE: _____

SURETY COMPANY: VANGUARD BONDING COVERAGE

AGENT: BOB KEMPER TELEPHONE: 516 349 1333

BONDING AMOUNT: \$ 100%

CONTRACT AWARD AMOUNT: \$ 3,602,630 CONTRACT NO.: 000010366

TOTAL VALUE OF CHANGE ORDERS: \$ _____

SCHEDULED START DATE: 06/07/2007 SCHEDULED COMPLETION DATE: 06/01/08

ACTUAL START DATE: 06/07/07 ACTUAL COMPLETION DATE: 06/01/08

CONSTRUCTION MANAGER/ARCHITECT: STV INCORPORATED 225 Park Avenue South

STREET ADDRESS: New York, New York 10003 212 777 4400

Jacob Garcia
REFERENCE FAMILIAR WITH PERFORMANCE: _____ TELEPHONE: _____

PRIME CONTRACTOR: (IF APPLICANT FIRM WORKED AS SUB)
N/A

REFERENCE: _____ TELEPHONE: _____

\$ VALUE AND DESCRIPTION OF WORK PERFORMED:

WITH YOUR WORK FORCE - \$ VALUE: 40% DESCRIPTION: CARPENTRY PAINTING
AND SELECTIVE DEMO

BY SUBCONTRACTORS - \$ VALUE 60% SUBC DESCRIPTION: CONCRETE, WATERPROOFING,
PLUMBING AND ELECTRICAL

IF ADDITIONAL SPACE IS REQUIRED, USE THE REVERSE SIDE OF THIS PAGE.



Name of Project

LONG ISLAND CITY COURT HOUSE INTERIOR/EXTERIOR RESTORATION

Location

Long Island City, New York

Agency:

Department of Citywide Administrative Services of the City of New York



The Long Island City Courthouse is a designated landmark building. Under the auspices of the Department of Citywide Administrative Services, the main courthouse building and adjacent DA and Jury Wings underwent a major exterior and interior renovation.

As the general contractor for this project, Beys performed comprehensive exterior repairs consisting of face brick replacement, brick stitching, patching and repairs of limestone, raking, pointing and cleaning all masonry and limestone surfaces of the building. Given the landmark status of the building, all masonry repair work was inspected and approved by the NYC Landmarks Preservation Commission. Comprehensive roofing work was also done consisting of roof replacement with a new 2-ply SBS Roofing System, replacement of two skylights (27 ft. x 33 ft. & 12 ft. x 30 ft.), rehabilitation of clay tile mansard roof and new copper roofing at selected areas. Other exterior repair work included repairs to the entry portico, new handrails and repairs to portico steps.

Interior renovation to the Department of Corrections Annex included demolition, structural steel and metal decking, fireproofing, new electrical work, new doors and partitions, lighting and finish work. The third floor courtroom, one of the largest in New York State, underwent rehabilitation which included refinishing of existing finishes, new fabric wall panels, new jury box, new spectator railing, new furniture, new acoustical treatments, new hardwood floors and carpet, stained glass restoration, new handicap lift and new electrical work.

Beys...Restoring the Past....Building the Future



B. PROJECT REFERENCES -- CONTRACTS CURRENTLY UNDER CONSTRUCTION

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
(1) PS97 QUEENS 85-52 85TH ST FOREST PARK NY	EXTERIOR MASONRY	3,570,000	2,499,000	2,671,750	DEC 2013	NYC SCA CONTRACT NO. C000012665	
						MR. HENRY SANCHEZ 917 681 9541	
(2) PS721 M 16 CLARKSON ST MANHATTAN, NY	ACCESS/ELEC FIRE ALAM/ CINCR CONC/						
	FLOORS	6,142,800	3,685,000	5,966,839	MAR 2014	NYC SCHOOL CONST. AUTHORITY CONTRACT NO. C000012667	
						MR. AMIR MOSAAD 347 672 2306	



C. PROJECT REFERENCES - 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					



VENDEX COMPLIANCE

(A) **Vendex Fees:** Pursuant to Procurement Policy Board Rule 2-08(f)(2), the contractor will be charged a fee for the administration of the VENDEX system, including the Vendor Name Check process, if a Vendor Name Check review is required to be conducted by the Department of Investigation. The contractor shall also be required to pay the applicable required fees for any of its subcontractors for which Vendor Name Check reviews are required. The fee(s) will be deducted from payments made to the contractor under the contract. For contracts with an estimated value of less than or equal to \$1,000,000, the fee will be \$175 per Vendor Name Check review. For contracts with an estimated value of greater than \$1,000,000, the fee will be \$350 per Vendor Name Check review.

(B) **Confirmation of Vendex Compliance:** The Bidder shall submit this Confirmation of Vendex Compliance to the Department of Design and Construction, Contracts Section, 30-30 Thomson Avenue – First Floor, Long Island City, NY 11101.

Bid Information: The Bidder shall complete the bid information set forth below.

Name of Bidder: BEYS SPECIALTY, INC
Bidder's Address: 2520 CONEY ISL AVE BROOKLYN NY 11223
Bidder's Telephone Number: 718 627 7480
Bidder's Fax Number: 718 336 5960
Date of Bid Opening: 4/10/2013
Project ID: P1CROT16A

Vendex Compliance: To demonstrate compliance with Vendex requirements, the Bidder shall complete either Section (1) or Section (2) below, whichever applies.

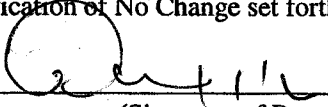
(1) **Submission of Vendex Questionnaires to MOCS:** By signing in the space provided below, the Bidder certifies that as of the date specified below, the Bidder has submitted Vendex Questionnaires to the Mayor's Office of Contract Services, Attn: VENDEX, 253 Broadway, 9th Floor, New York, New York 10007.

Date of Submission: _____

By: _____
(Signature of Partner or corporate officer)

Print Name: _____

(2) **Submission of Certification of No Change to DDC:** By signing in the space provided below, the Bidder certifies that it has read the instructions in a "Vendor's Guide to Vendex" and that such instructions do not require the Bidder to submit Vendex Questionnaires. The Bidder has completed **TWO ORIGINALS** of the Certification of No Change set forth on the next page of this Bid Booklet.

By: 
(Signature of Partner or corporate officer)

Print Name: GEORGE KOUGENTAKIS, PRESIDENT

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Certificate of No Change Form

- Please fill in all the fields and DO NOT leave any field blank.
- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges.

I, ANNA G. KOUGENTAKIS, being duly sworn, state that I have read
Enter Your Name

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

Vendor Questionnaire *This section is required.*

This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.

Name of Submitting Entity: BEYS SPECIALTY, INC

Vendor's Address: 2520 CONEY ISLAND AVENUE, BROOKLYN NY 11223

Vendor's EIN or TIN: 56 256 6527 Requesting Agency: NYC DDC

Are you submitting this Certification as a parent? (Please circle one) Yes No

Signature date on the last full vendor questionnaire signed by the submitting vendor: 03/14/2012

Signature date on changed submission, if applicable, for the submitting vendor: _____



Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.



	Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on Changed Submission (if applicable)
1	GEORGE KOUGENTAKIS	03/14/2012	
2	ANNA G. KOUGENTAKIS	03/14/2012	
3			
4			
5			
6			

Check if additional changes were submitted and attach a document with the date of additional submissions.

Certification *This section is required.*

This form must be signed and notarized. Please complete this twice. Copies will not be accepted.

Certified By:

ANNA G. KOUGENTAKIS

Name (Print)

VICE PRESIDENT

Title

BEYS SPECIALTY, INC

Name of Submitting Entity

Signature

10/16/2013

Date

IOANNA KATSIMBRAKIS
Notary Public, State of New York
No.01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 2014

Notarized By:

Notary Public

County License Issued

License Number

Sworn to before me on: 16TH DAY OF OCTOBER, IN THE YEAR 2013

Date 10/16/13



THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

April 2, 2013

ADDENDUM No. # 3

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

P1CROT16A

New Construction of the Bronx River House

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 April 3, 2013, at 2:00 pm is rescheduled to April 10, 2013, at 2:00 pm.**

Contract #1 – General Construction Work

2. **Questions from Bidders and Responses to Questions:**

See Attachment A.

3. **Revisions to the Specifications:**

See Attachment B.

4. **Revisions to the Drawings:**

See Attachment C.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.

BEYS SPECIALTY, INC.

**2520 CONEY ISLAND AVE
BROOKLYN, NY 11223**



David Resnick, R.A.
Deputy Commissioner



Name of Bidder

By: 



CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

ADDENDA CONTROL SHEET

RECEIVED

BID OPENING DATE: April 10, 2013

APR 05 2013

PROJECT No. : P1CROT16A

BEYS SPECIALTY, INC

TITLE: New Construction of the Bronx River House

APPROVED BY:

ADDENDA ISSUED	NO. OF DWG	DATE	ARCHITECTURE/ ENGINEERING	GENERAL COUNSEL
#1 Revised Bid Opening Date; Questions from Bidders and Responses to Questions; Revisions to the Bid Booklet; Revisions to the Drawings		3/15/2013		
#2 Questions from Bidders and Responses to Questions; Revisions to the Bid Booklet; Revisions to the Specifications; Revisions to the Drawings		3/22/2013		
#3 Revised Bid Opening Date; Questions from Bidders and Responses to Questions; Revisions to the Specifications; Revisions to the Drawings		4/2/2013	<i>AAA</i>	<i>[Signature]</i>

[Signature]

T.H.
B.B.
M.C.
O.P.F.



MEMO

DATE: 4/2/2013
TO: CONTRACTORS
FROM: DDC
SUBJECT: DDC
TO: ALL CONTRACTORS
FROM: LORRAINE HOLLEY, CHIEF OF CONTRACTS
TEL. NO.: 718-391-2200

PICROT16A

POSTPONED UNTIL FURTHER NOTIC

FAX. NO.: 718-391-2615
NO. OF PAGES: 1
MUST BE FAXED BACK TO THE NUMBER LISTED ABOVE.
SIGNED BY BIDDER

TITLE: New Construction of the Bronx River House

RECEIVED
APR 02 2013

BEYS SPECIALTY, INC





THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

March 22, 2013

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

P1CROT16A

New Construction of the Bronx River House

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. **Questions from Bidders and Responses to Questions:**
See Attachment A.
2. **Revisions to the Bid Booklet:**
See Attachment B.
3. **Revisions to the Specifications:**
See Attachment C.
4. **Revisions to the Drawings:**
See Attachment D.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.

BEYS SPECIALTY, INC.

2520 CONEY ISLAND AVE
BROOKLYN, NY 11223

Per [Signature]

David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: *[Signature]*





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

MEMO

DATE: **3/19/2013**
TO: **CONTRACTORS**
FROM: **DDC**
SUBJECT: **DDC**
TO: ALL CONTRACTORS
FROM: LORRAINE HOLLEY, CHIEF OF CONTRACTS

P1CROT16A

TEL. NO.: 718-391-2200

TITLE: **New Construction of the Bronx River House**

FAX. NO.: 718-391-2615

ADDENDUM NO. 1 NEW BID DATE APRIL 3,2013 AT2PM

NO. OF PAGES: 18

MUST BE FAXED BACK TO THE NUMBER LISTED ABOVE.

SIGNED BY BIDDER

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BEYS SPECIALTY, INC

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THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

March 15, 2013

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

P1CROT16A

New Construction of the Bronx River House

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 March 20, 2013, at 2:00 pm is rescheduled April 3, 2013, at 2:00 pm.**

Contract #1 – General Construction Work

2. **Questions from Bidders and Responses to Questions:**
See Attachment A.
3. **Revisions to the Bid Booklet:**
See Attachment B.
4. **Revisions to the Drawings:**
See Attachment C.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.

BEYS SPECIALTY, INC.

2520 CONEY ISLAND AVE
BROOKLYN, NY 11223

Name of Bidder

By: 


David Resnick, R.A.
Deputy Commissioner

THE UNIVERSITY OF CHICAGO
LIBRARY
540 EAST 57TH STREET
CHICAGO, ILL. 60637

CITY OF NEW YORK

DIVISION OF LABOR SERVICES

CONSTRUCTION EMPLOYMENT REPORT

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Division of Labor Services

CONSTRUCTION EMPLOYMENT REPORT

GENERAL INFORMATION

1. Your contractual relationship in this contract is: Prime Contractor Subcontractor
- 1a. Are M/WBE goals attached to this project? Yes No
2. Would your company like information on how to certify with the City of New York as a:
- Minority Owned Business Enterprise Locally based Business Enterprise
- Women Owned Business Enterprise Emerging Business Enterprise
- Disadvantaged
3. Please indicate if you would like assistance from SBS in identify certified M/WBEs for contracting opportunities: Yes No
4. Is this project subject to a Project labor Agreement? Yes No

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

5. 56 256 6527
Employer Identification Number or Federal Tax I.D.
6. BEYS SPECIALTY, INC
Company Name
7. 2520 CONEY ISLAND BROOKLYN NY 11223
Street Address City State Zip Code
8. GEORGE KOUGENTAKIS 718 6277780 718 3365960
(Chief Operating Officer) First Name Last Name Telephone Number Fax Number
9. ANTHONY HAMILAKIS 718 6277780
Designated Equal Opportunity Compliance Officer (if same as Item #8, write "Same") Telephone Number
10. SAME
Name of Prime Contractor and Contact Person (if same as item #6, write "Same")
11. Number of employees in your company: 20
12. Contract information:
- | | |
|--------------------------------------------------------|------------------------------------------------------------|
| (a) <u>NYC DDC</u>
Contracting Agency (City Agency) | (b) _____
Contract Amount |
| (c) _____
Procurement Identification Number (PIN) | (d) <u>PICROT16A</u>
Contract Registration Number (CT#) |
| (e) _____
Project Commence Date | (f) _____
Projected Completion Date |

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Revised 11/09



(g) Description and location of proposed contract:

BRONX River Boathouse
1041 E 172nd St BRONX
NY 10460

13. Has your firm been reviewed by the Division of Labor Services (DLS) within the past 36 months and issued a Certificate of Approval? Yes No

If Yes, attach a copy of the certificate.

14. Has DLS within the past month reviewed an Employment Report submission for your company and issued a Conditional Certificate of Approval? Yes No

If Yes, attach a copy of the certificate.

NOTE: DLS WILL NOT ISSUE A CONTINUED CERTIFICATE OF APPROVAL IN CONNECTION WITH THIS CONTRACT UNLESS THE REQUIRED CORRECTIVE ACTIONS IN PRIOR CONDITIONAL CERTIFICATES OF APPROVAL HAVE BEEN TAKEN

15. Has an Employment Report already been submitted for a different contract (not covered by this Employment Report) for which you have not yet received compliance certificate? Yes No

If Yes,

Date submitted: _____ Agency to which submitted: _____

Name of Agency Person: First Name _____ Last Name _____

Contract No. : _____ Telephone: _____

16. Has your company in the past 36 months been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP)? Yes No

If Yes,

(a) Name and address of OFCCP office: _____

(b) Was a Certificate of Equal Employment Compliance issued within the past 24 months? Yes No

If Yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes No

If Yes, attach a copy of such requirements or agreements.

(d) Were any deficiencies found? Yes No

If Yes, attach a copy of such findings.

17. Is your company or its affiliates a member or members of an employers' trade association which is responsible for negotiating collective bargaining agreements (CBA) which affect construction site hiring? Yes No

If Yes, attach a list of such associations and all applicable CBA's.

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Revised 1/89



PART II: DOCUMENTS REQUIRED

18. For the following policies or practices, attach the relevant documents (e.g., printed booklets, brochures, manuals, memoranda, etc.) If the policy(ies) are unwritten, attach a full explanation of the practices. See instructions.

(a) Health benefit coverage/description(s) for all management, nonunion and union employees (whether company or union administered)

(b) Disability, life, other insurance coverage/description

NO (c) Employee Policy/Handbook

NO (d) Personnel Policy/Manual

NO (e) Supervisor's Policy/Manual

(f) Pension plan or 401k coverage/description for all management, nonunion and union employees, whether company or union administered.

(g) Collective bargaining agreement(s) *SEE LETTER. BEYS SPECIALTY INC IS A SIGNATORY TO THE CEMENT MASON'S LOCAL 780 COLLECTIVE BARGAINING AGREEMENT WHICH SPONSORS AN APPRENTICESHIP PROGRAM REGISTERED & APPROVED BY THE NYS DOL.*

(h) Employment Application(s)

(i) Employee evaluation policy/form(s)

(j) Does your firm have medical and/or non-medical (i.e. education, military, personal, pregnancy, child care) leave policy?

19. To comply with the Immigration Reform and Control Act of 1986 when and of whom does your firm require the completion of an I-9 form?

(a) Prior to job offer Yes No

(b) After a conditional job offer Yes No

(c) After a job offer Yes No

(d) Within the first three days on the job Yes No

(e) To some applicants Yes No

(f) To all applicants Yes No

(g) To some employees Yes No

(h) To all employees Yes No

20. Explain where and how completed I-9 Forms, with their supportive documentation are maintained and made accessible.

PERSONNEL FILES IN MAIN OFFICE

21. Does your firm or any of its collective bargaining agreements require job applicants to take a medical examination?

Yes No

If Yes, is the medical examination given:

FOR OFFICIAL USE ONLY: File No. _____



- | | | |
|-----------------------------------|-----------|----------|
| (a) Prior to the job offer | Yes _____ | No _____ |
| (b) After a conditional job offer | Yes _____ | No _____ |
| (c) After a job offer | Yes _____ | No _____ |
| (d) To all applicants | Yes _____ | No _____ |
| (e) Only to some applicants | Yes _____ | No _____ |

If Yes, list for which applicants below and attach copies of all medical examination or questionnaire forms and instructions utilized for these examinations.

22. Do you have a written equal opportunity (EEO) policy? Yes No _____

If Yes, list the document(s) and page number(s) where these written policies are located.

23. Does the company have a current affirmative action plan(s) (AAP)

Minorities and Women
 Individuals with handicaps
 Other. Please specify _____

24. Does your firm or collective bargaining agreement(s) have an internal grievance procedure with respect to EEO complaints? Yes No _____

If Yes, please attach a copy of this policy.

If No, attach a report detailing your firm's unwritten procedure for handling EEO complaints.

25. Has any employee, within the past three years, filed a complaint pursuant to an internal grievance procedure or with any official of your firm with respect to equal employment opportunity? Yes _____ No

If Yes, attach an internal complaint log. See instructions.

26. Has your firm, within the past three years, been named as a defendant (or respondent) in any administrative or judicial action where the complainant (plaintiff) alleged violation of any anti-discrimination or affirmative action laws? Yes _____ No

If Yes, attach a log. See instructions.

27. Are there any jobs for which there are physical qualification? Yes _____ No

If Yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

28. Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes _____ No

If Yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

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JWS/EE 11.09



United Cement Masons' Union

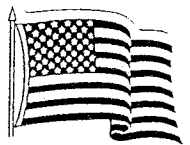
LOCAL No. 780

OF GREATER NEW YORK AND LONG ISLAND

of the O.P. & C.M.I.A. of United States and Canada

150-50 14TH AVENUE, WHITESTONE, NEW YORK 11357

Phone (718) 357-3750 Fax (718) 357-2057



To Whom It May Concern:

I am enclosing United Cement Masons' Union Local 780 Agreement book, which is in effect from July 1, 2012 till June 30, 2015.

Keep the agreement book for your records and please fill out and sign the single sheet enclosed and return it to us.

If you have any questions please feel free to call me.

*Fraternally yours,
Delores Doyle Rosamilia
Delores Doyle Rosamilia
Secretary/Office Administrator*

*Enclosures
DDR/ddr*

MICHAEL RENDINA *President* • ANGELO SCAGNELLI *Fin. Secy/Bus. Manager*
***Business Agents* BERT GALLO • GINO CASTIGNOLI • JOHN REGINA**

Affiliated with the Building Trades Department of the American Federation of Labor, - New York State Building and Construction Trades Council, - Building and Construction Trades Council of Greater New York City and Vicinity, - Nassau and Suffolk Counties Building Trades, - Building and Construction Trades of Westchester and Putnam Counties, - The Bronx, Brooklyn, Manhattan, Queens and Staten Island Boards of Business Agents, - New York State Federation of Labor, - Concrete Trades Alliance of Greater New York, - New York State, Massachusetts, Rhode Island Conference of the O.P. & C.M.I.A., the NorthEast Conference of the O.P. & C.M.I.A. - Building and Construction Trades Council of Rockland County - The Concrete Alliance, Inc.



**FORM C: CURRENT WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers
(H) Helper
(TOT) Total by Column
(A) Apprentice
(TRN) Trainee

For each trade to be engaged by your company for this project, enter the projected workforce for **Males and Females** by trade classification on the charts below.

Trade:	Males						Females														
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		
	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	
Union Affiliation, if applicable:																					
Total (Col. #1-10):																					
Total Minority, Male & Female (Col. #2, 3, 4, 5, 7, 8, 9 & 10)																					
Total Female (Col. #6 - 10):																					

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?



**FORM B: PROJECTED WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers (A) Apprentice
(H) Helper (TRN) Trainee
(TOT) Total by Column

For each trade to be engaged by your company for
this project, enter the projected workforce for
Males and **Females** by trade classification on
the charts below.

Trade: _____	<u>Males</u>						<u>Females</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.
Total (Col. #1-10): _____										
Total Minority, Male & Female (Col. #2, 3, 4, 5, 7, 8, 9 & 10)										
Total Female (Col. #6 - 10): _____										

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)? _____

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Revised 11-05



**FORM B: PROJECTED WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers
(H) Helper
(TOT) Total by Column
(A) Apprentice
(TRN) Trainee

For each trade to be engaged by your company for this project, enter the projected workforce for **Males** and **Females** by trade classification on the charts below.

Trade: LABOR

	Males						Females													
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)	
	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.
Total (Col. #1-10):	J																			
Total Minority, Male & Female (Col. #2, 3, 4, 5, 7, 8, 9 & 10)	4																			
Total Female (Col. #6 - 10):	0																			
	TRN																			
	TOT																			

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

JOB CENTERS, UNIONS, TRADE FAIRS & PUBLICATIONS

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FWS-SCD 11/09

Page 6 of 15





Division of
Labor Services

FORM A. CONTRACT BID INFORMATION: USE OF SUBCONTRACTORS/TRADES

1. Do you plan to subcontractor work on this contract? Yes No
2. If yes, complete the chart below.

NOTE: All proposed subcontractors with a subcontract in excess of \$1,000,000 must complete an Employment Report for review and approval before the contract may be awarded and work commences.

SUBCONTRACTOR'S NAME*	OWNERSHIP (ENTER APPROPRIATE CODE LETTERS BELOW)	WORK TO BE PERFORMED BY SUBCONTRACTOR	TRADE PROJECTED FOR USE BY SUBCONTRACTOR	PROJECTED DOLLAR VALUE OF SUBCONTRACT
	TO BE DETERMINED			

*If subcontractor is presently unknown, please enter the trade (craft name).

Ownership codes: W: White A: Asian B: Black N: Native American H: Hispanic F: Female

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Division of Labor Services

FORM C: CURRENT WORKFORCE TRADE CLASSIFICATION CODES

(J) Journey level Workers
 (H) Helper
 (TOT) Total by Column

(A) Apprentice
 (TRN) Trainee

For each trade to be engaged by your company for this project, enter the projected workforce for **Males** and **Females** by trade classification on the charts below.

Trade: _____	Males						Females														
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		
	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	
Union Affiliation, if applicable: _____																					
Total (Col. #1-10): _____	J																				
Total Minority, Male & Female (Col. #2, 3, 4, 5, 7, 8, 9 & 10) _____	H																				
Total Female (Col. #6 - 10): _____	A																				
Total Female (Col. #6 - 10): _____	TRN																				
Total Female (Col. #6 - 10): _____	TOT																				

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)? _____

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Division of Labor Services

N/A

Date _____

File Number _____

LESS THAN \$750,000 SUBCONTRACT CERTIFICATE

Are you currently certified as one of the following? Please check yes or no:

M/WBE Yes ___ No ___ MBE Yes ___ No ___
WBE Yes ___ No ___ LBE Yes ___ No ___

If you are certified as an M/WBE, MBE, WBE, or LBE, what city/state agency are you certified with? _____

Please check one of the following if your firm would like information on how to certify with the City of New York as a:

___ Minority Owned Business Enterprise ___ Locally based Business Enterprise
___ Women Owned Business Enterprise

Company Name, Employer Identification Number or Federal Tax I.D., Company Address and Zip Code, Contact Person (First Name, Last Name), Telephone Number, Fax Number, E-mail Address, Contracting Agency

Description and location of proposed subcontract: _____

Borough, Project Number, Pin Number, Contract Amount

I, (print name of authorized official signing) _____ hereby certify that I am authorized by the above-named subcontractor to certify that said subcontractor's proposed contract with the above named owner or City agency is less than \$750,000.

Willful or fraudulent falsifications of any data or information submitted herewith may result in the termination of the contract between the City and the bidder or contractor and in disapproval of future contracts for a period of up to five years. Further, such falsification may result in civil and/or criminal prosecution.

Signature of authorized official, Date



SIGNATURE PAGE

I, (Print name of authorized official signing) GEORGE KOUCENTAKIS hereby certify that the information submitted herewith is true and complete to the best of my knowledge and belief and submitted with the understanding that compliance with New York City's equal employment requirements, as contained in Chapter 56 of the City Charter, Executive Order No. 50 (1980), as amended, and the implementing Rules and Regulations, is a requirement for the contractors and subcontractors working on this construction project. I also agree on behalf of the company to submit a certified copy of payroll records to the Division of Labor Services on a monthly basis.

BEYS SPECIALTY, INC
Contractor's Name

GEORGE KOUCENTAKIS PRESIDENT
Name of person who prepared this Employment Report Title

GEORGE KOUCENTAKIS PRESIDENT
Name of official authorized to sign on behalf of the contractor Title

718 627 4780
Telephone Number

[Signature] 4/10/13
Signature of authorized official Date

If contractors are found to be underutilizing minorities and females in any given trade based on Chapter 56 Section 3H, the Division of Labor Services reserves the right to request the contractor's workforce data and to implement an employment program.

Contractors who fail to comply with the above mentioned requirements or are found to be in noncompliance may be subject to the withholding of final payment.

Willful or fraudulent falsifications of any data or information submitted herewith may result in the termination of the contract between the City and the bidder or contractor and in disapproval of future contracts for a period of up to five years. Further, such falsification may result in civil and/or criminal prosecution.

To the extent permitted by law and consistent with the proper discharge of DLS' responsibilities under Charter Chapter 56 of the City Charter and Executive Order No. 50 (1980) and the implementing Rules and Regulations, all information provided by a contractor to DLS shall be confidential.

Please attach your M/WBE Compliance Report.

Only original signatures accepted.

Sworn to before me this 10th day of APRIL 20 13

[Signature]
Authorized Signature

[Signature]
Notary Public, State of New York
No. 01KA5069243

FOR OFFICIAL USE ONLY: File No. _____
Qualified in Richmond County
Page 11 of 15 Expires Nov. 25, 2014



NOTICE TO BIDDERS:

- **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 Contract for General Construction Work.

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.

SPECIAL NOTICE TO BIDDERS

The New York City Department of Small Business Services (SBS), in conjunction with the New York Business Development Corporation (NYBDC), have established a NYC Construction Loan pilot program to provide prime contractors and subcontractors financing for mobilization costs on certain City construction projects.

Under this initiative, loans are available for early stage mobilization needs such as insurance, labor, supplies and equipment. Bidders are strongly encouraged to visit “Growing Your Business” at www.nyc.gov/nycbusiness to learn more about the loan or contact constructionloan@sbs.nyc.gov / (212) 513-6444 to obtain details and to determine preliminary eligibility.

A successful loan applicant will be required to make an assignment of its contract (or subcontract) payments to the lender NYBDC until the loan is repaid. If the loan is to a subcontractor, a prime contractor must honor the terms of such an assignment.

A prime contractor may not discriminate against a subcontractor or potential subcontractor by reason of the subcontractor’s participation, or nonparticipation, in the NYC Construction Loan program.

**BID BOOKLET
PART A**

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PROJECT ID: P1CROT16A

**CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES**

BID BOOKLET

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5. Bidder's Identification of Subcontractors.....	16
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**CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES**

SPECIAL NOTICE TO BIDDERS

BID SUBMISSION REQUIREMENTS

THE BID SHALL CONSIST OF TWO (2) SEPARATE, SEALED ENVELOPES. THE DOCUMENTS THAT MUST BE COMPLETED AND INCLUDED IN EACH SEPARATE ENVELOPE ARE LISTED BELOW.

BID ENVELOPE #1: Bid Envelope #1 shall contain the following items:

- Bid Form, including Affirmation
- Bid Security (if required, see page 22)
- MWBE Subcontractor Utilization Plan (if participation goals have been established)

BID ENVELOPE #2: Bid Envelope #2 shall contain **ONLY** the following item:

- Bidder's Identification of Subcontractors (see pages 16 & 17)

**FAILURE TO SUBMIT THE FOUR ITEMS LISTED ABOVE
WILL RESULT IN THE DISQUALIFICATION OF THE BID**

BID ENVELOPE #1: In addition to the items listed above, Bid Envelope #1 shall also contain the following items: **DO NOT** Include the items listed below in Bid Envelope #2.

- Bid Breakdown (if required, see page 21)
- Safety Questionnaire
- Construction Employment Report (if bid is \$1,000,000 or more)
- Contract Certificate (if bid is less than \$1,000,000)
- Confirmation of Vendex Compliance
- Bidder's Certification of Compliance with Iran Divestment Act
- Special Experience Requirements Qualification Form (if required, see pages 3, 4)

**FAILURE TO SUBMIT THE SEVEN ITEMS LISTED ABOVE
MAY RESULT IN THE DISQUALIFICATION OF THE BID.**

- NOTES:**
- (1) All of the above referred to blank forms to be completed and submitted with the bid are included in the BID BOOKLET.
 - (2) If additional information is required, please contact DDC at 718-391-2601.
 - (3) **VENDEX QUESTIONNAIRES:** Vendex Questionnaires, as well as detailed instructions, may be obtained at www.nyc.gov/vendex. The bidder may also obtain Vendex forms and instructions by contacting the Agency Chief Contracting Officer or the contact person for this contract.
 - (4) **SPECIAL EXPERIENCE REQUIREMENTS:** The Bidder is advised that Special Experience Requirements may apply to this contract. Such requirements are set forth on pages 3 and 4 of this Bid Booklet.
 - (5) **SPECIAL EXPERIENCE REQUIREMENTS FOR ASBESTOS:** The Bidder is advised that this contract contains strict requirements regarding the prior experience and licensing of the subcontractor who will perform any required asbestos abatement work. These special experience requirements are set forth in the section of the specifications which describes any required asbestos abatement work.

SPECIAL EXPERIENCE REQUIREMENTS

Special Experience Requirements apply as indicated below.

Bidder:	General Construction	<u> X </u> YES	<u> </u> NO
Specific Areas of Work:	General Construction	<u> X </u> YES	<u> </u> NO
	Plumbing Work	<u> </u> YES	<u> X </u> NO
	HVAC Work	<u> X </u> YES	<u> </u> NO
	Electrical Work	<u> </u> YES	<u> X </u> NO

(A) **EXPERIENCE REQUIREMENTS FOR THE BIDDER:** The special experience requirements set forth below apply to the bidder 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 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) **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 02300: Earth Work

HVAC Work:

- Section 15870: Earth Coupling Wells

- (2) Special experience requirements applicable to the contractor or subcontractor that will perform specific areas of work are summarized below. Such experience requirements are set forth in full in the Addendum to the General Conditions.

- 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, for drilling work, the following requirements shall apply:
 - The three (3) prior projects must have involved drilling fractured bedrock standing column wells.
 - The contractor or subcontractor performing the drilling work must be in compliance with registration and certification requirements of the New York State Department of Environmental Conservation.

- (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. 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.

Qualification Form

Project ID: PICROT16A

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: _____

Name of Project: _____

Location of Project: _____

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

Name: _____

Title: _____ Phone Number: _____

Brief description of work completed: _____

Was the work performed as a prime or a subcontractor: _____

Amount of Contract: _____

Date of Completion: _____

Name of Contractor: _____

Name of Project: _____

Location of Project: _____

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

Name: _____

Title: _____ Phone Number: _____

Brief description of work completed: _____

Was the work performed as a prime or a subcontractor: _____

Amount of Contract: _____

Date of Completion: _____

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MWBE PROGRAM

SUBCONTRACTOR UTILIZATION PLAN

Schedule B: Subcontractor Utilization Plan: Schedule B: Subcontractor Utilization Plan for this Contract is set forth on the following pages of this Bid Booklet. Schedule B: Subcontractor Utilization Plan (Part I) indicates whether participation goals have been established for this Contract. If participation goals have been established for this Contract, the bidder must submit Schedule B: Subcontractor Utilization Plan (Part II) with its bid.

Contract Provisions: Contract provisions regarding the participation of the MWBE firms are set forth in Article 77 of the Contract. The bidder is advised to review these contract provisions.

Waiver: The bidder may seek a full or partial pre-award waiver of the Target Subcontracting Percentage in accordance with Article 77 of the Contract (See Part A, Section 10). The bidder's request for a waiver must be submitted at least seven (7) calendar days prior to the bid date. Waiver requests submitted after the deadline will not be considered. The form for requesting a waiver of the Target Subcontracting Percentage is set forth in Schedule B: Subcontractor Utilization Plan (Part III).

Rejection of the Bid: The bidder must complete Schedule B: Subcontractor Utilization Plan (Part II) set forth on the following pages. Subcontractor Utilization Plans which do not include the required affirmations (on Page 2) will be deemed to be non-responsive, unless a full waiver of the Target Subcontracting Percentage is granted (Schedule B: Subcontractor Utilization Plan, Part III). In the event that the City determines that the bidder has submitted a Schedule B: Subcontractor Utilization Plan where the required affirmations are completed but other aspects of the Plan are not complete, or contain a copy or computation error that is at odds with the affirmation, the bidder 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 plan to the Agency. Failure to do so will result in a determination that the Bid is non-responsive.

Receipt of notification is defined as the date notice is emailed or faxed (if the bidder has provided an email address or fax number), or no later than five (5) days from the date of mailing or upon delivery, if delivered.

Impact on LBE Requirements: If goals have been established for the participation of M/WBE's, the contractor is not required to comply with the Locally Based Enterprise Program ("LBE"). The LBE Program is set forth in Article 67 of the Contract.

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The City of New York

SCHEDULE B: Subcontractor Utilization Plan -Part I: Agency's Target

This page to be completed by contracting agency

Contract Overview

Pin # 8502013PV0004C FMS Project ID#: P1CROT16A

Project Title Bronx River House

Contracting Agency Department of Design and Construction

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

Contact Person James A. Cerasoli Title _____

Telephone # (718) 391-1549 Email cerasoli@ddc.nyc.gov

Project Description (attach additional pages if necessary)

This Project consists of the construction of a new one-story Park headquarters structure, consisting of a pre-drilled, pile-supported timber foundation, concrete grade beams and slab, load-bearing masonry AAC exterior and interior walls with wood trusses and wood roof deck, an exterior metal fence with mesh infill, coiling overhead doors and gates, drip irrigation, plumbing, heating, ventilation and electrical. The project includes rainwater harvesting system, lighting controls, crystalline roof-mounted photovoltaic panels and associated balance of system, data acquisition system (DAS) and lobby display, ground-sourced standing column wells (SCW) and heat pumps, radiant slab hydronic heating. Sitework includes the construction of a parking lot, signage, fencing, paths, pavement, lawn and planting materials, precast vaults, underground utilities and site electrical. The project includes compliance with relevant USGBC LEED 2.2 NB green building requirements.

(1) ✓ Target Subcontracting Percentage

Percentage of total contract dollar value that agency estimates will be awarded to subcontractors in amounts under \$1 million for construction and professional services.

20 %**Subcontractor Participation Goals**

Complete and enter total for each Construction or Professional Services, or both (if applicable)

Group	Construction	Professional Services
Black American	Unspecified %	%
Hispanic American	Unspecified %	%
Asian American	Unspecified %	No Goal
Caucasian Female	No Goal	%
Total Participation Goals	(2) 40 %	(3) %

Note: For this procurement, individual ethnicity and gender goals are not specified. The Total Participation Goals for construction subcontracts may be met by using Black American, Hispanic American or Asian American firms or any combination of such firms.

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Tax ID #: _____

PIN#: _____

SCHEDULE B - Subcontractor Utilization Plan – Part II: Bidder/Proposer Subcontracting Plan

This page and the next (Part II herein) are to be completed by the bidder/proposer. **AFFIRMATIONS; Bidder/proposer must check the applicable boxes below, affirming compliance with M/WBE requirements.**

Bidder/proposer AFFIRMS or DOES NOT AFFIRM [statement below]

It is a material term of the contract to be awarded that, with respect to the total amount of the contract to be awarded, bidder/proposer will award one or more subcontracts for amounts under one million dollars, sufficient to meet or exceed the Target Subcontracting Percentage (as set forth in Part I) unless it obtains a full or partial waiver thereof, and it will award subcontracts sufficient to meet or exceed the Total Participation Goals (as set forth in Part I) unless such goals are modified by the Agency.

- Bidder/proposer AFFIRMS that it intends to meet or exceed the Target Subcontracting Percentage (as set forth in Part 1); or
- AFFIRMS that it has obtained a full/partial pre-award waiver of the Target Subcontracting Percentage (as set forth in Part I) and intends to award the modified Target Subcontracting Percentage, if any; or
- DOES NOT AFFIRM

Section I: Prime Contractor Contact Information

Tax ID # _____ FMS Vendor ID # _____

Business Name _____ Contact Person _____

Address _____

Telephone # _____ Email _____

Section II: General Contract Information

1. Define the industry in which work is to be performed.

- Construction** includes all contracts for the construction, rehabilitation, and/or renovation of physical structures. This category does include CM Build as well as other construction related services such as: demolition, asbestos and lead abatement, and painting services, carpentry services, carpet installation and removal, where related to new construction and not maintenance.
- Professional Services** are a class of services that typically require the provider to have some specialized field or advanced degree. Services of this type include: legal, management consulting, information technology, accounting, auditing, actuarial, advertising, health services, pure construction management, environmental analysis, scientific testing, architecture and engineering, and traffic studies, and similar services.

a. Type of work on Prime Contract (Check one):

b. Type of work on Subcontract (Check all that apply):

- Construction Professional Services Construction Professional Services Other

2. What is the expected percentage of the total contract dollar value that you expect to award to all subcontracts? _____ %

3. Will you award subcontract(s) in amounts below \$ 1 million for construction and/or professional services contracts within the first 12 months of the notice to proceed on the contract? Yes No

Section III: Subcontractor Utilization Summary

IMPORTANT: If you do not anticipate that you will subcontract at the target level the agency has specified, because you will perform more of the work yourself, you must seek a waiver of the Target Subcontracting Percentage by completing p. 9).

Step 1:	Subcontracts under \$1M (4) (construction/professional services)	Total Bid/Proposal Value	Calculated Target Subcontracting Percentage
Calculate the percentage (of your total bid) that will go towards subcontracts under \$1M for construction and/or professional services	\$ _____	\$ _____	%
		÷	
		x 100 =	%

- Subcontracts under \$1M (construction/professional services):** Enter the value you expect to award to subcontractors in dollars for amounts under \$1 million for construction and/or professional services. This value defines the amount that participation goals apply to, and will be entered into the first line of Step 2.
- Total Bid/Proposal Value:** Provide the dollar amount of the bid/proposal.
- Calculated Target Subcontracting Percentage:** The percentage of the total contract dollar value that will be awarded to one or more subcontractors for amounts under \$1 million for construction and/or professional services. **This percentage must equal or exceed the percentage listed by the agency on page 1, at line (1).**

NOTE: The "Calculated Target Subcontracting Percentage" MUST equal or exceed the Target Subcontracting Percentage listed by the agency on Page 6, Line (1).

Tax ID #: _____

PIN#: _____

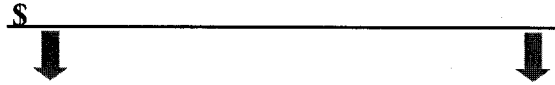
SCHEDULE B - cont.

Step 2:

Calculate value of subcontractor participation goals

Subcontracts under \$1M
(construction/professional services)

a. Copy value from Step 1, line (4) – the total value of all expected subcontracts under \$1M for construction and/or professional services



b. * From line a. above, allocate the dollar value of "Subcontracts under \$1M" by Construction and Professional Services,

Construction

Professional Services

* If all subcontracts under \$1M are in one industry, enter '0' for the industry with no subcontracts.

* Amounts listed on these lines should add up to the value from line a.

Subcontracts under \$1M by Industry \$ _____

\$ _____

* For Construction enter percentage from line (2) from Page 6.

* For Professional Services enter percentage from line (3) from Page 6.

c. * **Total Participation Goals Percentages must be copied from Part I, lines (2) and (3).**

Total Participation Goals x _____ %

x _____ %

d. **Value of Total Participation Goals** \$ _____

\$ _____

Step 3:

Subcontracts in Amounts Under \$1 M Scope of Work – Construction

Enter brief description of type(s) of subcontracts in amounts under \$1M anticipated, type of work, not by name of subcontractor

Enter brief description of type(s) of subcontracts in amounts under \$1M anticipated, by type of work, not by name of subcontractor

Subcontracts in Amounts Under \$1 M Scope of Work – Professional Services

Section IV: Vendor Certification and Required Affirmations

I hereby 1) acknowledge my understanding of the M/WBE requirements as set forth herein and the pertinent provisions of Local Law 129 of 2005, and the rules promulgated thereunder; 2) affirm that the information supplied in support of this subcontractor utilization plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE requirements of this Contract and the pertinent provisions of Local Law 129 of 2005, 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 subcontract(s) sufficient to meet the Target Subcontracting Percentage, unless a waiver is obtained, and the Vendor will award subcontract(s) sufficient to meet the Total Participation Goals unless such goals are modified by the Agency; and 5) agree and affirm, if awarded this contract the Vendor intends to make all reasonable, good faith efforts to meet the Target Subcontracting Percentage, or If the Vendor has obtained a waiver, the Vendor intends to meet the modified Target Subcontracting Percentage, if any, and the Vendor intends to solicit and obtain the participation of M/WBEs so as to meet the Total Participation Goals unless modified by the Agency.

Signature _____ Date _____
Print Name _____ Title _____

Tax ID #: _____

PIN#: _____

SCHEDULE B

ART III – REQUEST FOR WAIVER OF TARGET SUBCONTRACTING PERCENTAGE

Contract Overview

Tax ID # _____ FMS Vendor ID # _____

Business Name _____

Contact Name _____ Telephone # _____ Email _____

Type of Procurement Competitive Sealed Bids Other Bid/Response Due Date _____

PIN # (for this procurement) _____ Type of work on Prime Contract _____ Type of work on Subcontract (Check all that apply):

(Check one):

Construction

Construction

Other

Professional Services

Professional Services

SUBCONTRACTING as described in bid/solicitation documents (Copy this % figure from Subcontractor Utilization Plan, Part I, line

_____ % of the total contract value anticipated by the agency to be subcontracted for construction/professional services subcontracts valued below \$1 million (each)

ACTUAL SUBCONTRACTING as anticipated by vendor seeking waiver

_____ % of the total contract value anticipated in good faith by the bidder/proposer to be subcontracted for construction/ professional services subcontracts valued below \$1 million (each)

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

Vendor does not subcontract construction/professional services, and has the capacity and good faith intention to perform all such work itself.

Vendor subcontracts some of this type of work but at lower % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract.

Other _____

References

List 3 most recent contracts/subcontracts performed for NYC agencies (if any)

CONTRACT NO. _____ AGENCY _____ DATE COMPLETED _____

CONTRACT NO. _____ AGENCY _____ DATE COMPLETED _____

CONTRACT NO. _____ AGENCY _____ DATE COMPLETED _____

List 3 most recent contracts/subcontracts performed for other agencies/entities

(complete ONLY if vendor has performed fewer than 3 NYC contracts)

TYPE OF WORK _____ AGENCY/ENTITY _____ DATE COMPLETED _____

Manager at agency/entity that hired vendor (Name/Phone No.) _____

TYPE OF WORK _____ AGENCY/ENTITY _____ DATE COMPLETED _____

Manager at agency/entity that hired vendor (Name/Phone No.) _____

TYPE OF WORK _____ AGENCY/ENTITY _____ DATE COMPLETED _____

Manager at agency/entity that hired vendor (Name/Phone No.) _____

VENDOR CERTIFICATION: 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.

Signature: _____

Date: _____

Print Name: _____

Title: _____

Shaded area below is for agency completion only

AGENCY CHIEF CONTACTING OFFICER APPROVAL

Signature: _____

Date: _____

CITY CHIEF PROCUREMENT OFFICER APPROVAL

Signature: _____

Date: _____

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**BID FORM
THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES**

**BID FOR FURNISHING ALL LABOR AND
MATERIAL NECESSARY AND REQUIRED FOR:**

PROJECT ID: P1CROT16A

**Bronx River House
1041 East 172nd Street
Bronx 10460**

Name of Bidder: _____

Date of Bid Opening: _____

Bidder is: (Check one, whichever applies) Individual () Partnership () Corporation ()

Place of Business of Bidder: _____

Bidder's Telephone Number: _____ Bidder's Fax Number: _____

Bidder's Email Address: _____

Residence of Bidder (If Individual): _____

If Bidder is a Partnership, fill in the following blanks:

Names of Partners

Residence of Partners

If Bidder is a Corporation, fill in the following blanks:

Organized under the laws of the State of _____

Name and Home Address of President: _____

Name and Home Address of Secretary: _____

Name and Home Address of Treasurer: _____

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BID FORM

The above-named 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 set forth on the Affirmation included as page 17 of this Bid Booklet.

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

5. 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).

6. 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.

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.

7. 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.

8. 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.

9. 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:

BID FORM

PROJECT ID: PICROT16A

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. LUMP SUM PRICE - Total price for all labor and material for all required work, excluding items (B) and (C) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For
Labor

Total Price for Material
Sold and Delivered

\$ _____ + \$ _____ Total Price for Item A \$ _____

- B. ALLOWANCE for Part A-1 of Standing Column Well System Const. Seq. \$17,000.00
(Article 1.45 of the Addendum to General Conditions)

- C. ALLOWANCE for Part A-2 of Standing Column Well System Const. Seq. \$135,000.00
(Article 1.45 of the Addendum to General Conditions)

TOTAL BID PRICE (Add A + B + C) \$ _____
(a/k/a BID PROPOSAL)

BIDDER'S SIGNATURE AND AFFIDAVIT

WARNING!! Failure to comply with items below will result in the rejection of your bid.

SUBCONTRACTORS: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (See Page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". _____ Yes _____ No

- * MWBE GOALS: You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.**

Bidder: _____

By: _____
(Signature of Partner or corporate officer)

Attest: _____ Secretary of Corporate Bidder
(Corporate Seal)

Affidavit on the following page should be subscribed
and sworn to before a Notary Public

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BID FORM (TO BE NOTARIZED)

AFFIDAVIT WHERE BIDDERS IS AN INDIVIDUAL

STATE OF NEW YORK, COUNTY OF _____ ss:
_____ being duly sworn says:
I am the person described in and who executed the foregoing bid, and the several matters therein stated are in all respects true.

(Signature of the person who signed the Bid)

Subscribed and sworn to before me this
_____ day of _____,

Notary Public

AFFIDAVIT WHERE BIDDERS IS A PARTNERSHIP

STATE OF NEW YORK, COUNTY OF _____ ss:
_____ being duly sworn says:
I am a member of _____ the firm described in and which executed the foregoing bid.
subscribed the name of the firm thereto on behalf of the firm, and the several matters therein stated are in all respects true.

(Signature of Partner who signed the Bid)

Subscribed and sworn to before me this
_____ day of _____,

Notary Public

AFFIDAVIT WHERE BIDDERS IS A CORPORATION

STATE OF NEW YORK, COUNTY OF _____ ss:
_____ being duly sworn says:
I am the _____ of the above named corporation whose name is subscribed to and which executed
the foregoing bid. I reside at _____.
I have knowledge of the several matters therein stated, and they are in all respects true.

(Signature of Corporate Officer who signed the Bid)

Subscribed and sworn to before me this
_____ day of _____,

Notary Public

AFFIRMATION

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

(If none, the bidder shall insert the word "None" in the space provided above.)

Full Name of Bidder: _____

Address: _____

City: _____ State: _____ Zip Code: _____

CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:

A - Individual or Sole Proprietorship *
SOCIAL SECURITY NUMBER

B - Partnership, Joint Venture or other unincorporated organization
EMPLOYER IDENTIFICATION NUMBER

C - Corporation
EMPLOYER IDENTIFICATION NUMBER

By: _____
Signature:

Title: _____

If a corporation, place seal here

This affirmation must be signed by an officer or duly authorized representative.

* Under the Federal Privacy Act the furnishing of Social Security Numbers by bidders on City contracts is voluntary. Failure to provide a Social Security Number will not result in a bidder's disqualification. Social Security Numbers will be used to identify bidders, proposers or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying of businesses which seek City contracts.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

NOTICE TO BIDDERS

SUBMISSION: The Bidder must, at the time of the bid, submit the form on the next page ("BIDDER'S IDENTIFICATION OF SUBCONTRACTORS"). This form must be submitted in a separate, sealed envelope (BID ENVELOPE #2). Failure to do so will result in the disqualification of the bid as non-responsive.

Please be advised that pursuant to GML § 101(5) the 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:

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

NOTE: This project may not involve all of the above listed subcontractors. Please see the form on the next page which indicates the subcontractors required for this Project.

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

Failure to submit the completed form on the next page ("Bidder's Identification of Subcontractors") that includes the names of subcontractors and the agreed upon amounts to be paid to such subcontractors will render the bid non-responsive.

PLEASE NOTE: for any contract that is subject to M/WBE participation goals under Local Law 129, if the bidder's intention to use its own forces to do any of the above-referenced work would result in Bidder's failure to attain the Target Subcontracting Percentage identified in the Subcontractor Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a Waiver of Target Subcontracting Percentage (Subcontractor Utilization Plan, Part III) in advance of 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 shall be returned to the bidders unopened after contract award, unless the bidder has given the agency permission to shred the form.

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 §222 (2)(e) of the Labor Law, or if the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

Project ID: P1CROT16A

SUBMISSION: In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. PLUMBING CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

2. HVAC CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

3. ELECTRICAL CONTRACTOR:

(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ _____

BIDDER'S SIGNATURE: The Bidder must sign this form in the space provided below:

Name of Bidder: _____

By: _____
Signature of Partner or Corporate Officer

Print Name: _____

Title: _____

BID BOND 1
FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, _____

hereinafter referred to as the "Principal", and _____

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 _____

(\$ _____), 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 _____

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.

BID BOND 2

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to him 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 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 _____ day of _____, _____.

(Seal)

Principal (L.S.)

By: _____

(Seal)

Surety

By: _____

BID BOND 3

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

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

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

AFFIX ACKNOWLEDGEMENTS AND JUSTIFICATION OF SURETIES

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BID BREAKDOWN

Submission: Bidders are advised that the requirement to submit a Bid Breakdown applies to each contract for which an "X" is indicated before the word "Yes". If required, the bidder must submit, with its bid, a completed Bid Breakdown. Failure to provide a completed Bid Breakdown may result in rejection of the bid as non-responsive.

 X YES NO

Limitations on Use of Bid Breakdown:

Bidders are advised that the Bid Breakdown shall be used for bid analysis purposes only and shall not be binding for any other purposes under the Contract, including, without limitation, for payment purposes or in connection with a contractor claim for extra work. If the form for the Bid Breakdown does not include an item of work required by the Contract Documents, such omission shall have no effect whatsoever, nor shall it be used by the contractor in connection with a claim for extra work (i.e., work for which the contractor is entitled to a change order).

Instructions for Preparing Bid Breakdown:

- (A) The Bid Breakdown is set forth on the following pages of this Bid Booklet and is in accordance with the Construction Specification Institute (CSI) format. For all items of work listed in the Bid Breakdown, the bidder must indicate the price for labor and the price for material, as well as the estimated quantities required.
- (B) In preparing its Bid Breakdown, the bidder shall submit prices that include all costs for overhead and profit. Overhead shall include, without limitation, all costs in connection with the following: administration, management, superintendence, small tools, insurance, bonds, and provision of services or items required by the General Conditions [except for Security/Fire Guard Services and Temporary Heat]. If the Project requires Security/Fire Guard Services and/or Temporary Heat, such service(s) will be included as separate line items in the Bid Breakdown.
- (C) If an item is set forth in the Bid Breakdown, but is not included in the Contract Documents (Drawings, Specifications, General Conditions, and/or Addenda), the bidder is advised to leave the item blank and exclude the cost of the item from its grand total. In an attachment to its Bid Breakdown, the bidder shall provide a list of all items left blank.
- (D) If an item is not set forth in the Bid Breakdown, but is included in the Contract Documents (Drawings, Specifications, General Conditions, and/or Addenda), the bidder is advised to add the item to its Bid Breakdown and include the cost of the item in its grand total. In an attachment to its Bid Breakdown, the bidder shall provide a list of all items added.

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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 WORK							
01 000	GENERAL REQUIREMENTS							
	Mobilization		LS					
	Fire Guards		LS					
	Temporary Heat		LS					
	Temporary Light and Power		LS					
	Subtotal							
01 330	LEED REQUIREMENTS							
	LEED Requirements		LS					
	Subtotal							
01 332	LEED SUBMITTALS (included w/ 01330)							
01 335	VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, PAINTS, SEALANTS AND ARCHITECTURAL COATINGS (included w/ 01330)							
01 506	CONSTRUCTION WASTE MEANAGEMENT (included w/ 01330)							
01 511	CONSTRUCTION IAQ MEANAGEMENT (included w/ 01330)							
01 810	COMMISSIONING (included w/ 01330)							
02 000	SITE CONSTRUCTION							
02 060	AGGREGATE MATERIALS- LANDSCAPE (included w/ 02300)							
02 065	STRUCTURAL SOIL							
	Structural Soil		CY					
	Subtotal							

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02 120	HARVESTING SYSTEM							
	Storm Water Tank 10,000 GAL		EA					
	Pump		LS					
	Controller System		LS					
	Water Quality Treatment: Filtration & UV treatment & dye injection		LS					
	Carbon Activation Treatment		LS					
	Ferigation System		LS					
	Prefiltration Unit/ Hydine Seperator Manhole		EA					
	Subtotal							
02 130	HARVESTING SYSTEM CONTROLS (included w/ 02120)							
02 140	HARVESTING SYSTEM FILTRATION AND TREATMENT (included w/ 02120)							
02 205	PROTECTION, DEMOLITION AND RELOCATION OF EXISTING UTILITIES							
	Removal of Sheridan Outfall, etc. (excluding excavation, shoring)		LS					
	Subtotal							
02 230	TREE PROTECTION AND TREE PRUNING							
	Prepatory Fertilizing Existing Tree		LS					
	Prepatory Pruning Existing Tree		LS					
	Tree Protection		LS					
	Subtotal							
02 300	EARTHWORK							
	Clear and Grub		LS					

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	Site Grading/ Leveling (Earthmoving)		CY					
	Borrowed Fill (Truck Measured)		CY					
	Borrowed Fill (Measured In Place)		CY					
	Excavation and Backfill (Unclassified excavation) for Storm Lines and Sheridan Outfall		CY					
	Fine Grade at Sod or Groundcover (Earthmoving)		SF					
	6" Gravel Base for Paving (Broken Stone)		CY					
	Geotextile - Drainage		SY					
	Geotextile - Separation		SY					
	Broken Stone - Loose Measure		CY					
	Sand		CY					
	Foundation Material for Asphalt (Truck Measured)		CY					
	Sheeting and Shoring		SF					
	Sheeting and Shoring (Trenching Utilities to CS and Spray Controls)		SF					
	Dewatering		LS					
	Subtotal							
02 316	PNEUMATIC EXCAVATION							
	Hand and/or Pneumatic Excavation		CY					
	Subtotal							
02 370	EROSION CONTROLS							
	Catch Basin Silt Sack		EA					
	Temporary Silt Fence		LF					
	Stabilized Construction Entrance		SY					
	Subtotal							
02 371	GABION RETAINING WALLS							
	Stone Gabions 18"X18"X 3'0" H. including Stake Supports		LF					
	Recycled Plastic Lumber (RPL) Edging		LF					
	Subtotal							

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02 375	BOULDERS							
	Provide and Place Boulders (including Edging)		LS					
	Subtotal							
02 455	TIMBER PILES							
	Wood Piles (25' Long) Predrilled		LF					
	Mobilization/ Demobilization		LS					
	Dewatering		LS					
	Subtotal							
02 510	WATER DISTRIBUTION							
	Type K Copper Tubing - 1 1/2" Dia.		LF					
	Precast Concrete Water Vault		EA					
	Precast Above-Ground RPZ		EA					
	Cement-Lined Ductile Iron Water Pipe -3" Dia.		LF					
	Cement-Lined Ductile Iron Water Pipe -4" Dia.		LF					
	Cement-Lined Ductile Iron Water Pipe -6" Dia.		LF					
	Cement-Lined Ductile Iron Water Pipe -8" Dia.		LF					
	Cement-Lined Ductile Iron Water Pipe-12" Dia.		LF					
	Curb and Property Line Valves- 1-1/2" Dia.		SET					
	Gate Valve- Mechanical Joint 3" Dia.		EA					
	Gate Valve- Mechanical Joint 8" Dia.		EA					
	Cast Iron Valve Box- 5-1/4" Dia.		EA					
Fire Hydrant w/ Fenders		EA						
	Subtotal							
02 521	DECOMMISSION GROUNDWATER WELL							
	Decommission Groundwater Well		EA					
	Subtotal							

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02 530	SANITARY SEWERAGE							
	Precast Concrete Structures		EA					
	Ductile Iron Sewer Pipe- 6" Dia.		LF					
	Ductile Iron Sewer Pipe- 8" Dia.		LF					
	Ductile Iron Sewer Pipe- 12" Dia.		LF					
	Concrete- Encased High Density Force Main Pipe- 1.25" Dia.		LF					
	DCV Assembly and Water Meter w/ Remote- 8" Dia.		EA					
	Subtotal							
02 550	NATURAL GAS DISTRIBUTION							
	Gas Service Main- 2" Dia.		LF					
	Subtotal							
02 580	ELECTRICAL SITEWORK							
	4" PVC Coated RGS Conduit		LF					
	3" PVC Coated RGS Conduit		LF					
	2" PVC Coated RGS Conduit		LF					
	1-1/2" PVC Coated RGS Conduit		LF					
	#500 KCMIL Wire		LF					
	#4/0 AWG Wire		LF					
	#2/0 AWG Wire		LF					
	#1/0 AWG Wire		LF					
	#2 AWG Wire		LF					
	#6 AWG Wire		LF					
	#10 AWG Wire		LF					
	Property Line Box (Remove and Replace Existing)		EA					
	Temporary Electric Service Cabinet		EA					
	Pullbox		EA					
	DOT Lightpole w/ 2 Luminaires		EA					
	DOT Photo Cell Assembly and Control Cabinet Connections		EA					
	Electric Heater and Wiring for DCV Vault		EA					
	Exterior Cabinets for Relocated CS (Comfort Station)		LS					

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	Telephone Conduit -4" Dia.		LF					
	Subtotal							
02 630	STORM DRAINAGE							
	10" Dia. Dip		LF					
	6" Dia. Dip		LF					
	6" Dia. Slotted Polyethylene Pipe		LF					
	Clean, Flush and Test		LS					
	Clear Existing Storm/ Sanitary Sewer Pipe		LF					
	Clear Existing Drainage Structure		EA					
	Adjust Top of Utility Structure to Grade		EA					
	Precast Concrete Structures		EA					
	Parks Leaf Manhole Cover and Frame		EA					
	Parks Leaf Catch Basin Cover and Frame		EA					
	Reinforced Concrete Pipe- 12" Dia.		LF					
	Reinforced Concrete Pipe- 36" Dia.		LF					
	Slotted Polyethylene Pipe		LF					
	Stormwater Treatment		LS					
	Subtotal							
02 631	TRENCH DRAINS							
	SS Trench Drain w/ SS Grate (Exterior)		LF					
	Trench Drain and Cover in Boat Storage (Interior)		LF					
	Subtotal							
02 721	AGGREGATE BASE COURSES (included w/ 02300)							
02 731	SANITARY PUMP STATION							
	Sewage Ejector Pump/ Pit		LS					
	Subtotal							

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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
02 740	ASPHALT PAVING							
	Restoration of Street Pavement		SY					
	Detectable Warning for Ped. Ramp		SF					
	Steel Faced Concrete Curb		LF					
	Concrete Curb		CY					
	Full Depth Asphalt Pavement		SY					
	Roadwork to Upgrade Water Connection per DEP		LS					
	New Asphalt in Parking Lot (Replace Permeable)		SY					
	Subtotal							
02 750	CONCRETE PAVEMENT							
	Colored Reinforced Concrete Pavement		SY					
	5" Poured Concrete Paving (including Rebar and EJ at Boat Plaza)		SF					
	Cement Concrete Pavement		SY					
	Subtotal							
02 760	PAVEMENT MARKINGS							
	Thermoplastic HFPRM ADA Parking Symbol		EA					
	Thermoplastic HFPRM Parking Lines- 4" Width		LF					
	Subtotal							
02 761	UNIT PAVEMENTS							
	Precast Architectural Concrete Pavers		SF					
	2" Stone Dust		SF					
	Granite Pavers on Asphalt Base		SY					
	Detectable Warning for Pedestrian Ramp		SF					
	River Cobble Pavement		SF					
	Stone Border (at Parking Lot Median)		LF					
	Steel Edging		LF					
	Subtotal							

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02 771	STONE CURBS AND STEPS							
	Granite Edging		LF					
	Subtotal							
02 796	NATURAL STONE POROUS PAVING SYSTEM							
	Inserts at Boat Plaza		LS					
	Subtotal							
02 810	IRRIGATION AND CONTROLLER SYSTEM							
	Drip Irrigation System Complete (w/ Controller)		LS					
	Vertical Irrigation System Complete		LS					
	Subtotal							
02 821	METAL BARRIER GATES							
	Metal Barrier Fence		EA					
	Subtotal							
02 825	RANGE FENCE							
	Range Fence- 4' High		LF					
	Subtotal							
02 840	TIMBER BARRIER RAIL							
	Timber Barrier Rail- One Rail (Type C)		LF					
	Subtotal							
02 871	BICYCLE RACK							
	Bicycle Racks		EA					
	Subtotal							
02 872	PRECAST CONCRETE BENCH							
	Custom Curved Concrete Bench		LS					
	Subtotal							

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02 890	TRAFFIC SIGNAGE							
	Steel Drive Rail		EA					
	ADA Signs		EA					
	Miscellaneous Expenses		LS					
	Subtotal							
02 910	TOPSOIL							
	Imported Topsoil (Seeded and Sodded)		CY					
	Topsoil for Seeded and Sodded Areas		CY					
	Topsoil for Planting Pits and Beds		CY					
	Topsoil for Infiltration Swale		CY					
	Subtotal							
02 920	LAWNS AND GRASSES							
	Sod without Compost		SF					
	Construct Lawn		SY					
	Subtotal							
02 930	PLANTING							
	Trees:							
	Plants- Gleditsia Triacanthos Honey Locust 4"-6" Cal.		EA					
	Plants- Nyssa Sylvatica, Black Tulepo 4"-6" Cal.		EA					
	Plants- Sassafras Albidum, Sassafras 4"-6" Cal.		EA					
	Plants- Acer Rubrum 'Red Sunset' Red Maple		EA					
	Nyssa Sylvatica, Black Gum		EA					
	Multistemmed trees:							
	Plants- Amelanchier Canadensis, Shadbush Serviceberry 3 1/2" Cal.		EA					
	Plants- Amelanchier Canadensis, Shadblow Serviceberry, 8'-10' HT.		EA					
	Plants- Magnolia Virginiana, 'Moonglow' Sweetbay Magnolia, 8'-10' HT.		EA					

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	Large Shrubs:							
	Plants- Clethra Alnifolia, Sweet Pepperbush-10 Gal.		EA					
	Plants- Cornus Sericea 'Cardinal', Redosier Dogwood-10 Gal.		EA					
	Plants- Myrica Pennsylvanica, Northern Bayberry, 10 Gal., 4' HT.		EA					
	Plants- Cornus Sericea, Redosier Dogwood- 10 Gal.		EA					
	Plants- Viburnum Acerifolium Mapleleaf Viburnum- 10 Gal.		EA					
	Clethra Alnifolia 'Ruby Speic', Summersweet		EA					
	Aronai Arbutifolia 'Brilliantissima' Red Chokeberry		EA					
	Small Shrubs:							
	Plants- Ilex Glabra 'Compacta', Inkberry- 3 Gal.		EA					
	Plants- Ilex Glabra 'Nordic', Nordic Compact Inkberry- 3 Gal.		EA					
	Plants- Itea Virginica, Sweetspire- 3 Gal.		EA					
	Plants- Rosa Virginica, Virginia Rose- 3 Gal.		EA					
	Plants- Symphoricarpos Albus, Snowberry 3 Gal.		EA					
	Plants/ Shrubs- Myrica Pennsylvanica, Northern Bayberry		EA					
	Plants/ Shrubs- Rhus Glabra, Smooth Sumac		EA					
	Plants/ Shrubs- Sambucus Canadensis, Common Elderberry		EA					
	Plants/ Shrubs- Vaccinium Angustifolium, Lowbush Blueberry		EA					
	Vines:							
	Plants- Campsis Radicans, Trumpet Creeper- 3 Gal.		EA					
	Plants- Clematis Montana 'Alexander Clematis': 6'-8' Tendrils		EA					
	Plants- Parthenocissus Quinquefolia, Virginia Creeper- 3 Gal.		EA					
	Plants- Parthenocissus Tricuspidata, Boston Ivy- 3 Gal.		EA					
	Perennials:							
	Plants- Allium Christopii, Persian Onion		EA					
	Plants- Astilbe Chinensis, Maggie Daley Asilbe- 2 Gal.		EA					
	Plants- Campanula Latifolia, Sarastro Bell Flower- 2 Gal.		EA					
	Plants- Coreopsis Lanceolata 'Golden Gain', Tickseed- 2 Gal.		EA					
	Plants- Echinacea Paradoxa, Yellow Coneflower- 2 Gal.		EA					
	Plants- Coreopsis Lanceolata 'Golden Gain', Tickseed- 2 Gal.		EA					
	Plants- Echinacea Purpurea Purple Coneflower- 2 Gal.		EA					

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	Plants/ Perennials- Rudbeckia Hirta 'Indian Summer', Black-Eyed Susan		EA					
	Geranium Malculatum 'Expresso', Geranium 'Expresso'- 2 Gal.		EA					
	Salvia X Superba, Sage- 2 Gal.		EA					
	Grasses:							
	Carex Grayi, Gray's Sedge		EA					
	Deschampsia Cespitosa, Tufted Hairgrass- 3 Gal.		EA					
	Muhlenbergia Capillaris 'Lenca' Poink Muhiy Grass- 2 Gal.		EA					
	Panicum Virgatum, Red Switch Grass- 3 Gal.		EA					
	Sporobolus Heterolepis, Prairie Dropseed		EA					
	Ferns:							
	Matteuccia Struthiopteris, Ostrich Fern- 2 Gal.		EA					
	Polystichum Acrostichoides, Christman Fern- 2 Gal.		EA					
	Groundcover:							
	Vinca Minor Bowles, Periwinkle- 1 Qt.		EA					
	Bulbs:							
	Plants/ Bulbs-Lilium Alcifolium, Tiger Lily		EA					
	Shredded Bark Mulch		SY					
	Compost (Truck- Measured)		CY					
	Plants in Planter Pockets (per pocket)		EA					
	Subtotal							
02 931	VERTICAL WALL PLANTER PANTELS							
	Vertical Wall Panels (Various Sizes Cut in Field)		SF					
	Subtotal							
03 000	CONCRETE							
03 300	CAST IN PLACE CONCRETE							
	Concrete Pile Caps		CY					
	Concrete Grade Beams		CY					
	Epoxy-Coated Reinforcement		LS					
	12" Concrete Knee Wall		CY					

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	Vertical Concrete Footings for Green Screen Fence Posts		EA					
	Concrete Footings for Sloped Green Screen Fence Posts		EA					
	7" Structural Slab		SF					
	Reinforced Concrete Beam over Door Openings 10"X18"		LF					
	6" Gravel Base (Broken Stone)		CY					
	Radiant Piping in Topping Slab (included with 15000)							
	Subtotal							
03 320	CONCRETE FLOOR TOPPING							
	3" Topping Slab (Excludes Boathouse)		CY					
	Subtotal							
03 700	CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS							
	Concrete (Landscape) Steps		CY					
	6"X 12" Concrete Perimeter Curb		LF					
	8"X 24" Concrete Curb for Railings		LF					
	Concrete Footing for East Plaza Wall		CY					
	6"-16" Concrete for East Plaza Wall		CY					
	Concrete Slab Footing for Bench		CY					
	Reinforced Concrete Steps		LS					
	Average Concrete		CY					
	Subtotal							
04 000	MASONRY							
04 225	AUTOCLAVED AERATED CONCRETE UNITS							
	Reinforced ACC Blocks at Exterior Walls -12" Thick		SF					
	Reinforced ACC Blocks at Interior Partitions -12" Thick		SF					
	Miscellaneous Grouts, Mortar, Bond Beams, etc.		LS					
	Subtotal							

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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
05 000	METALS							
05 450	CHAIN LINK MECHANICAL ENCLOSURE							
	Chain Link Fence Mechanical Enclosure (including Gates and Locks)		SF					
	Chain Link Fence Horizontal Roof		SF					
	Subtotal							
05 500	MISCELLANEOUS METALS							
	Roof Ladder- 16' High		EA					
	Miscellaneous Steel Angles, Lintels, Brackets, etc.		LS					
	1 1/2" SS 2-Pipe Handrail- 34" High		LF					
	Bollards in Boat House (interior)		EA					
	Steel Pipe Bollard- 30" High (in boat plaza)		EA					
	Removable Steel Pipe Bollard		EA					
	Green Screen Steel Framing/ Mesh Panels including Swing Gates (20' High at Building/ 23' High at Sloped Screen)		SF					
	Security Grilles at Monitor/ Clerestory Windows		SF					
	Subtotal							
06 000	WOOD AND PLASTICS							
06 126	WOOD TRUSSES							
	Wood Truss Joists		SF					
	Subtotal							
06 200	CARPENTRY							
	Rough Framing, Blocking, Door Install		LS					
	Subtotal							
06 400	ARCHITECTURAL WOODWORK							
	Plywood Tops over Closets		SF					
	Timber Framing for Roof Monitors		SF					
	2" T&G Wood Plank at Roof- Flat		SF					

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	Ext. Plywood at Sloped Clerestory Roof		SF					
	Reception Desk		LS					
	Millwork at Pantry		LS					
	Miscellaneous Carpentry (Wood Blocking, Closet Shelves, Rods, etc.)		LS					
	Subtotal							
07 000	THERMAL AND MOISTURE PROTECTION							
07 130	SHEET MEMBRANE WATERPROOFING							
	Waterproof Membrane (Under Slab)		SF					
	Subtotal							
07 180	TRAFFIC COATING SYSTEM							
	Boat Storage Floor and Base		SF					
	Mechanical Room Floor and Base		SF					
	Subtotal							
07 210	BUILDING INSULATION							
	3" High Density EPS Insulation (excludes Boathouse)		SF					
	8" High Density EPS Rigid at IRMA Roof (No Slope)		SF					
	Vapor Barrier and 4" EPS Insulation/ CDX Composite Panel (at Roof Monitors- All Surfaces)		SF					
	Subtotal							
07 211	SPRAYED THERMAL INSULATION							
	Spray Thermal Insulation (12' High)		SF					
	Subtotal							
07 450	CEMENT BOARD RAINSCREEN SYSTEM							
	Exterior Cement Rainscreen including wood furring and accessories		SF					
	Subtotal							

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07 541	ROOF WATERPROOFING SYSTEM							
	Membrane (Seamless MAA w/ Fleece) including ballast and drainage mat/ filter fabric		SF					
	Inside of Parapets		SF					
	Subtotal							
07 542	WATERPROOFING SYSTEM FOR WALLS							
	Spray-Applied Waterproofing		SF					
	Spray-Applied Waterproofing at Monitors (all sides)		SF					
	Waterproofing Furring and other Penetrations		LS					
	Subtotal							
07 600	SHEET METAL WORK							
	Roof Accessories (Caps, Flashings, etc.)		SF					
	Subtotal							
07 610	SHEET METAL ROOFING							
	SS Seam Roof		SF					
	Subtotal							
07 700	ROOF SPECIALTIES AND ACCESSORIES							
	Roof Hatch/ Roof Specialties		EA					
	Subtotal							
07 840	FIRESTOPS AND SMOKESEALS							
	Miscellaneous Firestopping		LS					
	Subtotal							
07 900	JOINT SEALERS							
	Miscellaneous Caulking and Sealants		SF					
	Subtotal							

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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
08 000	DOORS AND WINDOWS							
08 100	STEEL DOORS AND FRAMES							
	HM Interior with Vision Panel - Single		EA					
	HM Interior with Vision Panel - Double		PR					
	HM Interior with Sidelight- Large Door (Vestibule)		EA					
	HM Interior Closet Door - Single		EA					
	HM Interior Closet Door - Double		PR					
	Subtotal							
08 300	ACCESS DOORS							
	Access Doors		LS					
	Subtotal							
08 330	ROLL UP DOORS							
	Roll Up Overhead Door Opaque Slats - 20'X13'		EA					
	Roll Up Overhead Door Opaque Slats - 10'X13'		EA					
	Motors on Roll Up Doors		EA					
	Subtotal							
08 340	ROLL UP GRILLES							
	Roll Up Mesh Doors in Screen		EA					
	Motors on Roll Up Doors		EA					
	Subtotal							
08 410	ALUMINUM SWINGING ENTRANCE DOORS							
	Glass Entrance Door 8'-8" High - Single		EA					
	Subtotal							
08 480	ALUMINUM FRAMED FOLDING DOORS							
	Bi-Fold Glass Entrance Doors - Double		PR					
	Subtotal							

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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
08 520	ALUMINUM WINDOWS							
	Roof Monitor Windows (fixed and operable)		SF					
	Operable Crank Groups for Roof Monitors		EA					
	Operable Windows and Motors		EA					
	Aluminum/ Glass Windows		SF					
	Subtotal							
08 700	FINISH HARDWARE							
	Finish Hardware		EA					
	Subtotal							
08 800	GLASS AND GLAZING							
	HM Glazed Transom Panels 6'X2'		EA					
	Aluminum/ Glass Door Sidelites		EA					
	Subtotal							
09 000	FINISHES							
09 250	GYPSUM DRYWALL							
	Gypsum Board Partitions (Stud/ Gyp./ Gyp.)		SF					
	Gypsum Board Partitions (Double Stud/ Gyp./ Gyp.)		SF					
	Gypsum Board Furring at ACC Walls (12' High)		SF					
	Batt Insulation		SF					
	Gypsum Board Ceiling		SF					
	Gypsum Board Fascia		SF					
	Gypsum Board Light Cove		SF					
	Subtotal							
09 310	CERAMIC TILE							
	Ceramic Tile Floor		SF					
	Ceramic Tile		LF					
	Ceramic Tile Wall - 8' High		SF					
	Subtotal							

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09 510	ACOUSTIC PANEL CEILINGS							
	ACT Ceiling		SF					
	Subtotal							
09 660	RESILIENT TILE FLOORING							
	Rubber Floor		SF					
	Rubber Base		LF					
	Subtotal							
09 681	CARPET							
	Carpet		SY					
	Subtotal							
09 900	PAINTING AND FINISHING							
	Paint Gyp. Walls		SF					
	Paint Gyp. Ceilings		SF					
	Paint Doors and Frames		LVS					
	Stain Wood Deck and Trusses		LS					
	Subtotal							
10 000	SPECIALTIES							
10 100	VISUAL DISPLAY BOARDS							
	Marker Board and Bulletin Board		LS					
	Subtotal							
10 260	CORNER GUARDS							
	Corner Guards		EA					
	Subtotal							
10 400	SIGNAGE							
	Signage and Graphics		LS					

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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
	Exterior Building Sign Type X		LS					
	Subtotal							
10 500	LOCKERS		EA					
	Metal Lockers, Half Height							
	Subtotal							
10 522	FIRE EXTINGUISHERS AND CABINETS		LS					
	Fire Extinguishers and Cabinets							
	Subtotal							
10 800	TOILET ACCESSORIES		EA					
	Individual Mirror							
	Toilet Tissue Dispenser							
	Sanitary Napkin Disposal							
	Sanitary Napkin Vendor							
	Paper Towel Dispenser/ Disposal							
	Toilet Seat Cover Dispenser							
	Soap Dispenser							
	Grab Bar 24"							
	Grab Bar 36"							
	Coat Hook							
	Shower Cubicle (with seat, rod, bar and all accessories)							
	Diaper Changing							
	Subtotal							
11 000	EQUIPMENT							
11 132	PROJECTION SCREEN		LS					
	Projection Screen (manual)							
	Subtotal							

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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
11 450	APPLIANCES							
	Refrigerator		EA					
	Microwave		EA					
	Subtotal							
12 000	FURNISHINGS							
12 480	FLOOR MATS AND FRAMES							
	Recessed Floor Mat at Vestibule		SF					
	Subtotal							
13 000	SPECIAL CONSTRUCTION							
13 650	PHOTOVOLTAIC SYSTEM							
	Solar Panels		EA					
	225 Amp AC Combiner Panel		EA					
	SB Inverters (including Nema 3R DC Disconnects)		EA					
	Nema 3R AC Disconnects		EA					
	12x6x6 Nema 1 Pull		EA					
	Nema 3R Pass-Thru Box		EA					
	Nema 3R Pull Boxes		EA					
	2 1/2" GRC		LF					
	3/4" GRC		LF					
	4/0 AWG		LF					
	6 AWG		LF					
	10 AWG		LF					
	DAS System		LS					
	Miscellaneous Accessories		LS					
	Testing/ Balancing		LS					
	Subtotal							

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13 845	RESOURCE MONITORING DISPLAY							
	Building Monitoring System (includes Wall-Mounted Monitor)		LS					
	Subtotal							
15 000	MECHANICAL							
15 000	SPECIAL REQUIREMENTS FOR MECHANICAL AND ELECTRICAL (included w/ 15600)							
15 050	SEISMIC RESTRAINTS FOR ISOLATED AND UNISOLATED EQUIPMENT (included w/ 15810)							
15 100	GENERAL PROVISIONS FOR PLUMBING							
	Water Heater:							
	WH - 40 Gal.		EA					
	WH - 20 Gal.		EA					
	Circ. Pump - 20 GPM		EA					
	Domestic Water (Potable Water):							
	2" Dia.		LF					
	1 1/2" Dia.		LF					
	1" Dia.		LF					
	3/4" Dia. - 1/2" Dia.		LF					
	Domestic Water (Not Potable Water):							
	2" Dia.		LF					
	1 1/2" Dia.		LF					
	1" Dia.		LF					
	3/4" Dia.		LF					
	1/2" Dia.		LF					
	1 1/2" RPZ		EA					
	Water Meter Valve Ass. 1 1/2" Dia.		EA					
	Sanitary Waste And Vent (Buried):							
	4" Dia.		LF					

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	2" Dia.		LF					
	1 1/2" Dia.		LF					
	Sanitary Waste And Vent (Above):							
	4" Dia.		LF					
	3" Dia.		LF					
	2" Dia. and smaller		LF					
	4" House Trap		EA					
	Sanitary & Storm Clean-Out		EA					
	Storm (Above):							
	2 1/2" Dia.		LF					
	2" Dia.		LF					
	System ID / Valve Tags		LS					
	Excavation, Backfill, Cutting & Patching		LF					
	Clean-Up Requirements		LS					
	Misc Job Expenses		LS					
	Subtotal							
15 110	PIPE, TUBE AND FITTINGS FOR PLUMBING WORK (included w/ 15100)							
15 120	VALVES FOR PLUMBING WORK							
	Plumbing Valves And Specialties (All Systems)		LS					
	Site Piping, Valves, Gates		LS					
	Subtotal							
15 130	HANGERS AND SUPPORTS FOR PLUMBING WORK (included w/ 15100)							
15 150	INSULATION FOR PLUMBING WORK							
	Potable & Non-Potable Water Pipe		LF					
	Storm Water Horizontal Pipe		LF					
	Subtotal							

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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
15 160	PLUMBING EQUIPMENT, SPECIALTIES AND ACCESSORIES							
	Roof Drains 2" Dia.		EA					
	Floor Drains 3" Dia.		EA					
	Trench Drains (Plumbers Connection Only)		EA					
	Vtr 4" Dia.		EA					
	Hose Bibbs		EA					
	3/4" NFWH		EA					
	3/4" NFBH		EA					
	Subtotal							
15 300	PLUMBING FIXTURES AND TRIMS							
	Plumbing Fixtures:							
	Water Closet		EA					
	Water Closet Flash Valve Wall Hang, Handicapped		EA					
	Lavatory		EA					
	Lavatory Wall Hang, Handicapped		EA					
	Sink (Boat House)		EA					
	Shower		EA					
	Service Sink		EA					
	Pantry Sink		EA					
	Electrical Water Cooler (ADA)		EA					
	Fixtures Rough-In		EA					
	Fixture Distribution and Handling		LS					
	Subtotal							
15 320	DOMESTIC HOT WATER HEATERS (included w/ 15100)							
15 380	TESTING AND ADJUSTMENTS							
	Clean, Flush and Test		LS					
	Subtotal							

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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
15 390	MANUFACTURERS FOR PLUMBING WORK (included w/ 15100)							
15 452	DOMESTIC HOT WATER TEMPERATURE MAINTENANCE SYSTEM (included w/ 15100)							
15 600	GENERAL PROVISIONS FOR MECHANICAL WORK							
	GWS/R:							
	3" Dia (Supply / Return) - HDPE		LF					
	1-1/2" Dia (Bypass) to Storm Drainage System		EA					
	Gate Valves - 3" Dia		EA					
	Gate Valves - 1-1/2" Dia		EA					
	Balancing Valves - 1-1/2" Dia		EA					
	Control Valves - 1-1/2" w/ Aquastat		EA					
	Thermometers and Gages		EA					
	ET-2 Expansion Tank (Heat Exchanger Loop) - 21 Gal.		EA					
	Pipe Sleeves - 3"		EA					
	Excavation & Backfill (excluding Sheathing)		LF					
	Controls		LS					
	Clean, Flush and Test		LS					
	Miscellaneous System Requirements		LS					
	Expansion Tanks:							
	ET-1 Expansion Tank (Heat Pump Loop) - 22 Gal		EA					
	Air Separator:							
	AS-1 Air Separator (Heat Pump Loop)		EA					
	AS-2 Air Separator (Heat Exchanger Loop)		EA					
	Water Storage Tanks:							
	ST-1 (Chilled Water System) - 120 Gal		EA					
	ST-2 (Hot Water System) - 120 Gal		EA					
	Equipment Hook-Up:							
	ACU-1		EA					

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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
	Air Side System:							
	Gal. Steel Duct Work		LBS					
	Air Devices		EA					
	Volume Dampers		EA					
	Backdraft Damper		EA					
	FD/ AD		SF					
	Smoke Detector (AHU)		EA					
	Acoustical Lining		SF					
	VAV Boxes - 200 CFM		EA					
	VAV Boxes - 400 CFM		EA					
	VAV Boxes - 700 CFM		EA					
	VAV Boxes - 1200 CFM		EA					
	VAV Boxes - 1800 CFM		EA					
	VAV Boxes - 2400 CFM		EA					
	VAV Boxes - 3500 CFM		EA					
	Sound Attenuator at VAV Boxes		EA					
	SA-1, SA-2 Sound Attenuator at AHU Unit		CFM					
	HVAC System Control:							
	ACU-1		EA					
	HVAC Fans		EA					
	Hot Water Unit Heater		EA					
	Cabinet Unit Heaters		EA					
	Heat Pump		EA					
	Water Pump		EA					
	Plate & Frame Heat Exchanger		EA					
	CO2 Sensor		EA					
	Zone Control (including Room & Radiant Thermostat, etc.)		EA					
	Miscellaneous Dampers		LS					
	Miscellaneous Control Requirements		LS					
	Smoke Purge		LS					
	Steel Support (HVAC)		LS					
	VFDs		HP					

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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
	Equipment Concrete Pads & Curb (AHU)		LS					
	Cutting, Patching & Fire Stopping		LS					
	Flexible Connection		LS					
	System ID / Valve Tags		LS					
	Miscellaneous		LS					
	Subtotal							
15 710	HEAT EXCHANGERS							
	Plate & Frame Heat Exchanger HX-1, 2 - 90 GPM		EA					
	Plate & Frame Heat Exchanger Equipment Hook-Up		EA					
	Subtotal							
15 735	PUMPS FOR MECHANICAL WORK							
	Water Pumps:							
	P-1, 2 - 90 GPM, 3 HP (Well Water), VFD		EA					
	Hook-Up Pumps		EA					
	P-3, 4 - 90 GPM, 1 HP (Heat Pump Loop), VFD		EA					
	P-5, 6 - 66 GPM, 3/4 HP (AHU Loop), VFD		EA					
	P-7, 8 - 36 GPM, 1/2 HP (Radiant Loop), VFD		EA					
	P-9, 10 - 90 GPM, 3 HP (HX Water Loop), VFD		EA					
	Heat Pumps:							
	HP-1, 2, 3, 4 - 22.5 GPM, 111 MBH, (2) Compressor, 208V		EA					
	Water Pump Equipment Hook-Up		EA					
	Heat Pump Equipment Hook-Up		EA					
	Subtotal							
15 745	OUTDOOR AIR HANDLING UNITS							
	AHU-1 - 8400 CFM, 7.5 HP, R.F. 7.5 HP, Cooling/ Heating, 328 MBH, 65.4 GPM		EA					
	Subtotal							
15 748	COILS (included w/ 15600)							

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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
15 750	AIR FILTERS (included w/ 15600)							
15 754	DUCT TERMINAL UNITS (included w/ 15600)							
15 760	FANS							
	EF-1, 2 - 150 CFM, 1/6 HP		EA					
	EF-3 - 50 CFM, 1/6 HP		EA					
	HVAC Fans Equipment Hook-Up		EA					
	Subtotal							
15 770	UNIT HEATERS							
	HWH-1, 2 - 2000 CFM, 8.22 GPM, 1/3 HP		EA					
	Hot Water Unit Heater Equipment Hook-Up		EA					
	Subtotal							
15 771	CABINET HEATERS							
	CUH - 8.1 MBH, 230 CFM, 120 V, 1/15 HP		EA					
	Cabinet Unit Heaters Equipment Hook-Up		EA					
	Subtotal							
15 774	RADIANT HEATING HYDRONIC PIPING							
	Radiant Heat Manifold:							
	Manifold 1 - 58534 BTUH, 10 LOOPS		EA					
	Manifold 2 - 63346 BTUH, 13 LOOPS		EA					
	Manifold 3 - 15599 BTUH, 4 LOOPS		EA					
	Radiant Heat Manifold Equipment Hook-Up		EA					
	Subtotal							
15 801	MECHANICAL SPECIALTIES (included w/ 15600)							

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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
15 810	VIBRATION ISOATION Vibration Isolation & Seismic Bracing		LS					
	Subtotal							
15 815	WATER TREATMENT AND CLEANING Water Treatment System (Shot Feeder) Glycol Feed (Shot Feeder)		EA EA					
	Subtotal							
15 820	PIPING FOR MECHANICAL GWS/R: 3" Dia 2 1/2" Dia 2" Dia 1 1/2" Dia 1 1/4" Dia 3/4" Dia Radiant Loop S/R 3/4" Dia AVG Condensate Drain Pipe & Specialties		LF LF LF LF LF LF LF LS					
	Subtotal							
15 830	VALVES FOR MECHANICAL (included w/ 15600)							
15 840	SHEET METAL DUCTWORK (included w/ 15600)							
15 850	INSULATION FOR MECHANICAL WORK Pipe Duct		LF SF					
	Subtotal							
15 860	HEAT PUMPS (included w/ 15600)							

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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
15 870	EARTH COUPLING WELLS (refer to Article 1.45 of the Addendum to General Conditions for more information)							
	Part A-1 Allowance as per Article 1.45							
	Part A-2 Allowance as per Article 1.45							
	Part B		LS					
	Part C		LS					
	Subtotal							
15 900	TESTING AND BALANCING							
	Testing and Balancing		LS					
	Subtotal							
15 960	DIRECT DIGITAL CONTROL SYSTEM (included w/ 15600)							
16 000	ELECTRICAL							
16 000	GENERAL PROVISIONS FOR ELECTRICAL WORK							
	Switchgear:							
	Service End Box		EA					
	800A Main Distribution Panel		EA					
	400A Panel		EA					
	225A Panel		EA					
	800A Service Disconnect Switch		EA					
	400A Disconnect Switch		EA					
	Meter & CT Cabinet		EA					
	Panel Mounting Assemblies		EA					
	Feeders:							
	4" PVC		LF					
	4" Conduit		LF					
	2" Conduit		LF					
	3/4" Conduit		LF					
	500 MCM		LF					
	300 MCM		LF					

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	3/0 AWG		LF					
	2 AWG		LF					
	3 AWG		LF					
	4 AWG		LF					
	6 AWG		LF					
	10 AWG		LF					
	Branch Circuit Requirements:							
	Single Receptacles, WP		EA					
	Duplex Receptacles		EA					
	Floor Duplex Receptacle		EA					
	GFI Receptacles		EA					
	Quad Receptacles		EA					
	Single Pole Light Switches		EA					
	3-Way Light Switches		EA					
	Standard Dimmer		EA					
	Three Way Dimmer		EA					
	Occupancy Sensor		EA					
	Dedicated Duplex REC		EA					
	Daylight Sensor - Photocell		EA					
	Switching Power Module and Bus Supply		EA					
	Door Bell		EA					
	Door Release w/ Intercom		EA					
	Control Panel for Daylight Harvesting		EA					
	Time Clock Panel		EA					
	Wiremold		LF					
	Wiremold Coupling		EA					
	Wiremold End Fitting		EA					
	1" PVC		LF					
	2 1/2" Conduit		LF					
	1" Conduit		LF					
	3/4" Conduit		LF					
	12 AWG		LF					

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	Mechanical Requirements:							
	VFDs (F.B.O.)		EA					
	30A Nema 4X Disconnect		EA					
	VAV Boxes		EA					
	Electric Water Cooler		EA					
	Hot Water Heaters		EA					
	Cabinet Unit Heaters		EA					
	Air Handling Unit		EA					
	Exhaust Fans		EA					
	Well Pumps		EA					
	Pumps		EA					
	Water Tank Pump		EA					
	Heat Pumps		EA					
	1 1/4" PVC		LF					
	1" PVC		LF					
	1" Conduit		LF					
	4 AWG		LF					
	8 AWG		LF					
	10 AWG		LF					
	3/4" Conduit		LF					
	12 AWG		LF					
	Intercom System		LS					
	Clock System (Wiring Only)		EA					
	Cutting and Patching		LS					
	Electrical Requirements for Supplemental Heating		LS					
	Misc Job Expenses		LS					
	Subtotal							
16 111	RACEWAYS AND INSTALLATION COMPONENTS (included w/ 16000)							
16 123	WIRE AND CABLE (600 VOLTS) (included w/ 16000)							

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
16 141	WIRING DEVICES AND INSTALLATION COMPONENTS (included w/ 16000)							
16 170	GROUNDING AND BONDING (included w/ 16000)							
16 180	POWER, CONTROL AND ALARM WIRING SYSTEM (included w/ 16000)							
16 426	DISTRIBUTION SWITCHBOARDS (included w/ 16000)							
16 440	SAFETY AND DISCONNECT SWITCHES (included w/ 16000)							
16 470	PANELBOARDS- LIGHTING AND DISTRIBUTION (included w/ 16000)							
16 510	LIGHTING FIXTURES							
	Lighting Fixture Type "R1"		EA					
	Lighting Fixture Type "R4"		EA					
	Lighting Fixture Type "R5"		EA					
	Lighting Fixture Type "R6"		LF					
	Lighting Fixture Type "R6A"		EA					
	Lighting Fixture Type "R7"		EA					
	Lighting Fixture Type "R8" & "R8A"		EA					
	Lighting Fixture Type "R9"		EA					
	Lighting Fixture Type "R10"		LF					
	Lighting Fixture Type "R11" & "R11A"		LF					
	Exit Lights		EA					
	Emergency Ballasts		EA					
	3/4" Conduit		LF					
	12 AWG		LF					
	Subtotal							

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse
 Location: 1041 East 172nd Street, Bronx, NY 10460
 Bidder: _____

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
16 721	FIRE ALARM AND SMOKE DETECTION SYSTEM							
	Fire Alarm Control Panel		EA					
	Fuse Cut Out		EA					
	Combination Horn/ Strobe		EA					
	Strobe Lights		EA					
	Pull Stations		EA					
	Smoke Detector		EA					
	Duct Detector		EA					
	Bells (Trouble, Alarm, Sprinkler)		EA					
	3/4" Conduit		LF					
	12 AWG		LF					
	Subtotal							
16 741	EMPTY RACEWAY SYSTEM (TELEPHONE AND COMPUTER DATA)							
	Tel/ Data System (Clear Path Only):							
	Wall Ports		EA					
	Subtotal							
16 902	ELECTRIC CONTROLS AND RELAYS (included w/ 16000)							
16 903	CEILING FANS							
	Ceiling Fans		LS					
	Subtotal							
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK							

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NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
16 721	FIRE ALARM AND SMOKE DETECTION SYSTEM							
	Fire Alarm Control Panel		EA					
	Fuse Cut Out		EA					
	Combination Horn/ Strobe		EA					
	Strobe Lights		EA					
	Pull Stations		EA					
	Smoke Detector		EA					
	Duct Detector		EA					
	Bells (Trouble, Alarm, Sprinkler)		EA					
	3/4" Conduit		LF					
	12 AWG		LF					
	Subtotal							
16 741	EMPTY RACEWAY SYSTEM (TELEPHONE AND COMPUTER DATA)							
	Tel/ Data System (Clear Path Only):							
	Wall Ports		EA					
	Subtotal							
16 902	ELECTRIC CONTROLS AND RELAYS (included w/ 16000)							
16 903	CEILING FANS							
	Ceiling Fans		LS					
	Subtotal							
16 950	LIGHTING CONTROL PANEL (included w/ 16000)							
	TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK							

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PLA PROJECT

**ATTACHMENT 1 - BID INFORMATION
PROJECT ID: P1CROT16A**

DESCRIPTION AND LOCATION OF WORK:

**Bronx River House
1041 East 172nd Street
Bronx, NY 10460
E-PIN: 85013B0023 / DDC PIN: 8502013PV0004C**

DOCUMENTS AVAILABLE AT:

Department of Design and Construction, Contract Section
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

SUBMISSION OF BIDS BEFORE BID OPENING:

TIME TO SUBMIT:

On or Before: **WEDNESDAY, SEPTEMBER 12, 2012**

BIDS MUST BE CLOCKED IN PRIOR TO BID OPENING

PLACE TO SUBMIT:

Department of Design and Construction, Contract Section (located behind Security Desk)
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

BID OPENING:

PLACE OF BID OPENING:	Department of Design and Construction Contract Section 30-30 Thomson Avenue – First Floor Long Island City, NY 11101
DATE AND HOUR:	WEDNESDAY, MARCH 20, 2013 @ 2:00 PM
	LATE BIDS WILL NOT BE ACCEPTED

PLACE	Bronx River House 1041 East 172nd Street Bronx, NY 10460
DATE AND HOUR	WEDNESDAY, MARCH 6TH, 2013 AT 10:00AM
MANDATORY OR OPTIONAL	OPTIONAL

BID SECURITY:

Bid Security is required in the amount set forth below; provided, however, bid security is not required if the TOTAL BID PRICE set forth on the Bid Form is less than \$1,000,000.

- (1) Bond in an amount not less than 10% of the TOTAL BID PRICE set forth on the Bid Form, OR
- (2) Certified Check in an amount not less than 2% of the TOTAL BID PRICE set forth on the Bid Form

PERFORMANCE AND PAYMENT SECURITY:

Required for Contracts in excess of \$1,000,000.00. Performance and Payment Security shall each be in an amount equal to 100% of the Contract Price

AGENCY CONTACT PERSON:

Lorraine Holley, 30-30 Thomson Avenue - First Floor, Long Island City, Queens, NY 11101
Telephone (718) 391-2200 or (718) 391-2601 Fax: (718) 391-2615



**BID BOOKLET
PART B**

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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.

1. Bidder Information:

Company Name: _____

DDC Project Number: _____

Company Size: _____ Ten (10) employees or less
 _____ Greater than ten (10) employees

_____ Company has previously worked for DDC

2. Type(s) of Construction Work

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 contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the contractor cannot obtain its EMR, it must submit a written explanation as to why.

The Contractor 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	<u>INTRASTATE RATE</u>	<u>INTERSTATE RATE</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the 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:

_____ Contractor has received a willful violation issued by OSHA or New York City Department of Buildings (NYCDOB) within the last three years.

_____ Contractor has had an incident requiring OSHA notification within 8 hours (i.e., fatality, or hospitalization of three or more employees).

The Occupational Safety and Health Act (OSHA) of 1970 requires employers with ten or more employees, on a yearly basis to complete and maintain on file the form entitled "Log of Work-related Injuries and Illnesses". This form is commonly referred to as the OSHA 300 Log (OSHA 200 Log for 2001 and earlier).

The OSHA 300 Log must be submitted for the last three years for contractors with more than ten employees.

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

The contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three 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 300 Log. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty weeks per year.

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
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the 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 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)

_____ Contractor previously audited by the DDC Office of Site Safety.

DDC Project Number(s): _____

_____ Accident on previous DDC Project(s).

_____ Fatality or Life-altering Injury on DDC Project(s) within the last three years.
 [Examples of a life-altering injury include loss of limb, loss of a sense (e.g., sight, hearing), or loss of neurological function].

Date: _____

By: _____
 (Signature of Owner, Partner, Corporate Officer)

Title: _____

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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 facsimile or in writing and will specify the types of information which must be submitted.

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 on pages 28 through 30 of this Bid Booklet. The Project Reference Form consists of 3 parts: (1) Similar 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.

A. PROJECT REFERENCES – SIMILAR CONTRACTS COMPLETED BY THE BIDDER

List all contracts substantially completed within the last 4 years similar to the contract being awarded, 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

B. PROJECT REFERENCES – 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

C. PROJECT REFERENCES – 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

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**OFFICE OF THE MAYOR
BUREAU OF LABOR SERVICES
CONTRACT CERTIFICATE**

To be completed if the contract is less than \$1,000,000

Contractor: _____

Address: _____

Telephone Number: _____

Name and Title of Signatory: _____

Contracting Agency or Owner: _____

Project Number: _____

Proposed Contract Amount: _____

Description and Address of Proposed Contract: _____

Names of Subcontractors in the amount of 750,000 or more on this contract (if not known at this time, so state indicating that trades will be subcontracted):

I, (fill in name of person signing) _____,
hereby affirm that I am authorized by the above-named contractor to certify that said contractor's proposed contract with the above-named owner or city agency is less than \$1,000,000. This affirmation is made in accordance with Executive Order No. 50 (1980) as amended and its implementing regulations.

Date

Signature

WILLFUL OR FRAUDULENT FALSIFICATION OF ANY DATA OR INFORMATION SUBMITTED HERewith MAY RESULT IN THE TERMINATION OF ANY CONTRACT BETWEEN THE CITY AND THE BIDDER OR CONTRACTOR AND BAR THE BIDDER OR CONTRACTOR FROM PARTICIPATION IN ANY CITY CONTRACT FOR A PERIOD OF UP TO THREE YEARS. FURTHER, SUCH FALSIFICATION MAY RESULT IN CRIMINAL PROSECUTION.

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VENDEX COMPLIANCE

(A) **Vendex Fees:** Pursuant to Procurement Policy Board Rule 2-08(f)(2), the contractor will be charged a fee for the administration of the VENDEX system, including the Vendor Name Check process, if a Vendor Name Check review is required to be conducted by the Department of Investigation. The contractor shall also be required to pay the applicable required fees for any of its subcontractors for which Vendor Name Check reviews are required. The fee(s) will be deducted from payments made to the contractor under the contract. For contracts with an estimated value of less than or equal to \$1,000,000, the fee will be \$175 per Vendor Name Check review. For contracts with an estimated value of greater than \$1,000,000, the fee will be \$350 per Vendor Name Check review.

(B) **Confirmation of Vendex Compliance:** The Bidder shall submit this Confirmation of Vendex Compliance to the Department of Design and Construction, Contracts Section, 30-30 Thomson Avenue – First Floor, Long Island City, NY 11101.

Bid Information: The Bidder shall complete the bid information set forth below.

Name of Bidder: _____
Bidder's Address: _____
Bidder's Telephone Number: _____
Bidder's Fax Number: _____
Date of Bid Opening: _____
Project ID: _____

Vendex Compliance: To demonstrate compliance with Vendex requirements, the Bidder shall complete either Section (1) or Section (2) below, whichever applies.

(1) **Submission of Vendex Questionnaires to MOCS:** By signing in the space provided below, the Bidder certifies that as of the date specified below, the Bidder has submitted Vendex Questionnaires to the Mayor's Office of Contract Services, Attn: VENDEX, 253 Broadway, 9th Floor, New York, New York 10007.

Date of Submission: _____

By: _____
(Signature of Partner or corporate officer)

Print Name: _____

(2) **Submission of Certification of No Change to DDC:** By signing in the space provided below, the Bidder certifies that it has read the instructions in a "Vendor's Guide to Vendex" and that such instructions do not require the Bidder to submit Vendex Questionnaires. The Bidder has completed **TWO ORIGINALS** of the Certification of No Change set forth on the next page of this Bid Booklet.

By: _____
(Signature of Partner or corporate officer)

Print Name: _____

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Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.



Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on submission of change
1		
2		
3		
4		
5		
6		

Check if additional changes were submitted and attach a document with the date of additional submissions.

Certification This section is required.
This form must be signed and notarized. Please complete this twice. Copies will not be accepted.

Certified By:

Name (Print)

Title

Name of Submitting Entity

Signature

Date

Notarized By:

Notary Public

County License Issued

License Number

Sworn to before me on: _____
Date

Certificate of No Change Form

- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, _____, being duly sworn, state that I have read
Enter Your Name

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

Vendor Questionnaire *This section is required.*

This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.

Name of Submitting Entity: _____

Vendor's Address: _____

Vendor's EIN or TIN: _____ Requesting Agency: _____

Are you submitting this Certification as a parent? (Please circle one) Yes No

Signature date on the last full vendor questionnaire signed for the submitting vendor: _____

Signature date on change submission for the submitting vendor: _____

Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.



Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on submission of change
1		
2		
3		
4		
5		
6		

Check if additional changes were submitted and attach a document with the date of additional submissions.

Certification *This section is required.*

form must be signed and notarized. Please complete this twice. Copies will not be accepted.

Certified By:

Name (Print)

Title

Name of Submitting Entity

Signature

Date

Notarized By:

Notary Public

County License Issued

License Number

Sworn to before me on: _____
Date

Certificate of No Change Form

- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, _____, being duly sworn, state that I have read
Enter Your Name

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

Vendor Questionnaire *This section is required.*

This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.

Name of Submitting Entity: _____

Vendor's Address: _____

Vendor's EIN or TIN: _____ Requesting Agency: _____

Are you submitting this Certification as a parent? (Please circle one) Yes No

Signature date on the last full vendor questionnaire signed for the submitting vendor: _____

Signature date on change submission for the submitting vendor: _____

IRAN DIVESTMENT ACT COMPLIANCE RIDER
FOR NEW YORK CITY CONTRACTORS

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law ("SFL") §165-a and General Municipal Law ("GML") §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the City, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

- (a) The person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- (b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the State Finance Law and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder's certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. In any case where the bidder or proposer cannot certify that they are not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The City of New York may award a bid to a bidder who cannot make the certification on a case by case basis if:

- (1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran: or
- (2) The City makes a determination that the goods or services are necessary for the City to perform its functions and that, absent such an exemption, the City would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

**BIDDER'S CERTIFICATION OF COMPLIANCE WITH
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

BIDDER'S CERTIFICATION

- By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer 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, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.
- I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: _____, New York
_____, 20__

SIGNATURE

PRINTED NAME

TITLE

Sworn to before me this
____ day of _____, 20__

Notary Public

Dated:

CITY OF NEW YORK

DIVISION OF LABOR SERVICES

CONSTRUCTION EMPLOYMENT REPORT

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Division of Labor Services

CONSTRUCTION EMPLOYMENT REPORT

GENERAL INFORMATION

1. Your contractual relationship in this contract is: Prime Contractor _____ Subcontractor _____
- 1a. Are M/WBE goals attached to this project? Yes _____ No _____
2. Would your company like information on how to certify with the City of New York as a:
- _____ Minority Owned Business Enterprise _____ Locally based Business Enterprise
- _____ Women Owned Business Enterprise _____ Emerging Business Enterprise
- _____ Disadvantaged
3. Please indicate if you would like assistance from SBS in identify certified M/WBEs for contracting opportunities: Yes _____ No _____
4. Is this project subject to a Project labor Agreement? Yes _____ No _____

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

5. _____
Employer Identification Number or Federal Tax I.D.
6. _____
Company Name
7. _____
Street Address _____ City _____ State _____ Zip Code _____
8. _____
(Chief Operating Officer) First Name _____ Last Name _____ Telephone Number _____ Fax Number _____
9. _____
Designated Equal Opportunity Compliance Officer (if same as Item #8, write "Same") _____ Telephone Number _____
10. _____
Name of Prime Contractor and Contact Person (if same as item #6, write "Same")
11. Number of employees in your company: _____
12. Contract information:
- (a) _____ Contracting Agency (City Agency) (b) _____ Contract Amount
- (c) _____ Procurement Identification Number (PIN) (d) _____ Contract Registration Number (CT#)
- (e) _____ Project Commence Date (f) _____ Projected Completion Date

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(g) Description and location of proposed contract:

13. Has your firm been reviewed by the Division of Labor Services (DLS) within the past 36 months and issued a Certificate of Approval? Yes _____ No _____

If Yes, attach a copy of the certificate.

14. Has DLS within the past month reviewed an Employment Report submission for your company and issued a Conditional Certificate of Approval? Yes _____ No _____

If Yes, attach a copy of the certificate.

NOTE: DLS WILL NOT ISSUE A CONTINUED CERTIFICATE OF APPROVAL IN CONNECTION WITH THIS CONTRACT UNLESS THE REQUIRED CORRECTIVE ACTIONS IN PRIOR CONDITIONAL CERTIFICATES OF APPROVAL HAVE BEEN TAKEN

15. Has an Employment Report already been submitted for a different contract (not covered by this Employment Report) for which you have not yet received compliance certificate? Yes _____ No _____

If Yes,

Date submitted: _____ Agency to which submitted: _____

Name of Agency Person: First Name _____ Last Name _____

Contract No. : _____ Telephone: _____

16. Has your company in the past 36 months been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP)? Yes _____ No _____

If Yes,

(a) Name and address of OFCCP office: _____

(b) Was a Certificate of Equal Employment Compliance issued within the past 24 months? Yes _____ No _____

If Yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes _____ No _____

If Yes, attach a copy of such requirements or agreements.

(d) Were any deficiencies found? Yes _____ No _____

If Yes, attach a copy of such findings.

17. Is your company or its affiliates a member or members of an employers' trade association which is responsible for negotiating collective bargaining agreements (CBA) which affect construction site hiring? Yes _____ No _____
If Yes, attach a list of such associations and all applicable CBA's.

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PART II: DOCUMENTS REQUIRED

18. For the following policies or practices, attach the relevant documents (e.g., printed booklets, brochures, manuals, memoranda, etc.) If the policy(ies) are unwritten, attach a full explanation of the practices. See instructions.

- ___ (a) Health benefit coverage/description(s) for all management, nonunion and union employees (whether company or union administered)
- ___ (b) Disability, life, other insurance coverage/description
- ___ (c) Employee Policy/Handbook
- ___ (d) Personnel Policy/Manual
- ___ (e) Supervisor's Policy/Manual
- ___ (f) Pension plan or 401k coverage/description for all management, nonunion and union employees, whether company or union administered.
- ___ (g) Collective bargaining agreement(s)
- ___ (h) Employment Application(s)
- ___ (i) Employee evaluation policy/form(s)
- ___ (j) Does your firm have medical and/or non-medical (i.e. education, military, personal, pregnancy, child care) leave policy?

19. To comply with the Immigration Reform and Control Act of 1986 when and of whom does your firm require the completion of an I-9 form?

- | | | |
|--------------------------------------------|---------|--------|
| (a) Prior to job offer | Yes ___ | No ___ |
| (b) After a conditional job offer | Yes ___ | No ___ |
| (c) After a job offer | Yes ___ | No ___ |
| (d) Within the first three days on the job | Yes ___ | No ___ |
| (e) To some applicants | Yes ___ | No ___ |
| (f) To all applicants | Yes ___ | No ___ |
| (g) To some employees | Yes ___ | No ___ |
| (h) To all employees | Yes ___ | No ___ |

20. Explain where and how completed I-9 Forms, with their supportive documentation are maintained and made accessible.

21. Does your firm or any of its collective bargaining agreements require job applicants to take a medical examination?
 Yes ___ No ___

If Yes, is the medical examination given:

FOR OFFICIAL USE ONLY: File No. _____

- | | | |
|-----------------------------------|-----------|----------|
| (a) Prior to the job offer | Yes _____ | No _____ |
| (b) After a conditional job offer | Yes _____ | No _____ |
| (c) After a job offer | Yes _____ | No _____ |
| (d) To all applicants | Yes _____ | No _____ |
| (e) Only to some applicants | Yes _____ | No _____ |

If Yes, list for which applicants below and attach copies of all medical examination or questionnaire forms and instructions utilized for these examinations.

22. Do you have a written equal opportunity (EEO) policy? Yes _____ No _____

If Yes, list the document(s) and page number(s) where these written policies are located.

23. Does the company have a current affirmative action plan(s) (AAP)

- ____ Minorities and Women
 ____ Individuals with handicaps
 ____ Other. Please specify _____
-

24. Does your firm or collective bargaining agreement(s) have an internal grievance procedure with respect to EEO complaints? Yes _____ No _____

If Yes, please attach a copy of this policy.

If No, attach a report detailing your firm's unwritten procedure for handling EEO complaints.

25. Has any employee, within the past three years, filed a complaint pursuant to an internal grievance procedure or with any official of your firm with respect to equal employment opportunity? Yes _____ No _____

If Yes, attach an internal complaint log. See instructions.

26. Has your firm, within the past three years, been named as a defendant (or respondent) in any administrative or judicial action where the complainant (plaintiff) alleged violation of any anti-discrimination or affirmative action laws? Yes _____ No _____

If Yes, attach a log. See instructions.

27. Are there any jobs for which there are physical qualification? Yes _____ No _____

If Yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

28. Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes _____ No _____

If Yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

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Small Business Services
Division of Labor Services

FORM A. CONTRACT BID INFORMATION: USE OF SUBCONTRACTORS/TRADES

1. Do you plan to subcontractor work on this contract? Yes No
2. If yes, complete the chart below.

NOTE: All proposed subcontractors with a subcontract in excess of \$1,000,000 must complete an Employment Report for review and approval before the contract may be awarded and work commences.

SUBCONTRACTOR'S NAME*	OWNERSHIP (ENTER APPROPRIATE CODE LETTERS BELOW)	WORK TO BE PERFORMED BY SUBCONTRACTOR	TRADE PROJECTED FOR USE BY SUBCONTRACTOR	PROJECTED DOLLAR VALUE OF SUBCONTRACT

*If subcontractor is presently unknown, please enter the trade (craft name).

Ownership codes: W: White A: Asian B: Black N: Native American H: Hispanic F: Female

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**FORM B: PROJECTED WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers (A) Apprentice
(H) Helper (TRN) Trainee
(TOT) Total by Column

For each trade to be engaged by your company for
this project, enter the projected workforce for
Males and **Females** by trade classification on
the charts below.

Trade: _____	<u>Males</u>					<u>Females</u>				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.
Total (Col. #1-10): _____										
Total Minority, Male & Female H (Col. #2, 3, 4, 5, 7, 8, 9 & 10)										
Total Female (Col. #6 - 10): _____										

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)? _____



**Division of
Labor Services**

**Small Business
Services**

**FORM B: PROJECTED WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers (A) Apprentice
(H) Helper (TRN) Trainee
(TOT) Total by Column

For each trade to be engaged by your company for
this project, enter the projected workforce for
Males and **Females** by trade classification on
the charts below.

Trade: _____	<u>Males</u>						<u>Females</u>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.
Total (Col. #1-10): _____										
Total Minority, Male & Female H (Col. #2, 3, 4, 5, 7, 8, 9 & 10)										
Total Female (Col. #6 - 10): _____										

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)? _____

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NYC Dept. of Small Business Services, Division of Labor Services, Contract Compliance Unit, 110 William Street, NY, NY 10038

Phone: (212) 513 - 6323

Fax: (212) 618 - 8879

**FORM C: CURRENT WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers (A) Apprentice
(H) Helper (TRN) Trainee
(TOT) Total by Column

For each trade to be engaged by your company for
this project, enter the projected workforce for
Males and Females by trade classification on
the charts below.

Trade: _____	Males					Females										
	(1)		(2)		(3)	(4)		(5)		(6)	(7)		(8)	(9)	(10)	
	White Non Hisp.	Black Non Hisp.	White Non Hisp.	Black Non Hisp.	Hisp.	White Non Hisp.	Asian	Hisp.	Asian	Native Amer.	White Non Hisp.	Black Non Hisp.	Hisp.	Asian	Native Amer.	
Total (Col. #1-10):																
Total Minority, Male & Female H (Col. #2, 3, 4, 5, 7, 8, 9 & 10)																
Total Female (Col. #6 - 10):																

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)? _____

**FORM C: CURRENT WORKFORCE
TRADE CLASSIFICATION CODES**

(J) Journey level Workers (A) Apprentice
(H) Helper (TRN) Trainee
(TOT) Total by Column

For each trade to be engaged by your company for
this project, enter the projected workforce for
Males and Females by trade classification on
the charts below.

Trade: _____	Males						Females					
	(1) White		(2) Black		(3)	(4)	(6) White		(7) Black	(8)	(9)	(10)
	Non Hisp.	Hisp.	Non Hisp.	Hisp.	Native Amer.	Asian	Non Hisp.	Hisp.	Non Hisp.	Asian	Native Amer.	
Total (Col. #1-10):	J											
Total Minority, Male & Female (Col. #2, 3, 4, 5, 7, 8, 9 & 10)	H											
Total Female (Col. #6 - 10):	A											
	TRN											
	TOT											

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)? _____

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Division of Labor Services

Date _____

File Number _____

LESS THAN \$750,000 SUBCONTRACT CERTIFICATE

Are you currently certified as one of the following? Please check yes or no:

M/WBE Yes ___ No ___ MBE Yes ___ No ___
WBE Yes ___ No ___ LBE Yes ___ No ___

If you are certified as an M/WBE, MBE, WBE, or LBE, what city/state agency are you certified with? _____

Please check one of the following if your firm would like information on how to certify with the City of New York as a:

___ Minority Owned Business Enterprise ___ Locally based Business Enterprise
___ Women Owned Business Enterprise

Company Name Employer Identification Number or Federal Tax I.D
Company Address and Zip Code
Contact Person (First Name, Last Name) Telephone Number
Fax Number E-mail Address
Contracting Agency

Description and location of proposed subcontract:

Borough Project Number Pin Number Contract Amount

I, (print name of authorized official) _____ hereby certify that I am authorized by the above-named subcontractor to certify that said subcontractor's proposed contract with the above named owner or City agency is less than \$750,000.

Willful or fraudulent falsifications of any data or information submitted herewith may result in the termination of the contract between the City and the bidder or contractor and in disapproval of future contracts for a period of up to five years. Further, such falsification may result in civil and/or criminal prosecution.

Signature of authorized official Date

SIGNATURE PAGE

I, (print name of authorized official signing) _____ hereby certify that the information submitted herewith is true and complete to the best of my knowledge and belief and submitted with the understanding that compliance with New York City's equal employment requirements, as contained in Chapter 56 of the City Charter, Executive Order No. 50 (1980), as amended, and the implementing Rules and Regulations, is a requirement for the contractors and subcontractors working on this construction project. I also agree on behalf of the company to submit a certified copy of payroll records to the Division of Labor Services on a monthly basis.

Contractor's Name

Name of person who prepared this Employment Report *Title*

Name of official authorized to sign on behalf of the contractor *Title*

Telephone Number

Signature of authorized official *Date*

If contractors are found to be underutilizing minorities and females in any given trade based on Chapter 56 Section 3H, the Division of Labor Services reserves the right to request the contractor's workforce data and to implement an employment program.

Contractors who fail to comply with the above mentioned requirements or are found to be in noncompliance may be subject to the withholding of final payment.

Willful or fraudulent falsifications of any data or information submitted herewith may result in the termination of the contract between the City and the bidder or contractor and in disapproval of future contracts for a period of up to five years. Further, such falsification may result in civil and/or criminal prosecution.

To the extent permitted by law and consistent with the proper discharge of DLS' responsibilities under Charter Chapter 56 of the City Charter and Executive Order No. 50 (1980) and the implementing Rules and Regulations, all information provided by a contractor to DLS shall be confidential.

Please attach your M/WBE Compliance Report.

Only original signatures accepted.

Sworn to before me this _____ day of _____ 20 _____

Authorized Signature

Notary Public

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Division of Labor Services

WHO MUST FILE AN EMPLOYMENT REPORT

An Employment Report (ER) must be filed if you meet the following conditions:

CONTRACTOR	CONTRACT VALUE	Submission Requirement
Prime Contractor	\$1,000,000 or greater (<i>city, state</i>)	Construction Employment Report
	\$10,000 or greater (<i>federally and/or federally assisted</i>)	
Subcontractor	\$750,000 or greater	Construction Employment Report
	Less than \$750,000	Less than \$750,000 Certificate
	\$10,000 or greater (<i>federally and/or federally assisted</i>)	Construction Employment Report

WHERE TO FILE

ERs must be filed directly with the Division of Labor Services (DLS).

DLS REVIEW PROCESS

In accordance with Executive Order 50 (EO 50), upon receipt by DLS of a completed ER, DLS conducts a review of the contractor's current employment policies, practices and procedures, as well as perform a statistical analysis of the contractor's workforce, if necessary. The process is as follows:

1. Within five (5) business days, DLS will review the ER for completeness and accuracy. If any information is omitted or incorrect, or if necessary documents are not submitted, the submission shall be deemed incomplete and DLS will inform the contractor. The substantive compliance review does not commence until the submission is complete. **An incomplete submission will delay the review process and may preclude or interrupt the contract approval.**
 - 1a. If the City is allocating funds to this project, you must provide the name of the contracting agency.
2. If the ER submission is complete, the compliance review will proceed, resulting in one of the following:

Certificate of Approval

The contractor is found to be in compliance with all applicable laws and regulations. The approval is valid for 36 months.

Continued Approval Certificate

The contractor has been issued a Certificate of Approval in the previous 36 months which is good for the applicable contract.

Conditional Certificate of Compliance

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The contractor is required to take corrective actions in order to be in compliance with EO 50. The contractor must meet the conditions within three months of the issue of the Conditional Certificate.

Determination of Nonperformance

The contractor has failed to take the required corrective actions stipulated in the Conditional Certificate. A determination of nonperformance may prevent a contractor from receiving an DLS Approval.

3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities.
- 3a. Please provide a copy of your project labor agreement which is negotiated through an employer trade association.

HOW TO COMPLETE THE EMPLOYMENT REPORT

Contents

General Information

Part I: Company/Contract Information

Part II: Employment Policies and Practices

Part III: Contract Bid Information and Projected and Current Workforce Forms

Signature Page

PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

- Question 5: Please provide the Employer Identification Number or Federal Tax I.D.
- Questions 6 – 9: Please provide the requested company information. All contracts must have a designated Equal Employment Officer.
- Question 10: If you are a subcontractor, you must state the name of the contractor for whom you are providing the construction services.
- Question 11: Please indicate how many employees are in your company.
- Question 12 (a-f): Please provide all relevant information requested in 12 (a) to (f).
- Question 12(g): Provide a description of the trade work you will perform on this project and the address where the work will be performed. Subcontractors can obtain this information from the contract they have with their contractor.
- Questions 13 – 15: If your company has received a valid Certificate of Approval within the past 36 months, been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP), or if your company has submitted an ER for a different contract for which you have not yet received a compliance certificate, then you only need to complete and submit the following:
- General Information section
 - Part I - Contractor/Subcontractor Information
 - Form B - Projected Workforce
 - Signature Page
- If your company is currently waiting for an approval on another contract previously submitted, be certain to identify the date on which you submitted the completed Employment Report, the name of the City contracting agency with which the contract was made, and the name and telephone number of the person to whom the Employment Report was submitted.
- If your company was issued a Conditional Certificate of Approval, all required corrective actions must have been taken or DLS will not issue a Continued Certificate.
- Question 16: If the company was audited by the OFCCP, also provide the following:
- Identify the reviewing OFCCP office by its name and address
 - If an unconditional certificate of compliance was issued by the OFCCP, attach a copy of the certificate in lieu of completing Parts II and III;

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- Include copies of all corrective actions and documentation of OFCCP's performance; and
- Provide a copy of all stated OFCCP findings.

Question 17: Please provide a copy of any Collective Bargaining Agreement(s) which is negotiated through an employer trade association on behalf of your organization or any of its affiliates.

PART II: EMPLOYMENT POLICIES AND PRACTICES

Remember to label all documents with the question number for which they are submitted.

Questions 18a – j: You must respond to the questions as to whether or not your firm has documents reflecting written policies, benefits and procedures. If so, then you must identify by name each document in which the policy(ies), procedure(s) and benefit(s) is located and submit copies of all of the document(s). If your firm follows unwritten practices or procedures, include an explanation of how they operate. Please submit the most current document(s), including all applicable amendments. Label each document and/or unwritten practice according to the question to which it corresponds (e.g. 18a, 18b, etc.)

Questions 19a – h: Inquires about the manner/methods by which you comply with the requirements of the Immigration Reform and Control Act of 1986 (IRCA).

Question 20: Inquires into where and how I-9 forms are maintained and stored.

Questions 21a – e: Inquires into whether or not there is a requirement that an applicant or employee be subjected to a medical examination at any given time. Copies of the medical information questionnaire and instructions must be submitted with the Employment Report.

Question 22: Indicate the existence and location of all statements of your firm's Equal Employment Opportunity policy and attach a copy of each statement.

Question 23: Submit any current Affirmative Action Plan(s) created pursuant to Executive Order 11246.

Question 24: If your firm or collective bargaining agreement has an internal grievance procedure, indicate this and submit a copy of the policy and procedure. If unwritten, explain its nature and operation. Explain how your firm's procedure addresses EEO complaints.

Question 25: If your employees have used the procedure in the last three (3) years, please submit an explanation in the format indicated below:

1. Number of complaint(s)	2. Nature of the complaint(s)	3. Position(s) of the complainant(s)	4. Was an investigation conducted? Y/N	5. Current status of the disposition
---------------------------	-------------------------------	--------------------------------------	-------------------------------------------	--------------------------------------

Question 26: Indicate whether in the past three (3) years complaints have been filed with a court of law or administrative agency, naming your company as a defendant (or respondent) in a complaint alleging violation of any anti-discrimination or affirmative action laws. If yes, develop and submit a log to show, for each administrative/and or judicial action filed, the following information:

1. Name(s) of complainant(s)	2. Administrative agency or court in which action was filed	3. Nature of the complaint(s)	4. Current status	5. If not pending, the complaint's disposition
------------------------------	-------------------------------------------------------------	-------------------------------	-------------------	------------------------------------------------

Question 27: Identify each job for which a physical qualification exists. Identify and explain the physical qualification(s) for each stated job. Submit job descriptions for each job and the reasons for the qualifications.

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Question 28: Identify each job for which there exists any qualification related to age, race, color, national origin, sex, creed, disability, marital status, sexual orientation or citizenship status. Identify and explain the specific related qualification for each job stated. Submit job descriptions for each job and the reasons for the qualifications.

PART III: CONTRACT BID INFORMATION AND PROJECTED AND CURRENT WORKFORCE FORMS

FORM A: CONTRACT BID INFORMATION – USE OF SUBCONTRACTORS/TRADES

Your projections for the utilization of subcontractors on the proposed contract are to be provided in this section. A chart has been provided for the identification of subcontractors. Information is to be provided to the extent known at the time the ER is filed for review by DLS. If the subcontractor's name is unknown, then write "unknown". Under "ownership", enter the appropriate race/ethnic and gender code. If the contract is federally funded or assisted and the subcontractor is being utilized in accordance with applicable federal requirements with respect to Minority Business Enterprise or Woman Business Enterprise requirements, enter the appropriate code. This will also apply to state funded contracts with similar requirements for minority and female owned businesses.

FORM B: PROJECTED WORKFORCE FOR WORK TO BE PERFORMED ON THIS PROJECT

For each trade to be engaged by your company for this project, enter the projected workforce for Males and Females by trade classification in the charts provided.

FORM C: CURRENT WORKFORCE FOR WORK TO BE PERFORMED ON THIS PROJECT

For each trade *currently* engaged by your company for all work performed in NYC, enter the current workforce for Males and Females by trade classification in the charts provided.

SIGNATURE PAGE

The signatory of this Employment Report and all other documents submitted to DLS must be an official authorized to enter into a binding legal agreement. The signature page must be completed in its entirety and notarized. Only original signatures will be accepted.

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FMS ID: P1CROT16A



**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

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

New Construction of the Bronx River House

**LOCATION: 1041 East 172nd Street
BOROUGH: Bronx 10460
CITY OF NEW YORK**

Contractor _____

Dated _____, 20____

Entered in the Comptroller's Office _____

First Assistant Bookkeeper _____

Dated _____, 20____





PROJECT ID: P1CROT16A

LAW

**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

**New Construction of the Bronx River
House**

LOCATION:
BOROUGH:
CITY OF NEW YORK

1041 East 172nd Street
Bronx 10460

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

Department of Parks and Recreation

Kiss + Cathcart, Architects

Date: October 1, 2012



12-129





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

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

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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





NOTICE: THIS CONTRACT IS SUBJECT TO A 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 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 the attached Letter of Assent prior to award. 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. Contractor will also be required to have all subcontractors of all tiers execute the attached Letter of Assent prior to such subcontractors performing any work on the Project. 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. All bidders should carefully read the entire PLA that governs this Contract.

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. 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.

In addition to the various provisions regarding work rules, Contractors should take special note of the requirement that Contractors and Subcontractors make payments to designated employee benefit funds. See PLA Article 11, Section 2. The PLA also contains provisions for what occurs when a contractor or a subcontractor fails to make required payments into the benefit funds, including potentially the direct payment by the City to the benefit fund of monies owed and corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2. The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

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 created by Local Law 129, the specific requirements of M/WBE participation for this Contract are set forth in Schedule B entitled the "Subcontractor Utilization Plan", and are detailed in a separate Notice to Prospective Contractors included with 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 2(C), carefully. A list of certified M/WBE firms may be obtained from the Department of Small Business Services (DSBS) website at www.nyc.gov/getcertified, by emailing DSBS at MWBE@sbs.nyc.gov, by calling the DSBS certification hotline at (212) 513-6311, or by visiting or writing DSBS at 110 William St., 7th floor, New York, New York, 10038.

The local collective bargaining agreements (CBAs) that are incorporated into the PLA as PLA Schedule A Agreements are available on computer disk from the Department's 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.

A contact list for the participating unions is set forth after the FAQs.

Below are answers to frequently asked questions (FAQs) about this PLA:

Q1. Does a contractor need to be signatory with the unions in the NYC Building and Construction Trades Council 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.

Q2. 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.

Q3. Does the PLA affect the subcontractors that a bidder may utilize on the project?

A. Subject to the Department'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 and agrees to the terms of the PLA.

Q4. 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. Subcontractors, however, will be required to sign the letter of Assent prior to being approved by the Department.

Q5. 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. See PLA Article 4. However, contractors and subcontractors who are not currently party to a labor agreement with those unions may continue to use up to 12% of their existing, qualifying labor force for this work, in accordance with the terms of PLA Article 4, Section 2B. Certified MWBEs for which participation goals are set pursuant to NYC Administrative Code §6-129 that are not signatory to any Schedule A CBAs may use their existing employees for the 2nd, 4th, 6th and 8th employee needed on the job if their contracts are valued at or under \$500,000. For contracts valued at above \$500,000 but under \$1,000,000, such certified MWBEs may use their own employees for the 2nd, 5th and 8th employees needed on the job in accordance with the provisions of PLA Article 4, Section 2C. If additional workers are needed by these MWBEs, the additional workers will be referred to the contractor from the signatory local unions subject to the contractor's right to meet 12% of the additional needs with its existing, qualifying employees.

Q6. Must the City set MWBE participation goals for the particular project or contract in order for a certified MWBE to utilize the provisions of PLA Article 4, Section 2C?

A. No. PLA Article 4, Section 2(C) specifies what categories of MWBEs are eligible to take advantage of this provision (i.e., those MWBEs for which the City is authorized to set participation goals under §6-129). For purposes of 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 projects receives State funding and therefore is subject to the requirements of Article 15-A of the Executive Law.

Q7. 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 collective bargaining agreements (local CBAs) where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.

Q8. 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. Non-union employees working under the PLA are subject to the

union's security provisions (i.e., union dues/agency shop fees) while on the project. These employees will be enrolled in the appropriate benefit plans and earn credit toward various union benefit programs. See PLA Article 4, Section 6 and Article 11.

Q9. Are all contractors and subcontractors working under the PLA, including non-union contractors and contractors signatory to collective bargaining agreements with locals other than those that are signatories to the PLA, required to make contributions to designated employee benefit funds?

A. Contractors and subcontractors working under the PLA will be required to contribute on behalf of all employees covered by the PLA to established jointly trustee employee benefit funds designated in the Schedule A CBAs and required to be paid on public works under any applicable prevailing wage law. See PLA Article 11, Section 2. 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 C.

Q10. 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. The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

Q11. 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.

Q12. 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.

Q13. Does the PLA create a common holiday schedule for all the signatory trades?

A. Yes, the PLA recognizes eight (8) common holidays. See PLA Article 12, Section 4.

Q14. Does the PLA provide for a standard policy for 'shift work' across all signatory trades?

A. Yes. In addition, a day shift does not have to be scheduled in order to work the second and third shifts. See PLA Article 12, Section 3.

Q15. May the Contractor schedule overtime work, including work on a weekend?

A. Yes, the PLA authorizes the Contractor to schedule overtime work, including work on the 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.

Q16. 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 trades CBA.

Q17. Does the PLA contain special provisions for the manning 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 and may be limited to one person per applicable trade where practicable. There will be no stacking of trades on temporary services. See PLA Article 15.

Q18. 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.

Q19. Should a local collective bargaining agreement [local CBA] 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.

Q20. 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.

Q21. 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 Project Labor Agreements 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.

Q22. 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.

Q23. 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. See PLA Article 10. A copy of the NY Plan is available upon request from the Department. 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, Section 3.

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 _____ and located at _____ (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 and local trust agreements as set forth in the Project Labor Agreement and this Agreement but only to the extent of Project 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 Project 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.

Dated: _____

(Name of Contractor or subcontractor)

(Name of CM; GC; Contractor or
Higher Level Subcontractor)

(Authorized Officer & Title)

(Address)

(Phone) (Fax)

Contractor's State License

Sworn to before me this
____ day of _____, 2010

Notary Public

PROJECT LABOR AGREEMENT
COVERING
NEW CONSTRUCTION OF BRONX RIVER GREENWAY RIVERHOUSE

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**PROJECT LABOR AGREEMENT COVERING NEW CONSTRUCTION OF THE
BRONX RIVER GREENWAY RIVERHOUSE**

ARTICLE 1 - PREAMBLE

WHEREAS, the City of New York, acting through the Department of Parks and Recreation desires to provide for the cost efficient, safe, quality, and timely completion of certain new construction ("Project Work," as defined in Article 3) in a manner designed to afford the lowest costs to the Agency 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 Project 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 Project Work;

(2) expediting the construction process and otherwise minimizing the disruption to the covered Agency's 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 Project Work;

(4) standardizing the terms and conditions governing the employment of labor on the Project 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) ensuring a reliable source of skilled and experienced labor; and
- (9) 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 Project 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 New York City Department of Parks and Recreation, including in its 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") (on behalf of itself) and the signatory affiliated Local Union's ("Unions" or "Local Unions"). The Council and each signatory Local Union hereby warrants and represents that it has been duly authorized to enter into this Agreement.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

Throughout this Agreement, the various Union parties including the Building and Construction Trades Council of Greater New York and Vicinity and its participating affiliated Local Unions, are referred to singularly and collectively as "Union(s)" or "Local Unions"; the term "Contractor(s)" shall include any Construction Manager, General Contractor and all other

contractors, and subcontractors of all tiers engaged in Project Work within the scope of this Agreement as defined in Article 3; "Agency" means the New York City Department of Parks and Recreation; when the 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 the Agency; the Building and Construction Trades Council of Greater New York and Vicinity is referred to as the "Council"; and the work covered by this Agreement (as defined in Article 3) is referred to as "Project Work."

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 commissioner of the Agency or his 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 Project 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 Project 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 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 appended hereto as Schedule A, represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other collective bargaining agreement of any type which would otherwise apply to this Project Work, in whole or in part, except that Project Work which falls within the jurisdiction of the Operating Engineers Locals 14 and 15 and/or the Teamsters Local 282 will be performed under the terms and conditions set out in the Schedule A agreements of Operating Engineers Locals 14 and 15 and Teamsters Local 282. Subject to the foregoing, where a subject covered by the provisions of this Agreement is also covered by a Schedule A, the provisions of this Agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing Project Work. No practice, understanding or agreement between a Contractor and a Local Union which is not set forth in this Agreement shall be binding on this Project Work unless endorsed in writing by the Construction Manager or such other designee as may be designated by the Agency.

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 Project 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 Project Work. It is further understood that the Agency or Construction Manager has sole discretion at any time to terminate, delay or suspend the Project Work, in whole or part, on any Program.

**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) Project 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 Project Work.

SECTION 8. SUBCONTRACTING

Contractors will subcontract Project 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

Project Work shall be limited to construction contracts bid and let by the Agency (or its Construction Manager where applicable) after the effective date of this Agreement (and prior to June 30, 2014) for that new construction on the Bronx River Greenway Riverhouse,

Bronx, New York.

It is understood that Project Work does not include, and this Project Labor Agreement shall not apply to, any other work, including:

1. 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 June 30, 2014;
2. Contracts procured on an emergency basis;
3. Small purchases (purchases not more than \$100,000) awarded pursuant to New York City Charter §314, New York City Charter § 316 and New York City Procurement Policy Board Rules §3-08;
4. 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 Project Work pursuant to this agreement; and
5. Contracts for installation of information technology that are not otherwise Project Work.

SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement Project Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to June 30, 2014, 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 Project Work until completion, even if not completed by the expiration date of the Agreement. If Project 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 Project Work:

A. Superintendents, supervisors (excluding general and forepersons specifically covered by a craft's Schedule A), 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 Program site while covered Project 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 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 firm; and

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

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 Project 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 the 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 Project Work.

As the contracts involving Project 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 Project Work, with respect to that work.

SECTION 2. UNION REFERRAL

A. The Contractors agree to employ and hire craft employees for Project Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions' area collective bargaining agreements. 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 is unable to 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 Project Work within its jurisdiction from any source other than referral by the Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Project Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Project 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 pursuant to New York City Administrative Code §6-129, that are not signatory to any Schedule A CBAs, with contracts valued at or under five hundred thousand (\$500,000), may request by name, and the Local will honor, referral of the second (2nd), fourth (4th), sixth (6th), and eighth (8th) employee, who have applied to the Local for Project Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Project 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 work days prior to the contract award.

For such contracts valued at above \$500,000 but less than \$1 million, the Local will honor referrals by name of the second (2nd), fifth (5th), and eighth (8th) employee subject to the foregoing requirements. In both cases, name referrals will thereafter be in accordance with Section 2(B), above.

D. Where a certified MWBE Contractor voluntarily enters into a Collective

Bargaining Agreement (“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 AND FEMALE 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.

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. UNION DUES

All employees covered by this Agreement shall be subject to the union security provisions contained in the applicable Schedule A local agreements, as amended from time to time, but only for the period of time during which they are performing on-site Project Work and only to the extent of tendering payment of the applicable union dues and assessments uniformly required for union membership in the Local Unions which represent the craft in which the employee is performing Project Work. No employee shall be discriminated against at any Project Work site because of the employee's union membership or lack thereof. In the case of unaffiliated employees, the dues payment will be received by the Local Unions as an agency shop fee.

SECTION 7. 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, 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 Collective Bargaining Agreement prohibits a foreperson from working when the craft persons he is leading exceed a specified number.

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 Project Work site.

SECTION 2. STEWARDS

A. Each Local Union shall have the right to designate a working journey person as a Steward and an alternate, and shall notify the Contractor and Construction Manager 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 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. 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 Project 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 Contractors' 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 Project 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 disruptive activity at the Project 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 Project Work or the objectives of the Agency at any Project 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 Project Work site where the failure to cross disrupts or interferes with the

operation of Project 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 Project 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 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 minority and female employees.

SECTION 2. COMPOSITION

The Committee 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 may 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.

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:

The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor, Council and the Construction Manager (or designee), shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement.

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 J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure. 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 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 Project 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 Project 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 trustee employee benefit

funds designated 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 trustee 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.

B. The Contractors agree to be bound by the written terms of the legally established jointly trustee 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 Project Work done under this Agreement and only for those employees to whom this Agreement requires such benefit payments.

C. 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.

D. 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 which the union and/or fringe benefit fund claims to be due it, and deposit such amount when and so withheld in a separate interest-bearing account pending resolution of the dispute pursuant to the union's Schedule A agreement, and the amount so deposited together with the interest thereon shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the Delinquent Contractor and union or fringe 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.

E. 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 WORK DAY

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.

B. In accordance with Program 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. 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 Project Work site designated by the Contractor.

C. Scheduling - Monday through Friday is the standard work week; 8 hours of work plus ½ hour unpaid lunch.

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 over eight (8) hours in a day and over forty (40) hours in a week, 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 Project Work

schedules and existing Project 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 work days notice to the Local Union or such lesser notice as may be mutually agreed upon.

B. Second and/or Third Shifts/Saturday and/or Sunday Work - - The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 11 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.

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

SECTION 4. HOLIDAYS

A. Schedule - There shall be 8 recognized holidays on the Project:

New Years Day	Labor Day
Martin Luther King Day	President's Day
Memorial 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 recognized holiday shall be in accordance with the applicable Schedule A.

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

SECTION 5. SATURDAY WORK

The Contractor may schedule a Saturday work day and such time shall be scheduled and paid at time and one-half (1½) unless the applicable Schedule A permits a straight time rate.

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 or 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 his full shift.

B. When an employee, who has completed their scheduled shift and left the Project 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 Project 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 8 hours wages for that day. Further, the employee shall be rehired at such time as able to return to duties provided there is still Project Work available for which the employee is qualified and able to perform.

SECTION 10. TIME KEEPING

A Contractor may utilize brassing or other systems to check employees in and out. Each employee must check in and out. 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.

ARTICLE 13 - APPRENTICES

SECTION 1. RATIOS

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 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. 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 and Helmets to Hardhats.

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 Project 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.

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 this Project Work. Such rules will be published and posted in conspicuous places throughout the Project 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 Project 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

Temporary services, i.e. all temporary heat, climate control, water, power and light, shall only be required upon the specific request of the Agency or Construction Manager, and when so requested shall be assigned to the appropriate trade claiming jurisdiction. Temporary system coverage shall be provided by the appropriate Contractors' existing employees during working hours in which a shift is scheduled for employees of this Contractor. The Agency or Construction Manager may determine the need for temporary system coverage requirements during non-working hours, which may be limited to one person per applicable trade where practicable. There shall be no stacking of trades on temporary services. In the event a temporary system 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, age or any other status provided by law, in any manner prohibited by law or regulation.

SECTION 2. LANGUAGE OF AGREEMENT

The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

ARTICLE 17- GENERAL TERMS

SECTION 1. PROJECT RULES

A. The Construction Manager and the Contractors shall establish such

reasonable Project 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 Project 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 WORK DAY

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 NYS Department of Labor, 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 Program funding or any New York State Labor Law exemption for all or any part of the Project Work, the provision or provisions involved (and/or its application to particular Project 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 Program funding or any New York State Labor Law exemption for all or any part of the Project Work, such requirement (and/or its application to particular Project 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 Project 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 Collective Bargaining Agreements which are the basis for Schedule A notify the Agency and Construction Manager in writing of the hourly rate changes agreed to in that Area Collective Bargaining which are applicable to work covered by this Agreement and their effective dates.

B. It is agreed that any provisions negotiated into Schedule A collective bargaining agreements 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 Project 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 Collective Bargaining Agreements 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 Project Work by any Local Union involved in the renegotiation of Area Local Collective Bargaining Agreements nor shall there be any lock-out on such Project Work affecting a Local Union during the course of such renegotiations.

ARTICLE 20 - WORKERS' COMPENSATION ADR

SECTION 1.

An 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 Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program 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 the Center 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.

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 I

BY: _____
(Name/Title)

FOR NEW YORK CITY

BY: _____
ADRIAN BENEPE, COMMISSIONER

APPROVED AS TO FORM:

ACTING CORPORATION COUNSEL
NEW YORK CITY

FOR THE LOCAL UNIONS:

Boiler Makers Local No. 5

By: _____

Date: _____

Bricklayers Local No. 1

By: _____

Date: _____

Concrete Workers District Council No. 16

By: _____

Date: _____

Drywall Tapers 1974 DC 9

By: _____

Date: _____

Elevator Constructors No. 1

By: _____

Date: _____

Glaziers Local Union No. 1281 DC 9

By: _____

Date: _____

Heat & Frost Insulators Local
Union No. 12A

By: _____

Date: _____

Carpenters District Council

By: _____

Date: _____

Cement Masons No. 780

By: _____

Date: _____

Derrickmen and Riggers Local Union No. 197

By: _____

Date: _____

Electrical Local No. 3

By: _____

Date: _____

Heat & Frost Insulators
Local Union No. 12

By: _____

Date: _____

Pavers and Road Builders District Council NYC

By: _____

Date: _____

Plumbers No. 1

By: _____

Date: _____

Iron Workers Local No. 40

By: _____

Date: _____

Local 79 Construction and General Building Laborers

By: _____

Date: _____

Metal Lathers Local No. 46

By: _____

Date: _____

Metal Polishers District Council #9

By: _____

Date: _____

Painters District Council # 9

By: _____

Date: _____

Painters, Decorators & Wallcoverers DC 9

By: _____

Date: _____

Painters Structural Steel No. 806

By: _____

Date: _____

Iron Workers District Council

By: _____

Date: _____

Iron Workers Local No. 361

By: _____

Date: _____

Laborers Local No. 29 Blasters and Drillers

By: _____

Date: _____

Laborers Local No. 78 Asbestos & Lead Abatement

By: _____

Date: _____

Laborers Local No. 731 Excavators

By: _____

Date: _____

Mason Tenders District Council

By: _____

Date: _____

Ornamental Iron Workers No. 580

By: _____

Date: _____

Roofers & Waterproofers
No. 8

By: _____

Date: _____
Sheet Metal Workers Local No. 28

By: _____

Date: _____

Teamsters Local Union 814

By: _____

Date: _____

Plasters Local Union No. 262

By: _____

Date: _____

Steamfitters Local Union
No. 638

By: _____

Date: _____
Sheet Metal Workers Local
No. 137

By: _____

Date: _____

Teamsters Local No. 813 Private Sanitation

By: _____

Date: _____

Tile, Marble & Terrazzo B.A.C. Local
Union No. 7

By: _____

Date: _____

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 _____ and located at _____ (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 and local trust agreements as set forth in the Project Labor Agreement and this Agreement but only to the extent of Project 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 Project 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.

Dated: _____

(Name of Contractor or subcontractor)

(Name of CM; GC; Contractor or
Higher Level Subcontractor)

(Authorized Officer & Title)

(Address)

(Phone) (Fax)

Contractor's State License

Sworn to before me this
____ day of _____, 2010

Notary Public

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 days 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.

CONTACT INFORMATION FOR LOCAL UNIONS

BOILER MAKERS LOCAL NO. 5

24 Van Siclen Avenue
Floral Park, NY 11001
Phone: (516) 326-2500
Fax: (516) 326-3435
Thomas Klein, Bus. Mgr.
boilermakers5@optonline.net

BLASTERS & DRILLERS LOCAL NO. 29

43-12 Ditmars Blvd.
Astoria, NY, 11105
Phone: (718) 278-5800
Thomas Russo, bus mgr.

BRICKLAYERS LOCAL NO. 1

Santo Lanzafame
(718) 392-0525

BUILDING TRADES MAINTENANCE DIVISION

71 West 23rd Street, Suite 501
New York, NY 10010
Phone: (212) 647-0700
Fax: (212) 647-0705
Jim Barnett, Chairman

CARPENTERS DISTRICT COUNCIL

395 Hudson Street
New York, New York 10014
Phone: (212) 366-7500
Fax: (212) 675-3140
Michael J. Forde, Executive Secy Treas.
Peter Thomassen, President
Denis Sheil, V.P.
Ronald Rawald, D.C. Rep.
carpmik@aol.com

CEMENT MASONS NO. 780

150-42 12th Avenue
Whitestone, NY 11357
Phone: (718) 357-3750
Fax: (718) 357-2057
Angelo Scagnelli, Bus. Mgr.
Paul M. Mantia, President
Angelolocal780@yahoo.com

CONCRETE WORKERS
DISTRICT COUNCIL NO. 16

29-18 35th Avenue
Long Island City, NY 11106
Phone: (718) 392-5077
Fax: (718) 392-5087
Alex Castaldi, Pres. Bus. Mgr.
Ccwdc16@yahoo.com

DERRICKMEN AND RIGGERS
CONCRETE WORKERS

25-19 43rd Avenue
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Joseph McDonald, Bus. Agent
joemac197@aol.com

DRYWALL TAPERS 1974

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Phone: (212) 242-8500
Fax: (212) 242-2356
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Salvatore Marsala, Org.
Maurice Maynard, Org.
Ellior Santiago, Org.
Vincent Calderone, Org.
Ann Juliano Union Sec.
Local1974@aol.com

ELECTRICAL LOCAL NO. 3

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Fax: (718) 380-8998
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John E. Marchell, President
Raymond Melville, Asst. Bus. Mgr.
Construction
Paul Ryan, Asst. Bus. Mgr
Westchester/Fairfield
Luis Restrepo, Asst. Bus. Mgr.
Mark G. Hansen, Bus. Rep.
Elliot Hecht, Bus. Rep.
Raymond Kitson, Bus. Rep.

Austin McCann, Bus. Rep.
Robert Olenick, Bus. Rep.
Michael O'Neill, Bus. Rep.
Joseph Santigate, Bus. Rep.
Louis Sciara, Bus. Rep.
Lance Van Arsdale, Asst. Bus
Maintenance Division
Ray West, Bus. Rep.
mail@local3ibew.org

ELEVATOR CONSTRUCTORS NO. 1

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Thomas Moore, Bus. Agent
Gary Riefenhauser, Bus. Agent
Fred McCourt, Bus. Agent
Robert Stork, Bus. Agent
llegotte@localoneiuec.com
snoble@localoneiuec.com

ENGINEERS LOCAL UNION NO. 14

141-57 Northern Boulevard
Flushing, NY 11354
Phone: (718) 939-0600
Fax: (718) 939-3131
Edwin Christian, Pres. Bus. Mgr.
Christopher Confrey, Bus. Rep. Rec Sec.
John R. Powers, Bus. Rep. Treas.
engineers@iuoelocal14.com

ENGINEERS NO. 15, 15A, 15B, 15C

15D

265 West 14th Street
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Robert G. Shaw, Bus. Rep. & V.P.
Charles Gambino, Bus. Rep., Fin. Sec.
Brian S. Kelly, Bus. Rep. & Rec. Sec.
Daniel Schneider, Bus. Rep. & Treasurer
Gregg Nolan, Bus. Rep.
Christopher Thomas, Bus. Rep.

Bruce Murphy, Director of Training

ENGINEERS NO. 30

115-06 Myrtle Avenue
Richmond Hill, NY 11418
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Fax: (718) 850-0524
John T. Ahern, Bus. Mgr.

ENGINEERS No. 94

331-337 West 44th Street
New York, NY 10036
Phone: (212) 245-7040 Fax: (212) 245-7886
Kuba Brown, Bus. Mgr. & President
kubabrown@local94.com

GLAZERS NO. 1281

45 West 14th Street
New York, NY 10011
Phone: (212) 924-5200
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William Elfeld, Bus. Rep.

**HEAT & FROST INSULATORS
AND ASBESTOS WORKERS**

LOCAL UNION NO. 12

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Matthew Aracick, Fin. Sec.
John Killard, President
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**HEAT FROST INSULATORS
LOCAL UNION NO. 12A**

2110 Newton Avenue
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Francisco Vega, Bus. Mgr.

IRON WORKERS DISTRICT

505 White Plains Road, Suite 200
Tarrytown, NY 10591
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Edward J. Walsh, Pres.
ironworkdc@aol.com

IRON WORKERS NO. 40 (Manhattan, The Bronx & Staten Island)

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Robert Walsh, Bus. Mgr. Fin. Sec.
Daniel Doyle, Bus. Rep. V.P.
Kevin O'Rourke, Pres. Bus. Agent

IRON WORKERS NO. 361 (Brooklyn & Queens)

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Richard O'Kane, Bus. Mgr. Fin. Sec.
Thomas Seaman, President
Anthony DeBlaisie, Bus. Agent, V.P.
John Delaney, Jr., Rec. Sec.
unionhall@361.com

LABORERS LOCAL NO. 78

ASBESTOS & LEAD ABATEMENT

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New York, New York 10038-2825
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Fax: (212) 406-1800
Kazik Prosniewski, Pres.
Edison Severino, Bus. Mgr.
Pawel Gruchacz, Sec. Treas.
Local78dispatchers@gmail.com

**LABORERS, CONSTRUCTION AND
GENERAL BUILDING NO. 79**

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George Zecca, Bus. Mgr.
John Norbury, V.P. & Bus. Agent
Chas Rynkiewicz, Organizer, Mk Dev.
Eugene Sparano, Organizer Mkt. Dev.
John Modica, Bus. Agent
Joseph Cangelosi, Bus. Agent
Kenny Robinson, Bus. Agent
James Haggerty, Bus. Agent
Carl Tully, Bus. Agent
Jose Andino, Bus. Agent
Edward Medina, Bus. Agent
Luis Pereria, Bus Agent
Noe Duran, Bus. Agent
Timothy Campbell, Bus. Agent
John Wund, Agent, Organizer
79@laborerslocal.org

LABORERS NO. 731

34-11/19 35th Avenue
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LATHERS METAL

LOCAL NO. 46

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Kenneth Allen, Bus. Agent
Fred LeMoine Jr., Bus. Agent
Kevin Kelly, Bus. Agent

MASON TENDERS DIST. COUNCIL

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David Bolger, Field Rep.

METAL POLISHERS

LOCAL UNION NO. 8A

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Phone: (718) 361-1770
Fax: (718) 361-1934
Hector Lopez, Bus. Mgr., Pres.

METAL TRADES DIVISION

Kevin Connelly, Bus. Agent
21-42 44th Drive

**MILLWRIGHT AND MACHINERY
ERECTORS LOCAL NO. 740**

89-07 Atlantic Avenue
Woodhavaen, NY 11412
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Fax: (718) 849-0070
Robert Seeger, Bus. Mgr.

**ORNAMENTAL IRON WORKERS
NO. 580**

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James Mahoney, Bus. Agent
Robert Benesh, Bus. Agent
Dennis Milton, Bus. Agent
Peter Creegan, Bus. Agent
dlusardi@local-580.com

**PAINTERS DISTRICT
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Richard Small, Bus. Rep.
Jose Torent, Bus. Rep.
Raul Rendon, Bus. Rep.
Paul Belliveau, Bus. Rep.
Joseph Ramaglia, Bus. Mgr.

Anthony Buscema, Bus. Rep.
James Barnett, Bus. Rep.
Angelo Serse, Bus. Rep.
Jack Kittle, Political Dir.
Gus Diamantas, Training Director
John Barrett, Bus. Rep.

PAINTERS STRUCTURAL STEEL

NO. 806

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Angelo Serse, Bus. Mgr.

PAVERS & ROAD BUILDERS

DISTRICT COUNCIL NO. 1

136-25 37th Avenue, Suite 502
Flushing, NY 11354
Phone: (718) 779-8850
Fax: (718) 779-8857
Keith Loscalzo, Bus. Mgr.
Vincent Masino, Trustee
Lowell Barton, Bus. Agent
Francisco Fernandez, Bus. Agent
Joao Teixeira, Bus. Agent
Bonaventura Valerio, Bus. Agent
Joseph Sarro, Bus. Agent

PLASTERS LOCAL UNION NO. 262

2241 Conner Street
Bronx, NY 10466
Phone: (718) 547-5440
Fax: (718) 547-5435
John Sweeney, Int'l Rep.
mventura@opcmialocal262.com

PLUMBERS NO. 1

158-29 Bross Bay Boulevard
Howard Beach, NY 11414
Phone: (718) 738-7500
Fax: (718) 835-0896
George Reilly, Bus. Mgr.
Daniel Lucarelli, Bus. Agent
Kevin Brady Sr., Bus. Agent
Donald Doherty Jr. Bus. Agent at Large

Dudley Kinsley, Bus. Agent
Michael Apuzzo, Bus. Agent
John Feeney Jr., Bus. Agent
Paul O'conner, Bus. Agent
Anthony Russini, Bus. Agent
John Murphy, Fin. Sec. Treasuer
Fred Delligatti, Bus. Agent
Thomas Kemps, Bus. Agent
plu1ny@aol.com

PRIVATE SANITATION

LOCAL NO. 813

45-18 Court Sq., Suite 600
Long Island City, NY 11101
Phone: (718) 937-7010
Fax: (718) 937-7003
Anthony Marino, President

ROOFERS & WATERPROOFERS NO. 8

467 Dean Street
Brooklyn, NY 11217
Phone: (718) 857-3500
Fax (718) 398-8359
Thomas Pedrick, Trustee & Int'l V.P.
Nicolas Siciliano, Bus. Agent

SHEET METAL WORKERS

LOCAL NO. 28

MANHATTAN OFFICE
500 Greenwich Street
New York, NY 10013
Phone: (212) 226-941-7700
Fax: (212) 226-0304
Brian McBreaty, Bus. Agent
Richard Knice, Fin. Sec-Treas.
Michael Belluzzi, Bus. Mgr. & Pres.
Kevin McPike, Bus. Agent
Daniel Fox Jr., Bus. Agent
Rick Buckheit, Bus. Agent
Robert Rotolo, Bus. Mgr.
joanne@local28union.com

SHEET METAL WORKERS

LOCAL 137

21-42 44th Drive
Long Island City, NY 11101
Phone: (718) 937-4514
Fax: (718) 937-4113
Paul Collins Jr.
Dante Dano, Agent

STEAMFITTERS LOCAL UNION

NO. 638

32-32 48th Avenue
Long Island City, NY 11101
Phone: (718) 392-3420
Fax: (718) 784-7285
John Torpey, Pres.-Fax: (718) 372-5340
James Elder, Sec. Treasurer
John Enright, Bus. Agent
John O'Connell, Bus. Agent
Richard Roberts, Bus. Agent At-Large
Patrick Dolan Jr., Bus. Agent
Brian Wangerman, Bus. Agent
Robert Egan Jr., Bus. Agent
Vincent Curran Jr., Bus. Agent
Patrick Daly, Bus. Agent
Raymond Dean Jr., Bus. Agent
Scott Roche, Bus. Agent
Patrick Norton, Bus. Agent
Robert Bartels, Jr. Bus. Agent
Christopher P. Sheeran, Bus. Agent
bpetriccione@steamfitters638.org
rroberts@steamfitters638.org

TEAMSTERS LOCAL UNION 282

2500 Marcus Avenue
Lake Success, NY 11042
Phone: (516) 488-2822
Fax: (516) 488-4895
Thomas Gesualdi
Kpalmeri282@yahoo.com

TEAMSTERS LOCAL UNION 814

33-01 38th Avenue
Long Island City, NY 11101
Phone: (718) 392-4510
Fax: (718) 361-9610
George Daniello, Pres., Bus. Mgr.
team814@hotmail.com

TILE, MARBLE & TERRAZO B.A.C.

LOCAL UNION 7

45-34 Court Square

Long Island City, NY 11101

Phone: (718) 786-7648

Fax: (718) 472-2370

Thomas Lane, President Bus. Mgr.

William Hill, Bus. Agent

Blaise Toneatto, Bus. Agent

Christopher Guy, Sec. Treasuer

Ernesto Jimenez, Bus. Agent

Joseph Andriano, Bus. Agent

Ronald Nicastri, Bus. Agent

James Ghan, Bus. Agent

tlane@baclocal7.com

TIMBERMEN LOCAL 1536

395 Hudson Street, 8th Floor

New York, NY 10014

Phone: (212) 366-7500

Samuel Bailey, Bus. Mgr.

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NOTICE TO BIDDERS

DAMAGES FOR DELAY PILOT PROGRAM

Please be advised that this contract is part of a pilot program in which the Standard Construction Contract provisions concerning delay damages have been revised to allow contractors to be reimbursed for specified additional costs that are attributable to a delay in the performance of the work resulting from certain acts or omissions of the City agency or its representatives. Certain changes are highlighted here to alert bidders to the pilot program. Please see Articles 11, 12.3, and 13.10 of the Standard Construction Contract for a full understanding and the actual text of the pilot program. The text of the revised Standard Construction Contract is the controlling document should there be any discrepancies between this notice and the Standard Construction Contract.

Changes to Articles 11, 12.3, and 13.10 of the Standard Construction Contract permit contractors to make claims for delay damages relating to the following circumstances:

The failure of the City to take reasonable measures to coordinate and progress the Work;

Extended delays attributable to the City in the review or issuance of change orders, in shop drawing reviews and approvals or as a result of the cumulative impact of multiple change orders, which constitute a material change to the Work and which have a verifiable impact on project costs.

The unavailability of the site for an extended period of time that significantly affects the scheduled completion of the contract.

The issuance by the City of a stop work order relative to a substantial portion of work for a period exceeding thirty days, that was not brought about through any action or omission of the Contractor.

Differing site conditions that were not known or 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.

Delays caused by the City's bad faith or its willful, malicious, or grossly negligent conduct;

Delays not contemplated by the parties;

Delays so unreasonable that they constitute an intentional abandonment of the Contract by the City; and

Delays resulting from the City's breach of a fundamental obligation of the Contract.

Please see Article 11.4 for provisions regarding compensable delays.

Specific exclusions to claims for damages also apply, such as for third party (non-City) acts and omissions, court orders, strikes or *force majeure* events. For provisions related to non-compensable delays, please see Article 11.5.

For those delays where damages are available, Article 11 also sets forth what costs are recoverable. Please see Article 11.7 for which costs are recoverable and which costs are non-recoverable.

Article 11 also contains provisions concerning notice and documentation of claims. Please see Articles 11.1, 11.2, and 11.6. Contractors must comply with the notice requirements in order to preserve their claims. Consequently, please read these sections carefully. Delay damages are compensable only if they were actually, reasonably and necessarily incurred and are verified by appropriate documentation submitted at the appropriate times.

Claims for delay damages are not covered by the dispute resolution process in Article 27 of the Standard Construction Contract. See Article 11.8. When the amount of delay damages are agreed upon, such damages may be paid through a change order.

NOTICE TO BIDDERS

Please be advised that the City of New York has revised the form of the performance bond that is required for City construction contracts that do not exceed \$5 million. The form of bond required for contracts that are greater than \$5 million has not changed. The City now has two approved forms. One form is to be used for contracts that do not exceed \$5 million and one form is to be used for contracts above \$5 million. The City's payment bond remains unchanged.

The new bond form for contracts that do not exceed \$5 million has been approved by the U.S. Small Business Administration ("SBA") for participation in their Bond Guarantee Program. The SBA's Bond Guarantee Program enables eligible small businesses to obtain or increase bonding by having the SBA act as a partial guarantor of the contractor to the surety. If you are interested in participating in this program, we suggest that you contact your broker or the SBA.

In order to maximize participation by small businesses in the SBA Guarantee Program, the City also encourages prime contractors who are awarded contracts greater than \$5 million to allow their subcontractors to use the SBA-approved form, particularly on contracts that are subject to Local Law 129 (the M/WBE program), if the prime contractor requires subcontractors to obtain performance bonds.



WHISTLEBLOWER PROTECTION EXPANSION ACT RIDER

1. In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the New York City Administrative Code, respectively,
 - (a) 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 (i) the Commissioner of the Department of Investigation, (ii) a member of the New York City Council, the Public Advocate, or the Comptroller, or (iii) the City Chief Procurement Officer, ACCO, Agency head, or Commissioner.
 - (b) If any of Contractor's officers or employees believes that he or she has been the subject of an adverse personnel action in violation of subparagraph (a) of paragraph 1 of this rider, he or she shall be entitled to bring a cause of action against Contractor to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (i) an injunction to restrain continued retaliation, (ii) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (iii) reinstatement of full fringe benefits and seniority rights, (iv) payment of two times back pay, plus interest, and (v) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.
 - (c) 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:
 - (i) 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
 - (ii) the rights and remedies afforded to its employees under New York City 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.
 - (d) For the purposes of this rider, "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.
 - (e) This rider is applicable to all of Contractor's subcontractors having subcontracts with a value in excess of \$100,000; accordingly, Contractor shall include this rider in all subcontracts with a value a value in excess of \$100,000.
2. Paragraph 1 is not applicable to this Contract if it is valued at \$100,000 or less. Subparagraphs (a), (b), (d), and (e) of paragraph 1 are not applicable to this Contract if it was solicited pursuant to a finding of an emergency. Subparagraph (c) of paragraph 1 is neither applicable to this Contract if it was solicited prior to October 18, 2012 nor if it is a renewal of a contract executed prior to October 18, 2012.

NOTICE TO BIDDERS, PROPOSERS, CONTRACTORS, AND RENEWAL CONTRACTORS

This contract includes a provision concerning the protection of employees for whistleblowing activity, pursuant to New York City Local Law Nos. 30-2012 and 33-2012, effective October 18, 2012 and September 18, 2012, respectively. The provisions apply to contracts with a value in excess of \$100,000.

Local Law No. 33-2012, the Whistleblower Protection Expansion Act (“WPEA”), prohibits a contractor or its subcontractor from taking an adverse personnel action against an employee or officer for whistleblower activity in connection with a City contract; requires that certain City contracts include a provision to that effect; and provides that a contractor or subcontractor may be subject to penalties and injunctive relief if a court finds that it retaliated in violation of the WPEA. The WPEA is codified at Section 12-113 of the New York City Administrative Code.

Local Law No. 30-2012 requires a contractor to prominently post information explaining how its employees can report allegations of fraud, false claims, criminality, or corruption in connection with a City contract to City officials and the rights and remedies afforded to employees for whistleblowing activity. Local Law No. 30-2012 is codified at Section 6-132 of the New York City Administrative Code.

CITY OF NEW YORK

**DEPARTMENT OF
DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES**

INFORMATION FOR BIDDERS

DELAY DAMAGES PILOT

September 2008

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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.

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 or 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. VENDEX Questionnaires

(A) Requirement: Pursuant to Administrative Code Section 6-116.2 and the PPB Rules, bidders may be obligated to complete and submit VENDEX Questionnaires. Generally, if this bid is \$100,000 or more, or if this bid when added to the sum total of all contracts, concessions and franchises the bidder has received from the City and any subcontracts received from City contractors over the past twelve months, equals or exceeds \$100,000, Vendex Questionnaires must be completed. If required, Vendex Questionnaires must be completed and submitted before any award of contract may be made or before approval is given for a proposed subcontractor. Non-compliance with these submission requirements may result in the disqualification of the bid, disapproval of a subcontractor, subsequent withdrawal of approval for the use of an approved subcontractor, or the cancellation of the contract after its award.

(B) Submission: Vendex Questionnaires must be submitted directly to the Mayor's Office of Contract Services, ATTN: Vendex, 253 Broadway, 9th Floor, New York, New York 10007. In addition, the bidder must submit a Confirmation of Vendex Compliance to the agency. A form for this confirmation is set forth in the Bid Booklet.

(C) Obtaining Forms: Vendex Questionnaires, as well as detailed instructions, may be obtained at www.nyc.gov/vendex. The bidder may also obtain Vendex forms and instructions by contacting the Agency Chief Contracting Officer or the contact person for this contract.

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)669-2797.

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. 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 202-512-1800; (2) through the Internet at <http://www.fms.treas.gov/c570/index.html>, and (3) through a computerized public bulletin board, which can be accessed by using your computer modem and dialing 202-874-6887.

(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 it 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 on page 2 of the Bid Booklet.

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. 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

THE DDC SAFETY REQUIREMENTS INCLUDE THE FOLLOWING SECTIONS:

- I. POLICY ON SITE SAFETY**
- II. PURPOSE**
- III. DEFINITIONS**
- IV. RESPONSIBILITIES**
- V. SAFETY QUESTIONNAIRE**
- VI. SAFETY PROGRAM AND SITE SAFETY PLAN**
- VII. KICK-OFF/PRE-CONSTRUCTION MEETINGS AND SAFETY REVIEW**
- VIII. EVALUATION DURING WORK IN PROGRESS**
- IX. SAFETY PERFORMANCE EVALUATION**

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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 jobsites must, at a minimum, comply with applicable federal, state and city laws, rules and regulations, including without limitation:

- ❑ U. S. Department of Labor 29 Code of Federal Regulations (CFR) Part 1926 and applicable Sub-parts of Part 1910 – U.S. Occupational Safety and Health Administration (OSHA) including, but not limited to “Respiratory Protection” (29 CFR 1910.134), “Permit-Required Confined Spaces” (29 CFR 1910.146), and “Hazard Communication” (29 CFR 1910.1200);
- ❑ New York State Department of Labor Industrial Code Rule 23 – Protection in Construction, Demolition and Excavation;
- ❑ New York City Construction Codes, Title 28
- ❑ NYC Department of Transportation Title 34 Chapter 2 – Highway Rules
- ❑ New York State Department of Labor Industrial Code Rule 753
- ❑ NYC Local Law No. 113 (2005) Noise Control Code

In addition, all regulations promulgated by the NYC Department of Transportation, including requirements for Maintenance and Protection of Traffic (MPT), are applicable when contained in contract specifications. While MPT is a significant component of work in our Infrastructure Division, it does not supersede or exempt Contractors from complying with other applicable health and safety standards (for example, excavating and trenching standards, operation of heavy equipment and compliance with City environmental and noise regulations).

I. 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 hazard, 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 shall mean the person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the 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.

Construction Safety Auditor: A representative of the QACS Construction Safety Unit 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 surveys, reviewing health and safety plans, reviewing construction permits, and rendering technical advice and assistance to DDC Resident Engineers and Project Managers.

Construction Safety Unit: A part of QACS within the Division of Technical Support that assesses contractor safety on DDC jobsites and advises responsible parties of needed corrective actions.

Construction Superintendent: A representative of the contractor responsible for overseeing performance of the required construction work. This individual must engage in sound construction practices, and is responsible to maintain a safe work site. In the case of a project involving the demolition, alteration or new construction of buildings, the Construction Superintendent must be licensed by the NYC Department of Buildings.

Contractor: For purposes of these Safety Requirements, the term "Contractor" shall mean any person or entity that enters into a contract for the performance of construction work on a DDC project. The term "Contractor" shall 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").

Director - Quality Assurance and Construction Safety (QACS): Responsible for the operations of the QACS Construction Safety Unit and the DDC Site Safety management programs.

Job Hazard Assessment (JHA): A process of identifying site-specific hazards that may be present during construction and establishing the means and methods to reduce or eliminate those hazards.

Jobsite Safety Coordinator: A person designated by the Contractor to be onsite during all activities. This individual shall have received, at a minimum, the OSHA 10-hour construction safety program. Other examples of acceptable training are the 30-hour OSHA Safety and Health Standards for the Construction Industry training program (OSHA 510) or a degree/certificate in a safety and health from a college-level curriculum. This person does not necessarily have to be dedicated full-time to site safety, but must have sufficient experience and authority to undertake corrective action and must qualify to be a competent person. For certain projects, as defined in NYC Construction Codes – Title 28, this person may be required to have a Site Safety Manager's License issued by the NYC DOB.

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 and trenching and shoring, among others.

Resident Engineer (RE) / Construction Project Manager (CPM): Representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the work. (The RE/CPM may be a third-party consultant, including a CM, retained by DDC.)

Safety Program: Established by the Contractor that covers all operations of that Contractor and establishes the Contractor's overall safety policy, regulatory compliance plan and minimum safety standards. The Safety Program must be submitted prior to the commencement of work at the site and is subject to review and acceptance by the Construction Safety Unit.

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 Plan: A site-specific safety plan developed by the Contractor for a specific project. The Site Safety Plan must identify hazards associated with the project, and include specific safety precautions and training appropriate and necessary to complete the work. The Site Safety Plan must be submitted prior to the commencement of work at the site and is subject to review and acceptance by the Construction Safety Unit.

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 documented 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.

IV. RESPONSIBILITIES

All persons who manage, perform, and provide support for construction projects shall 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 / Construction Project Manager / Construction Manager

- Monitors the issuance of safety-related permits, approvals and drawings and maintains copies on site.
- Monitors construction-related work activities to confirm that they are conducted in accordance with DDC policies and all applicable regulations that pertain to construction safety.
- Maintains documentation and periodically attends weekly safety meeting.
- Notifies the Construction Safety Unit and the ACCO's Insurance and Risk Management Unit of project-related accidents and emergencies, as per DDC's Construction Safety Emergency Protocol.
- Gathers facts related to all accidents and prepares DDC Accident Reports.
- Notifies the Construction Safety Unit of outside regulatory agency inspections and forwards a copy of the inspection report within three days of its receipt.
- Monitors the conditions at the site for conformance with the Site Safety Plan and DDC construction documents.
- Notifies the contractor and DDC in the event that any condition or activity exists that is not in compliance with the 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.
- Notifies DDC of any emergency condition and directs the contractor to provide such labor, materials, equipment and supervision to abate such conditions.
- Reports gross safety violations to the Construction Safety Unit immediately.

A. Contractors

- Complete a Safety Questionnaire and submit with its bid or as part of a pre-qualification package.
- Provide a Written Job Hazard Assessment (JHA) that identifies expected safety issues of the work to be performed. JHA shall be included with the Site Safety Plan submitted by the contractor.
- Submit a Site Safety Plan and Safety Program within 15 days of issuance of the Notice to Proceed, or as otherwise directed. The Site Safety Plan and Safety Program are subject to review and acceptance by the Construction Safety Unit prior to the commencement of work at the site. The Site Safety Plan shall be revised and updated as necessary.
- Ensure that all employees are aware of the hazards associated with the project through formal and informal training and/or other communications. Conduct and document weekly safety meetings for the duration of the project. Documentation to be provided to the RE/CPM/CM on a monthly basis.
- Name a Construction Superintendent, if required.
- Name a Job Site Safety Coordinator. The Contractor will be required to identify the Job Site Safety Coordinator in the Site Safety Plan.
- Comply with all mandated federal, state and local safety and health rules and regulations.
- Comply with all provisions of the Site Safety Plan.
- As part of the Site Safety Plan, prepare a site specific MPT (if not otherwise provided in the contract documents) and comply with all of its provisions.
- Conduct and document site-specific safety orientation for Contractor 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 Job Site Safety Coordinator will conduct this training prior to mobilization and provide documentation to the RE/CPM/CM.
- 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.).
- Report unsafe conditions or hazards to the DDC RE/CPM/CM as soon as practical, but no more than 24 hours after discovery, and take action to remove or abate such conditions.

- Report any accident involving injuries to workers or the general public, as well as property damage, to the DDC RE/CPM/CM within two (2) hours.
- Notify the DDC RE/CPM/CM within two (2) hours of the start of an inspection by any regulatory agency personnel, including OSHA.
- Maintain all records pertaining to all required compliance documents and accident and injury reports.
- Respond to DDC recommendations on safety, which shall 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 and environmental 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 must submit a completed DDC Safety Questionnaire listing their workers' compensation experience modification rating and OSHA Incidence 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 must provide the requested update within 30 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 years; and
- Criteria 4: A fatality (worker or member of public) experienced on or near Contractor's worksite within the last three (3) years; and
- Criteria 5: An unacceptable rating by QACS based on past performance on DDC projects; and
- Criteria 6: Contractor has in place an acceptable corporate safety program and its employees shall have completed all documented relative safety training; and
- Criteria 7: Contractor shall provide OSHA Injury Records (currently OSHA 300 Log) for the last three (3) years.

If the Contractor fails to meet the basic criteria listed above, the Construction Safety Unit may request, through the ACCO, more detail concerning the Contractor's safety experience. DDC may request the Contractor to provide copies of, among other things, OSHA records, OSHA and DOB citations, EPA citations and written Safety Programs.

VI. SAFETY PROGRAM AND SITE SAFETY PLAN

Within fifteen (15) days of issuance of the Notice to Proceed, or as otherwise directed, the Contractor shall submit the following: (1) Safety Program, and (2) Site Safety Plan. The Safety Program shall set forth the Contractor's overall safety policy, regulatory compliance plan and minimum safety standard, and the Site Safety Plan shall identify hazards associated with the project, and include specific safety precautions and training appropriate and necessary to complete the work. The Safety Program and the Site Safety Plan are subject to review and acceptance by the Construction Safety Unit prior to the commencement of work at the site. Failure by the contractor to submit an acceptable Site Safety Plan and Safety Program shall be grounds for default.

The Site Safety Plan shall apply to all Contractor and subcontractor operations, and shall have at a minimum, the following elements. Each element shall be described in a separate section in the written document. It may be necessary to modify the basic format for certain unique or high-risk projects (such as tunnels or high-rise construction). The basic elements are as follows:

1. **Responsibility and Organization:** Identify the person or persons with authority and responsibility for implementing the Site Safety Plan. Provide an organization chart and define levels of authority and responsibility. Identify the Competent Person, the Construction Superintendent (if required), the Job Safety Coordinator and the Qualified Person required for this project.
2. **Communication:** Establish a system for communicating with employees and subcontractors on matters relating to worker and public safety and health and environmental protection, including provisions designed to encourage employees to inform the employer of hazards at the worksite without fear of reprisal. An emergency response notification protocol is to be established that also includes after hours contact numbers. The plan must also include provisions for weekly safety meetings held by the Job Site Safety Coordinator.
3. **Job Hazard Assessment:** A written document submitted by the contractor, used to identify expected job hazards and public safety risks and state the specific means and methods to reduce, control or eliminate those hazards. This part of the Site Safety Plan must also include how on-going evaluations of those risks and hazards will be carried out, including plans for periodic inspections to identify unsafe conditions, work practices and public safety hazards.
4. **Accident/Exposure Investigation:** Establish a procedure to investigate and report occupational and public injury or illness, property damage, vehicle accidents or other mishaps.
5. **Hazard Correction:** Establish means, methods and/or procedures for correcting unsafe or unhealthy conditions that might be exposing both the public and workers to hazards. Corrective actions must be taken immediately when observed or discovered. Should an imminent hazard exist which cannot be immediately abated without endangering employees, the public and/or property, remove or restrict all exposed persons from the area except those necessary to correct the existing condition. Employees necessary to correct the hazardous condition shall be provided the necessary safeguards. When corrective actions cannot be taken immediately, temporary measures should be taken until such time permanent measures are taken to eliminate the potential risks or hazards.
6. **Training:** Describe site-specific hazard training programs. In addition to the required safety orientation, additional site specific training, in the form of required weekly safety meetings, will be required. Contractors must also initiate training when: a) new employees are hired; b) employees are given new job assignments for which training has not been previously received; c) new substances, processes, procedures or equipment are introduced that might represent a new public or worker hazard; d) the employee is made aware of a new or previously unrecognized hazard; e) new supervisors are assigned to familiarize themselves with the safety and health hazards to which employees under their immediate direction and control may be exposed; and f) after a jobsite incident or accident has occurred.
7. **Recordkeeping:** Establish procedures to maintain records of scheduled and periodic inspections, weekly safety meetings, and training records. Updated records shall be maintained at the jobsite, accessible to the Construction Safety Auditors and/or Quality Assurance Auditors/RE/CPM, and retained in accordance with DDC policy.

The most critical component of the Site Safety Plan is the Job Hazard Assessment section. This section must address specific hazards that are anticipated throughout the project. Each Site Safety Plan must address, at a minimum:

- Public and pedestrian safety
- Fall protection
- Electrical hazards
- Scaffolding
- Fire protection
- Emergency notification & response
- Housekeeping / debris removal
- Dust control
- Maintenance and protection of traffic
- Trenching and excavating
- Heavy equipment operations
- Material / equipment storage
- Environmental contamination
- Sheeting and shoring
- Alcohol and Drug Abuse Policy

The following additional hazards must be addressed, if applicable, based on the contract safety specifications and/or the results of the JHA (the list is not all-inclusive):

- Basic Personal Protective Equipment
- Compressed Air
- Compressed Gas Cylinders
- Cranes, Derricks and Hoists
- Demolition
- Electrical safety
- Excavations and Trenching
- Fall Protection – Floor openings/Stairways
- Fall Protection – Guardrails Toe boards etc
- Fall Protection – Leading Edge
- Fall Protection – Personal Fall Protection Devices
- Fire Protection and Fire Prevention
- Hazard Communication (RIGHT TO KNOW)
- Hazardous Energy & Lock Out / Tag Out
- Housekeeping/ Sanitation
- Maintenance and Protection of Traffic (MPT)
- Man Lifts /Aerial Lifts
- Marine Operations
- Motor Vehicle Safety
- Overhead Power lines
- Permit Required Confined Space
- Portable Ladders
- Powered Actuated Tools
- Powered Material Handling Equipment
- Scaffolds – Mobile
- Scaffolds – Stationary
- Scaffolds – Suspended
- Slings
- Steel Erection
- Welding and Cutting (Hot Work)
- Airborne Contaminants – Particulates – General
- Asbestos
- Blood borne Pathogens
- Hearing Protection
- Lead in Construction
- Mercury in Construction
- PCB's
- Respiratory Protection
- Silica
- Thermal Stress
- West Nile Virus
- Rodents and Vermin
- Noise Mitigation Plan

Certain DDC programs, such as Job Order Contracting System (JOCS), may not necessarily require Site Safety Plans. The JOCS contractor will be required to submit a Safety Program. In addition, certain DDC Operating Units may establish program or client-specific safety requirements. The contractor's Site Safety Plan must address such program or client specific safety requirements.

VII. KICK-OFF MEETINGS/PRE-CONSTRUCTION AND SAFETY REVIEW

As part of the construction kick-off meeting, a Site Safety Plan review will be part of the agenda. A QACS representative will participate in this meeting with the contractor prior to the start of the project for the purpose of:

- A. Reviewing the safety issues detailed in the contract.
- B. Reviewing the Site Safety Plan.
- C. Reviewing any new issues or information that was not previously addressed.
- D. Discussing planned inspections and audits of the site by DDC 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 Construction Safety Unit or other designated DDC representative or Consultant during regular, unannounced inspections of the job site. Field Exit Conferences will be held with the RE/CPM, Contractor Superintendents or Safety Representatives.
- B. The RE/CPM will continually monitor the safety and environmental performance of the contractor's employees and work methods. Deficiencies shall be brought to the attention of the contractor's representative on site for immediate correction. The DDC representative will maintain a written record of these deficiencies and forward them to the Construction Safety Unit on a weekly basis. Any critical deficiencies shall be immediately reported to QACS phone# (718) 391-1624 or (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- QACS, or designee will meet with the Contractor's safety representative, the DDC project manager, the RE/CPM, or 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 to occur with inadequate attention by the contractor, this shall, among other remedies available, be grounds for default.
- E. The contractor shall inform the Construction Safety Unit and ACCO Insurance and Risk Management Unit of all medical injuries or illnesses that require doctors' treatment resulting from an on-the-job incident within 24 hours of the occurrence. The Construction Safety Unit shall also be immediately informed of all fatalities, catastrophic accidents with more than one employee hospitalized, any injuries to members of the general public and major equipment damage (e.g., property damage, equipment rollovers, loads dropped from crane). QACS shall maintain a record of all contractor injuries and illnesses during the project and provide regular reports to the Agency.
- F. The Construction Safety Unit shall be immediately notified at the start of any NYS-DOL/ NYC-COSH/ OSHA/ EPA inspections. The Director of Quality Assurance & Construction Safety shall maintain a log of all contractor OSHA/EPA inspections and citations during the project.

IX. SAFETY PERFORMANCE EVALUATION

The contractor's safety record, including all DDC 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 shall be a reason to rate a Contractor unsatisfactory which will be reflected in the City's Vendex system and will be considered for future procurement actions as set forth in the City's Procurement Policy Board Rules.

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CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT
DELAY DAMAGES PILOT

September 2008

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**CITY OF NEW YORK
STANDARD CONSTRUCTION CONTRACT**

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CITY OF NEW YORK

STANDARD CONSTRUCTION CONTRACT (September 2008)

The Standard Construction Contract dated September 2008 (the "Contract") is amended as set forth below.

- Article 77: Article 77, Part A, Section 5 is deleted in its entirety and replaced with the following:
 5. Where a Subcontractor 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. **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 a contract that is subject to a Project Labor Agreement] where the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades [i.e., 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 of the Wicks trades, regardless of what point in the life of the contract such subcontracts will occur, at the time of bid submission. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.**

- Article 77: Article 77, Part A, Section 11 is deleted in its entirety and replaced with the following:
 11. **Modification of Subcontractor Utilization Plan.** A Contractor may request a modification of its Subcontractor Utilization Plan (Subcontractor Participation Goals) 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 a contract that is subject to a Project Labor Agreement] where the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades [i.e., 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 Subcontractor Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's Subcontractor 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 Subcontractor Participation Goals. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:**

Sub-paragraphs (a) through (h) remain unchanged.

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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 content 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 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.

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 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.

2.1.4 "**City**" shall mean the City of New York.

2.1.5 **"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.

2.1.6 **"Commissioner"** shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.

2.1.7 **"Comptroller"** shall mean the Comptroller of the City of New York.

2.1.8 **"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.

2.1.9 **"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.

2.1.10 **"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.

2.1.11 **"Contractor"** shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and it(s), 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.

2.1.12 **"Days"** shall mean calendar days, except where otherwise specified.

2.1.13 **"Engineer" or "Architect" or "Project Manager"** shall mean the person so designated in writing by the Commissioner to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be.

2.1.14 **"Engineering Audit Officer" (EAO)** shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.

2.1.15 **"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.

2.1.16 **"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.

2.1.17 **"Final Acceptance"** shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.

2.1.18 **"Final Approved Punch List"** shall mean a list, approved in writing by the Engineer, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.

2.1.19 **"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.

2.1.20 "**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.

2.1.21 "**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.

2.1.22 "**Other Contractor(s)**" shall mean any Contractor (other than the entity which executed this Contract or its Subcontractors) who has a contract with the City for work on or adjacent to the building or site of the Work.

2.1.23 "**Payroll Taxes**" shall mean State Unemployment Insurance ("SUI"), Federal Unemployment Insurance (FUI) and payments pursuant to the Federal Insurance Contributions Act ("FICA").

2.1.24 "**Project**" shall mean the public improvement to which this Contract relates.

2.1.25 "**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.

2.1.26 "**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.

2.1.27 "**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.

2.1.28 "**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.

2.1.29 "**Specifications**" shall mean all of the directions, requirements and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.

2.1.30 "**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, at the site. Wherever the word Subcontractor appears, it shall also mean Sub-Subcontractor.

2.1.31 "**Substantial Completion**" shall mean the written determination by the Commissioner that the Work required under this Contract is substantially, but not entirely, complete.

2.1.32 "**Treasurer**" shall mean the Commissioner of the Department of Finance of the City of New York.

2.1.33 **"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 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 Department of Environmental Protection.

5.3.2 The Contractor agrees to comply with Section 24-219 of the Administrative Code of the City ("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 work 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 New York City Department of Environmental Protection. In addition, the Contractor's certified Construction Noise Mitigation Plan is subject inspection by the Department of Environmental Protection in accordance with 15 RCNY §28-101. No Contract work may take place at a worksite 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 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 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.

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 to fulfill the requirements of this Article 5.4.2, where the Commissioner of the New York 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 City agencies and Contractors. Any such determination shall expire after six months unless renewed.

5.4.2(c) Contractors shall not be required to comply with this Article 5.4.2 where the 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 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 is available. Any finding made pursuant to this subdivision shall expire after sixty days, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the 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 Agency issuing this solicitation.

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 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 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 calendar 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)(1) Where the 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 those paragraphs is unavailable for such vehicle, Contractor shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.

5.4.3(d)(2) 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, 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)(3) In determining which technology to use for the purposes of Articles 5.4.3(d)(1) and 5.4.3(d)(2) above, 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)(4) Contractors 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 Agency issuing the solicitation. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(1) and 5.4.3(d)(2) above shall expire after one hundred eighty days, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the 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. Contractors 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) 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 and ten thousand 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 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 Department the following information:

5.4.6(1) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;

5.4.6(2) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;

5.4.6(3) 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(4) 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(5) The locations where such Nonroad Vehicles were used; and

5.4.6(6) 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.

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 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 of New York 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 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 terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five horsepower 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.

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 horsepower (HP) rating of 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.

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 the persons and 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 notify in writing the commercial general liability insurance carrier, and, where applicable, the worker's compensation and/or other insurance carrier, of any such loss, damage, injury, or accident, and any claim or suit arising therefrom, immediately, but not later than 20 days after such event. The **Contractor's** notice to the commercial general liability insurance carrier must expressly specify that "this notice is being given on behalf of the City of New York as Additional Insured as well as [the Contractor] as Named Insured." The **Contractor's** notice to the insurance carrier shall contain the following information: the name of the **Contractor**, the number of the **Contract**, the date of the occurrence, the location (street address and borough) of the occurrence, and the identity of the persons or things injured, damaged or lost.

7.3.2(a) At the time notice is provided to the insurance carrier(s), the **Contractor** shall provide copies of such notice to the **Comptroller** and the **Commissioner**. Notice to the **Comptroller** shall be sent to the Insurance Unit, NYC Comptroller's Office, 1 Centre Street – Room 1222, New York, New York, 10007. Notice to the **Commissioner** shall be sent to the address set forth in Schedule A of the General Conditions.

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 indemnify, defend and hold the **City**, its employees and agents (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 **Contractor** waives all rights against the **City** for any damages or losses for which either is covered under any insurance required under Article 22 (whether or not such insurance is actually procured) or any other insurance applicable to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract**.

7.6 The provisions of this Article 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 **Work** on the date specified in a written notice signed by the **Commissioner**. The time for performance of the **Work** under the **Contract** shall be computed from the date specified in such written notice. **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 herein, 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 with this **Contract**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule 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**; 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** 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 enable 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 seven (7) **Days** after the commencement of such condition, the **Contractor** must notify the **Engineer** 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.

11.1.2 If the **Contractor** shall claim to be sustaining damages for delay as provided for in this Article, within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter for as long as such damages are being incurred, the **Contractor** shall submit to the **Commissioner** verified written statements of the details and the amounts of such damages, together with documentary evidence of such damages, ("statement of delay damages") as further detailed in Section 11.6. 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. On failure of the **Contractor** to fully comply with all of 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 arising under or by reason of this **Contract** shall not be different from or in excess of the statements made and documentation provided pursuant to this article.

11.1.3 Within 60 days of submission of the final verified statement of claims pursuant to Article 44, the **Commissioner** shall make a determination as to whether a compensable

delay has occurred and, if so, the amount of compensation due the **Contractor**. Notwithstanding the above, the **Commissioner** may make a determination as to whether a compensable delay has occurred at any time after the **Contractor's** first submission of a statement of delay damages.

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 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 **Contract** necessarily extending the time for completion of the **Work** or resulting from acceleration directed by the City and required to maintain the project 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**, 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 Extended delays attributable to the **City** in the review or issuance of change orders, in shop drawing reviews and approvals or as a result of the cumulative impact of multiple change orders, which have a verifiable impact on project costs.

11.4.1.3 The unavailability of the site for an extended period of time that significantly affects the scheduled completion of the **contract**.

11.4.1.4 The issuance by the **Engineer** of a stop work order relative to a substantial portion of work for a period exceeding thirty days, that was not brought about through any action or omission of the **Contractor**.

11.4.1.5 Differing site conditions that were not known or 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 The provisions of this Article 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 section shall be allowed.

11.5 Non-Compensable Delays. The **Contractor** agrees to make no monetary request for, and has 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 generally recognized 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 action or omission by the **City**;

11.5.4 Any labor boycott, strike, picketing or similar situation;

11.5.5 Any shortages of supplies of materials 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 war or of the public enemy or terrorist acts;

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 dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, the reasons for the delay and an explanation of how they were delayed.

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 amount of additional compensation sought and a breakdown of that amount into categories as described in Article 26.2, subject to the limitations set forth in section 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 Labor;

11.7.1.2 Materials;

11.7.1.3 Equipment;

- 11.7.1.4 Extended Field Office Costs;
- 11.7.1.5 Extended Contract Site Overhead;
- 11.7.1.6 Extended Home office overhead; and
- 11.7.1.7 Insurance and Bond Costs.

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 11.7.1.1 through 11.7.1.6, and an additional overhead of 5% of the costs outlined in 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;
- 11.7.3.2 Consequential damages, including but not limited to interest on monies in dispute, including interest which is paid on such monies, 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;
- 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 Determinations 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 If the parties agree that a compensable delay has occurred and agree on the amount of compensation, payment may be made pursuant to a written change order, subject to pre-audit by the **Engineering Audit Officer**, and may be post-audited by the **Comptroller** and/or the **Department**.

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** shall determine 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. Except as provided for in Article 11.4.1.1, the **Contractor** agrees to make no claim against the **City** for

any damages relating to or arising out of any timely directions issued by the **Engineer** pursuant to this article (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 this **Contractor's** failure to comply with the **Engineer's** direction 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 **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 suit based upon such claim and if any judgment or claims (even if the allegations of the suit 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 and the **PPB Rules**.

13.2 Any extension of time may be granted only by the **Commissioner** 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 officers, 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 **Commissioner** 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 **Commissioner** 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 **Commissioner** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.

13.6 The granting of an application for an extension of time for causes of delay other than those herein referred to shall be entirely within the discretion of the **Commissioner** or the Board.

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 **Commissioner** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **Commissioner** 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 bid amount;

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 **Commissioner** 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 **Commissioner** 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 **Commissioner** 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 **Commissioner**, 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 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** except as set forth in Article 11, and agrees that all it may be entitled to on account of any such delay for which compensation is not specifically provided for in Article 11 is an extension of time to complete performance of the **Work** as provided herein.

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 in Articles 14.2.1 and 14.2.2 have been met. The **Commissioner** will then issue a Certificate of **Substantial Completion**.

14.2.1 **Inspection:** The **Engineer** has inspected the **Work** and has made a written determination that it is substantially complete.

14.2.2 **Approval of Final Punch List and Date for Final Acceptance:** Following inspection of the **Work**, the **Engineer** shall furnish the **Contractor** a final punch list, specifying all items of **Work** to be completed. The **Contractor** shall then submit to the **Engineer** dates for the completion of each specified item of **Work**. Within a reasonable time after receipt, the **Engineer**, in a written notification to the **Contractor**, shall approve the **Contractor's** completion dates or, if they are unable to agree, 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 **Determining the Date of Final Acceptance:** The **Work** will be accepted as final and complete as of the date of the **Engineer's** inspection if, upon such inspection, the **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**.

14.4 **Request for Inspection:** Inspection of the **Work** by the **Engineer** for the purpose of **Substantial Completion** or **Final Acceptance** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.5 **Request for Re-inspection:** If upon inspection for the purpose of **Substantial Completion** or **Final Acceptance**, the **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** 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** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.6 **Initiation of Inspection by the 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** may initiate such inspection or re-inspection.

ARTICLE 15. LIQUIDATED DAMAGES

15.1 In the event the **Contractor** fails to complete the **Work** within the time fixed for such 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 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 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 shall apply to the **Contractor** if it 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** 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 this article. In the event the **Commissioner** takes over, uses, occupies, or operates any part of the **Work**:

16.1.1 the **Commissioner** 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, 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 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed subcontract shall be submitted in the same manner as directed above.

17.4 The **Commissioner** will notify the **Contractor** in writing whether the proposed **Subcontractor** is qualified or not qualified. If the proposed **Subcontractor** is not qualified, the **Contractor** may submit another proposed **Subcontractor** unless the **Contractor** decides to do the **Work**. No **Subcontractor** shall be permitted on the **Site** unless approved.

17.5 Before entering into any subcontract hereunder, the **Contractor** shall inform the **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 **Subcontractor** shall expressly stipulate that all labor performed and materials furnished by the **Subcontractor** shall strictly comply with the requirements of this **Contract**.

17.6 Documents given to a **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.

17.7 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.

17.8 The **Contractor** shall be responsible for ensuring that all **Subcontractors** performing **Work** at the **Site** have either their own insurance coverage or are covered by the **Contractor's** insurance as required by Article 22.

17.9 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:

17.9.1 **Payment to Subcontractors:** The agreement between the **Contractor** and its **Subcontractors** 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**.

17.9.2 **Prevailing Rate of Wages:** The agreement between the **Contractor** and its **Subcontractors** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.

17.9.3 **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 its **Subcontractors** in excess of \$50,000 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.).

17.10 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 adjusted.

17.11 On **Contracts** where 100% 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.

17.12 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, or conveyance shall not be valid until filed in the office of the **Commissioner** and the **Treasurer**, 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 or conveyance, 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 GUARANTY**

ARTICLE 19. SECURITY DEPOSIT

19.1 The bid deposit, if required, shall be retained by the **Comptroller** as security for the **Contractor's** faithful performance of the **Contract** and will be returned to the **Contractor** only after the sum retained under Article 21 equals the amount of the bid deposit, subject to the other provisions of this **Contract**. If performance and payment bonds are required, any bid security posted shall be returned within a reasonable time after posting of such bonds and execution of this **Contract** by the **City**. When no partial payments are provided, the bid deposit will be released when final payment is certified to the **Comptroller** for payment.

19.2 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**:

19.2.1 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

19.2.2 To indemnify the **City** against any and all claims.

ARTICLE 20. PAYMENT GUARANTEE

20.1 On **Contracts** where 100% performance bonds and payment bonds are executed, this article does not apply.

20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond, the **City** shall, in accordance with the terms of this article, guarantee payment of all lawful demands 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 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 this Article 20.3.

20.3.2 Nothing in this article 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**.

20.3.3 All demands made against the **City** pursuant to this article shall be made within four (4) months from the date payment is due on the invoice or invoices submitted by the beneficiary to the **Contractor** for labor or **Work** done or for materials or supplies delivered, or, if the demand is for wages, four (4) months from the date the wages were due to be paid to the beneficiary.

20.3.4 All demands made against the **City** by such beneficiary shall be presented to the **Engineer** along with all written documentation concerning the demand which the **Engineer** deems 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.

20.3.5 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.

20.3.6 The **City** will not initiate the payment process of this article or make payment on a demand where the beneficiary making the demand has filed a lien against the **Work** or otherwise sues the **City** prior to receiving a written notice from the **City** that it will not pay the demand.

20.3.7 No beneficiary shall be entitled to interest from the **City**, or to any other costs, including, but not limited to, attorney's fees.

20.4 Upon the receipt by the **City** of a demand pursuant to this article, 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.

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**.

20.4.2 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 lien has been filed, the terms and conditions set forth in Article 23 shall apply.

20.5 The provisions of this article 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, 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 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 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 his **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 within the one year limitations period set forth in Section 137(4)(b).

ARTICLE 21. RETAINED PERCENTAGE

21.1 If this **Contract** requires 100% 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 100% performance and payment security and if the price for which this **Contract** was awarded does not exceed \$500,000, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.3 If this **Contract** does not require 100% performance and payment security and if the price for which this **Contract** was awarded exceeds \$500,000, 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: 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**), the **Contractor** shall effect 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 issued by companies that meet the standards of Article 22.2.1 and shall be primary (and non-contributing) to any insurance or self-insurance maintained by the **City**.

22.1.1 Commercial General Liability Insurance: The **Contractor** shall provide a Commercial General Liability Insurance policy covering the **Contractor** as Named Insured and the **City** as an Additional Insured. This policy shall protect the **City** and the **Contractor** from claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this **Contract**. Coverage under this policy shall be at least as broad as that provided by ISO Form CG 0001 (10/01 ed.), must be "occurrence" based rather than "claims-made", and shall 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, Medical Payments, Independent Contractors, Personal Injury (Contractual Exclusion deleted), Explosion, Collapse and Underground Property, and Incidental Malpractice. If such insurance contains an aggregate limit, it shall apply separately to this **Project**.

22.1.1(a) Such Commercial General Liability Insurance shall name the City, together with its officials and employees, as an Additional Insured under this policy. Coverage for the City as Additional Insured shall specifically include the City's officials and employees, and shall be at least as broad as either Insurance Services Office ("ISO") Form CG 20 10 (07/04 ed.) or Form CG 20 33 (07/04 ed.) and shall provide completed operations coverage at least as broad as CG 20 37 (07/04 ed.).

22.1.1(b) If this **Contract** is equal to or greater than Ten Million Dollars (\$10,000,000.00), each Commercial General Liability Insurance policy provided shall contain each of the following endorsements:

22.1.1(b)(i) The Duties in the Event of Occurrence, Claim or Suit condition of the policy is amended per the following: If and insofar as knowledge of an "occurrence", "claim", or "suit" is relevant to the City of New York as Additional Insured under this policy, such knowledge by an agent, servant, official, or employee of the City of New York will not be considered knowledge on the part of the City of New York of the "occurrence", "claim", or "suit" unless the following position shall have received notice thereof from such agent, servant, official, or employee: Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department; and

22.1.1(b)(ii) Any notice, demand or other writing by or on behalf of the Named Insured to the Insurance Company shall also be deemed to be a notice, demand, or other writing on behalf of the City as Additional Insured. Any response by the Insurance Company to such notice, demand or other writing shall be addressed to Named Insured and to the City at the following addresses: Insurance Unit, NYC Comptroller's Office, 1 Centre Street - Room 1222, New York, N.Y. 10007; and Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, NY 10007.

22.1.2 Workers' Compensation Insurance and Disability Benefits Insurance: The **Contractor** shall provide, and ensure that each **Subcontractor** provides, Workers Compensation 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 qualifying for insurance pursuant to Article 22.1.4).

22.1.3 Employers' Liability Insurance: The **Contractor** shall provide, and ensure that each **Subcontractor** provides, Employers Liability Insurance affording compensation due to bodily injury by accident or disease sustained by any employee arising out of and in the course of his/her employment under this **Contract** (except for those qualifying for insurance pursuant to Article 22.1.4).

22.1.4 United States Longshoremen's and Harbor Workers Act and/or Jones Act Insurance: The **Contractor** shall provide, and ensure that each **Subcontractor** provides, 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**.

22.1.5 Builders' Risk Insurance: The **Contractor** shall provide a Builders' Risk Insurance policy covering all risks in completed value form. Such policy shall cover the total value of the **Work** performed in accordance with Schedule A, as well as the value of any equipment, supplies and/or material for the **Project** that may be in storage (on or off the **Site**) or in transit. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by the operation of any law, ordinance or regulation, and for loss or damage to any owned, borrowed, leased or rented capital equipment, tools, including tools of their agents and employees, staging towers and forms,

and property of the **City** held in their care, custody and/or control. Such policy shall name as insureds the **City**, the **Contractor**, and its **Subcontractors**. The Builders' Risk policy shall contain the following endorsements:

22.1.5(a) The **City** and the **Contractor** shall be named as loss payee for the **Work** in order of precedence, as their interest may appear; and

22.1.5(b) In the event the loss occurs at an occupied facility, the policy shall permit occupancy without the consent of the Insurance Company; and

22.1.5(c) In the event that the insurance policy has been issued by a mutual insurance company, the following language shall be included: "The City of New York is not liable for any premium or assessment under this policy of insurance. The First Named Insured is solely liable therefor."

22.1.6 Comprehensive Business Automobile Liability Insurance: The **Contractor** shall provide a Comprehensive Business Automobile Liability policy for liability arising out of any owned, non-owned, leased and hired vehicles to be used in connection with this **Contract**. Coverage should be at least as broad as ISO Form CA0001, ed. 10/01.

22.1.6(a) If autos 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.

22.1.7 Pollution/Environmental Liability Insurance: The **Contractor** shall provide Pollution/Environmental Liability Insurance covering bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured. 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, suit, or proceedings against the **City** arising from the operations under this **Contract**. Such insurance shall be in the **Contractor's** name and list the **City** as an Additional Insured. Coverage for the **City** as Additional Insured shall specifically include the **City's** officials and employees, and shall be at least as broad as provided to the **Contractor** for this **Project**.

22.1.7(a) If such coverage 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 years from the time the **Work** under this **Contract** is completed.

22.1.8 Marine Insurance:

22.1.8(a) Marine Protection and Indemnity Insurance: The **Contractor** shall provide a Marine Protection and Indemnity policy with coverage at least as broad as policy form SP-23. The policy shall provide coverage for the **Contractor** and for the **City** (together with its officials and employees) as Additional Insured for bodily injury and property damage arising from marine operations under this **Contract** including injury or death of crew members (if not fully provided through other insurance), damage to piers, wharves and other fixed or movable structures and loss of or damage to any other vessel or craft, or to property on such other vessel or craft, not caused by collision.

22.1.8(b) Ship Repairers Legal Liability Insurance: The **Contractor** shall provide a Ship Repairers Legal Liability Insurance policy covering all repair operations under this **Contract** at

or in the vicinity of a designated approved port or yard under this **Contract**. The policy shall provide coverage from the point of acceptance of care custody and control of any **City** vessel. The policy shall provide Bailee Coverage for any **City** vessel in the **Contractor's** care, custody and control and coverage for damage to property of others caused by any **City** vessel in the **Contractor's** care custody and control.

22.1.8(c) Collision Liability/Towers Liability Insurance: The **Contractor** shall provide a Collision Liability/Towers Liability Insurance policy with coverage for the **Contractor** and for the **City** (together with its officials and employees) as Additional Insured at least as broad as the American Institute Tug Form (08/01/76) for all tugs used under this **Contract** and Collision Liability per American Institute Hull Clauses (6/2/77).

22.1.8(d) Marine Pollution Liability Insurance: The **Contractor** shall provide a Marine Pollution Liability Insurance policy covering itself as Named Insured and the **City** (together with its officials and employees) as Additional Insured for 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. Coverage under this policy shall be at least as broad as that provided by Water Quality Insurance Syndicate Form (09/98 ed.).

22.1.9 The **Contractor** shall provide such other types of insurance, at such minimum limits, as are specified in Schedule A of the General Conditions.

22.2 General Requirements for Insurance 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 AA, unless prior written approval is obtained from the Mayor's Office of Operations.

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 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 All required insurance policies, except for insurance required pursuant to Sections 22.1.2, 22.1.3, and 22.1.4, shall contain the following endorsement: "This policy may not be cancelled, terminated, modified or changed unless thirty (30) days prior written notice is sent by the Insurance Company to the Named Insured (or First Named Insured, as appropriate), the **Commissioner**, and to the **Comptroller**, attn: Office of Contract Administration, Municipal Building, Room 1005, New York, New York 10007."

22.3 Proof of Insurance:

22.3.1 Within ten (10) **Days** of award, the **Contractor** shall, for each policy required under this **Contract**, except for Workers Compensation Insurance and Disability Benefits Insurance and builders' risk insurance, file a Certificate of Insurance with the **Commissioner** pursuant to Article 22.6. For Workers' Compensation Insurance and Disability Benefits Insurance, the **Contractor** shall file proof of insurance in a form acceptable to the **Commissioner** within ten (10) **Days** of award. Accord forms are not acceptable proof of workers' compensation coverage. The Contractor must submit one of the following forms to the Department, or another form acceptable to the Department: C-105.2 -- Certificate of Workers' Compensation Insurance, or U-26.3 -- State Insurance Fund Certificate of Workers' Compensation Insurance. For builders' risk insurance, the **Contractor** shall file a Certificate of Insurance with the **Commissioner** at the direction of the **Commissioner** but in any event no later than ten (10) **Days** prior to commencement of the **Work**.

22.3.1(a) All Certificates of Insurance shall be in a form acceptable to the **City** and shall certify the issuance and effectiveness of the types of insurance specified in Schedule A, each with the specified minimum limits and evidence of the compliance with the Additional Insured or Named Insured provisions of Articles 22.1.1(a), 22.1.5, 22.1.7, and 22.1.8, as applicable. All Certificate(s) of Insurance shall be accompanied by either a duly executed "Certification by Broker" in the form contained in Part II of Schedule A or completed copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.

22.3.2 Certificates of Insurance confirming renewals of insurance shall be submitted to the **Commissioner** prior to the expiration date of coverage of policies required under this **Contract**. Such Certificates of Insurance shall comply with the requirements of Article 22.3.1(a) and, if applicable, Article 22.3.1(b).

22.3.3 The **Contractor** shall be obligated to provide the **City** with a copy of any policy required by this Article 22 upon the demand for such policy by the **Commissioner** or the New York City Law Department.

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 hereunder does not excuse the **Contractor** from securing a policy consistent with all provisions of this Article 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.

22.5 The **City** as Additional Insured or Loss Payee under **Subcontractors'** Insurance. The Contractor shall ensure that each **Subcontractor** name the **City** as Additional Insured or loss payee, as appropriate, under all

policies covering **Work** performed by such **Subcontractor** under this **Contract**. The **City's** coverage as Additional Insured shall include the **City's** officials and employees and be at least as broad as that provided to the **Contractor**. The foregoing requirements shall not apply to insurance provided pursuant to Articles 22.1.2, 22.1.3, and 22.1.4.

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 If the **Contract** involves disposal of hazardous materials, the **Contractor** shall dispose such materials only at sites where the disposal site operator maintains Pollution Legal Liability Insurance in the amount of at least \$2,000,000 for losses arising from such disposal site.

22.8 **Materiality/Non-Waiver:** The **Contractor's** failure to secure policy(ies) in complete conformity with this Article, or to give the Insurance Company timely notice of any sort required in this **Contract** on behalf of the **City**, or to do anything else required by this Article 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.

22.9 **Other Remedies:** Insurance coverage in the minimum amounts provided for herein shall not relieve the **Contractor** or **Subcontractors** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions as are 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, and return the balance, if any, without interest, to the **Contractor**.

23.3 **Liens:** If at any time before or within thirty (30) **Days** after the **Work** is completed and accepted by the **City**, any persons claiming to have performed any labor or furnished any material toward the performance or completion of this **Contract**, shall file with the **Agency** and with the **Treasurer** any notice as is described in the

New York State Lien Law, or any act of the Legislature of the State of New York, the City shall retain, from the monies due or to become due under this Contract, so much of such monies as shall be sufficient to pay the amount claimed in said notice, together with the reasonable costs of any action or actions brought or that may be brought to enforce such lien. The monies so retained shall be held by the City until the lien thereon created by the said act and the filing of the said notice shall be discharged pursuant to Law.

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 guarantee are provided for.

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 or lessees of the premises.

**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 **Laws** 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 **Department**.

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.

26.1.1 For 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 a time and material basis 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 on a time and material basis 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.

26.2.1 Necessary materials (including transportation to the **Site**); plus

26.2.2 Necessary direct labor, including payroll taxes 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, 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: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. 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 PRIMEDIA (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 PRIMEDIA (the "Blue Book"). The reasonable rental value is 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 percent of such rental rates; second shift shall be sixty percent of the first shift rate; and third shift shall be forty percent of the first shift rate. Equipment on standby shall be reimbursed at one-third the prorated monthly rental rate. **Contractor**-owned equipment includes equipment from rental companies affiliated with or controlled by the **Contractor**, as determined by the **Commissioner**. In establishing cost reimbursement for non-operating contractor-owned 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 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 Reasonable rental costs of non-**Contractor**-owned 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: $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$. 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

26.2.7 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 shall be based upon the Manual Rate for such insurance for the applicable work classifications/codes, in accordance with the most recent schedule promulgated by the New York Compensation Insurance Rating Board; plus

26.2.8 Additional costs incurred as a result of the **Extra Work** for performance and payment bonds; plus

26.2.9 Ten (10%) 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

26.2.10 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus item 26.2.9, 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

26.2.11 Five (5%) percent of the total of items in Article 26.2.6, 26.2.7, and 26.2.8 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**. The cost of such **Extra Work** and of such omitted or reduced **Work** shall be computed based upon applicable **Contract** unit prices. Where there are no applicable **Contract** unit prices, the cost of such **Extra Work** and of such omitted or reduced **Contract Work** shall be computed in accordance with items 26.2.1 through 26.2.8. If the cost of such **Extra Work** exceeds the costs of such omitted or reduced **Contract Work**, the **Contract** price shall be increased by the difference, plus percentages for overhead and profit as provided in Articles 26.2.9 through 26.2.11. If the cost of the omitted or reduced **Contract Work** exceeds the cost of the **Extra Work**, then the **Contract** price shall be reduced by the difference.

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 that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this article 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 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 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 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 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, 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 disputed 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 **Contractor** thus brought into the dispute resolution proceeding shall have the same rights and obligations under this article 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** 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. 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 **Agency** 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 section 7-201 and 7-203 of the New York City 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 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 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;

27.6.1.1 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

27.6.2 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, 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 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 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 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 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 Corporation Counsel, the Director of the Office of Construction, 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 Laws 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.

27.8 Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this article 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.

ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK

28.1 While the **Contractor** or any of its **Subcontractors** is performing **Extra Work** on a Time and Material Basis ordered by the **Commissioner** under Article 25, or is performing **disputed Work**, or complying with a determination or order under protest in accordance with Articles 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 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** 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 for as long as such damages are incurred, 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 fully 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.

30.2 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, 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, 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, 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** or **Comptroller** 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** or **Comptroller** 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.

30.5 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 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** 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**, officer, 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 **Resident Engineer**, or any other officer, 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 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 hours in duration.

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.

36.1.5 The aforesaid provisions of this article covering every **Contract** for or on behalf of the State or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York.

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 section 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 all information and reports including an Employment Report before the award of the **Contract** which are required by E.O. 50, the Rules and Regulations promulgated thereunder, and orders of the 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.

Failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in the **Agency** declaring the **Contractor** to be non-responsible.

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 VIII of the Administrative Code;

36.5.2 every agreement between the **Contractor** and its **Subcontractors** in excess of \$50,000 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.); and

36.5.3 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 Section 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) calendar **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. Minimum wages shall be the rates fixed by Federal Law and regulations.

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.

37.4 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 wage scale as provided in Labor Law Section 220, as amended, or

37.4.1(b) Less than 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) and Minimum Wages (Article 37.2.6), the party responsible therefore 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 suits brought by the Corporation Counsel in the name of the **City**, in addition to damage for any other breach of this **Contract**, 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 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 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, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public work projects are rendered simultaneously, such **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public work 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 work 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 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 work 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 dollars, such notice shall also include a statement that, that each worker, laborer or mechanic 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 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, which signed statement shall be maintained with the payroll records required by this **Contract**; and

37.6.3.1 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:** Provide laminated identification badges which indicate the worker's, laborer's or mechanic's name, trade, employer's name and employment starting date (month/day/year). Further, 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**; 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 in Article 37.6.1 in that language or languages as may be required. The **Contractor** is responsible for all distributions under 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 If this **Contract** is for an amount greater than \$1,000,000, 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 \$750,000, 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** or **Subcontractor(s)** 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.

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 with the provisions of this article 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 for 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** shall maintain on the **Site** the original payrolls or transcripts thereof which the **Contractor** and its **Subcontractor(s)** are required to maintain pursuant to Labor Law Section 220. The **Contractor** and **Subcontractor(s)** shall submit original payrolls or transcripts, subscribed and affirmed by it as true, with each and every payment requisition. 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 original payrolls or transcripts thereof, subscribed and affirmed by it as true, and the statements signed by each worker pursuant to this Chapter VIII. In addition, the **Contractor** and **Subcontractor(s)** shall furnish to the **Engineer** upon written demand any other information to satisfy the **Engineer** that this Chapter VIII and the Labor Law, as to the hours of employment and rates of wages, are being observed. The **Contractor** shall maintain the payrolls or transcripts thereof for six (6) years from the date of completion of the **Work** on this **Contract**.

38.2 When directed by the **Engineer**, the **Contractor** or **Subcontractor** shall provide the **Engineer** with an attendance sheet for each **Day** on which **Work** is performed on the **Site**. Such attendance sheet shall be in a form acceptable to the **Agency** and shall provide information for employees of the **Contractor** and **Subcontractor(s)**.

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** void.

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 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, 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 a month, 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 such satisfactory payment application, 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 **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 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 section 43.5 herein, then the **Contractor** shall pay interest on amounts due to such **Subcontractor** or **Materialman** at a 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 NY General Business Law. Accrual of interest shall commence on the day immediately following the expiration of the seventh day following receipt of payment to the **Contractor** by 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 suppliers 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 When the **Work** in the opinion of the **Commissioner**, has been substantially but not entirely completed, he/she shall issue a certificate of **Substantial Completion**.

44.2 The **Contractor** shall submit with the **Substantial Completion** requisition:

44.2.1 A Final Verified Statement of any and all alleged claims against the **City** and any pending dispute resolution procedures in accord with the **PPB** Rules and this **Contract**, 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.

44.2.1(a) With respect to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the Corporation Counsel of the **City** 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 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, will have waived any such claims.

44.2.2 **A Final Approved Punch List.**

44.2.3 Where required, a request for a substantial or final extension of time.

44.3 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 where the **Contractor** shall fail 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.

44.4 No further partial payments shall be made to the **Contractor** after the **Commissioner** issues a Certificate of **Substantial Completion**, except the **Substantial Completion** payment and **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.

44.5 The **Contractor** acknowledges that nothing contained in this article 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. 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 and all alleged claims against the **City**, and any pending dispute resolution procedures in accord with the **PPB Rules** and this **Contract**, 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 Corporation Counsel of the **City** 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, is entitled 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 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 to 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 officers, 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, or those for amounts deducted by the **Commissioner** from the final requisition or by the **Comptroller** 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 officer, 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 from commencing an action for breach of **Contract** under this provision to the extent permitted by **Law** and by the terms of the **Contract** 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 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 the 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.

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 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 a lawsuit 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 provision 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 complete 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 previous provisions of this Chapter X shall be in addition to any and all other legal or equitable remedies permissible in the premises.

54.3 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**.

54.4 The expense of such completion, 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**.

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 lawsuit, 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 lawsuit be instituted or maintained on any such claims unless such lawsuit is commenced within six (6) months after the date the **Commissioner** issues a Certificate of **Substantial Completion** pursuant to Article 44; except that:

56.2.1 Any claims arising out of events occurring after the date the **Commissioner** issues a Certificate of **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 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 becomes 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 lawsuit 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 indemnify the **City** against any and all claims and judgments for damages for any infringement of copyright and patents or use of patented articles, tools, materials, equipment, appliances or processes in the performance or completion of the **Work**, including all costs and expenses which the **City** shall or may incur or be obligated to pay by reason thereof.

ARTICLE 58. NO CLAIM AGAINST OFFICERS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any officer, 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. SERVICES OF NOTICES

59.1 The **Contractor** hereby designates the business 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. Actual delivery of any such notice, direction or communication to the aforesaid place, or depositing it in a postpaid wrapper addressed thereto in any post office box (P.O. Box) regularly maintained by the United States Postal Service, shall be conclusively deemed to be sufficient service thereof upon the **Contractor** as the date of such delivery or deposit.

59.2 Such address 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, local taxes and Sales and Compensation Use Taxes of the State of New York and of cities and counties on all materials and supplies 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** or a **Subcontractor**, or to supplies and materials which even though they are consumed, are not incorporated into the completed **Work** (consumable supplies), and the **Contractor** and its **Subcontractors** shall be responsible for and pay any and all applicable taxes, including Sales and Compensation Use Taxes, on such leased tools, machinery, equipment or other property and upon all such unincorporated supplies and materials.

62.2 The **Contractor** agrees to sell and the **City** agrees to purchase all supplies and materials, other than consumable supplies, 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 supplies and materials shall be in full payment and consideration for the sale of such supplies and materials herein.

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, etc., 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** and labor.

62.3 The purchase by the **Contractor** of the supplies and materials sold hereunder shall be a purchase or procurement for resale and therefore not subject to the New York State or **City** Sales or Compensation Use Taxes or any such taxes of cities or counties. The sale of such supplies and materials by the **Contractor** to the **City** is exempt from the aforesaid sales or compensating use taxes. With respect to such supplies and materials, 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 supplies and materials, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such materials as the property of the **City**.

62.4 Title to all materials 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 supplies and materials to the **Site** and prior to its becoming a part of the permanent structure and/or construction. Notwithstanding such transfer of title, the **Contractor** shall have the full and continuing responsibility to install such materials and supplies in accordance with the provisions of this **Contract**, protect them, maintain them in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional materials 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 such supplies and materials are rejected as being defective or otherwise unsatisfactory, title to all such supplies and materials shall be deemed to have been transferred back to the **Contractor**.

62.5 The purchase by **Subcontractors** of supplies and materials to be sold hereunder shall also be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid Sales or Compensation Use Taxes, provided that the subcontract agreements provide for the resale of such supplies and materials prior to and separate and apart from the incorporation of such supplies and materials into the permanent structure and/or construction and that such subcontract agreements are in a form similar to this **Contract** with respect to the separation of the sale of materials from the **Work** and labor, services, consumable supplies and any other matters to be provided, and provided further that the subcontract agreements provide separate prices for materials and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for supplies and materials from the payments for other **Work** and labor and other things to be provided.

62.6 The **Contractor** and its **Subcontractors** and Materialmen shall obtain any and all necessary **Contractor** Exempt Purchase Certificates or Resale Certificates from the appropriate governmental **Agency** or

Agencies, and furnish a **Contractor Exempt Purchase Certificate** or **Resale Certificate** to all persons, firms or corporations from which they purchase supplies and materials for the performance of the **Work** covered by this **Contract**.

62.7 In the event any of the provisions of this article shall be deemed to be in conflict with any other provisions of this **Contract** or create any ambiguity, then the provisions of this article 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 **Agreement**, 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 herein 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 herein 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 herein 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 herein 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, 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 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 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, less salvage value, 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:

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, whichever is less, 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 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 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.

64.2.2 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 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 Material Contracts or Items: On all **Contracts** or items in a **Contract** where time and material records are specified as the basis for payment of the **Work**, 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 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 Cost shall not include overhead.

64.3 In no event shall any payments under this article exceed the **Contract** price for such items.

64.4 All payments pursuant to this article 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, 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 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** of New York, State of New York, 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 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 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 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 United States 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 State of New York, upon request of the **City**, the **Contractor** shall either consent to a transfer of the action to a State Court of competent jurisdiction located in the **City** and State 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 State Court of competent jurisdiction in the **City**.

65.3 If any provision(s) of this article 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 Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce 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, 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.

67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the 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 enterprise ("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 prime **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 LBE's 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 **Contract**. Remedy for such breach of **Contract** may include the imposition of any or all of the following sanctions:

67.6.1 Reducing a **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 Where non-compliance is by an LBE, de-certifying and declaring the LBE 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** and rules, 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 assess, 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 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. HEALTH INSURANCE COVERAGE

70.1 If the price for which this **Contract** was awarded exceeds \$100,000, or if the price for which this **Contract** was awarded when combined with other construction or services contracts awarded the **Contractor** by the **City** in the year prior to award of this **Contract** exceeds \$100,000, the **Contractor**, following registration of the **Contract**, shall be required to submit responses to requests for information regarding the nature of any health insurance provided by the **Contractor** to its employees and their spouses and domestic partners, upon request of the **Agency** or other designated **City** agency.

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 3.

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 of: *Eleven Million* Dollars, (*\$11,827,686.00*), 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.

Eight Hundred Twenty-Seven Thousand Six Hundred Eighty Six ←

ARTICLE 76. ELECTRONIC FUNDS TRANSFER

76.1 In accordance with Section 6-107.1 of the New York City Administrative Code, the Contractor agrees to accept payments under this Agreement from the City by electronic funds transfer. An electronic funds transfer 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 Agreement, 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 Finance with information necessary for Contractor to receive electronic funds transfer payments through the 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 agreement. 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 agency head may waive the application of the requirements herein to payments on contracts entered into pursuant to §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 contracting agency may waive the requirements hereunder 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 - 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 Section 6-129 to the Administrative Code of the City of New York. The local law creates a program for participation by minority-owned and women-owned business enterprises (MBEs and WBEs) in City procurement. As stated in the 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 made pursuant to Local Law 129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program created by Local Law 129, the specific requirements of M/WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "Subcontractor Utilization Plan"), and are detailed below. The Contractor must comply with all applicable M/WBE requirements for this Contract. Schedule B of the Contract ("Subcontractor Utilization Plan") is included in the Bid Booklet.

Article I, Part A, below, sets forth provisions related to the participation goals for construction 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 AND PROFESSIONAL SERVICES CONTRACTS

1. The Target Subcontracting Percentage applicable to this Contract is set forth on Schedule B, Part I to this Contract (see Page 1, line (1)). The "Target Subcontracting Percentage" is the percentage of the total Contract which Agency anticipates that the prime contractor for this Contract would in the normal course of business award to one or more subcontractors for amounts under \$1 million for construction and professional services.

A prospective contractor may seek a full or partial pre-award waiver of the Target Subcontracting Percentage in accordance with Local Law 129 and Part A, Section 10 below. To apply for the a full or partial waiver of the Target Subcontracting Percentage, a prospective contractor must complete Part III (Page 4) of Schedule B, and must submit such request no later than seven (7) days prior to the date and time the bids or proposals are due, in writing to the Agency by e-mail at poped@ddc.nyc.gov or via facsimile at (718) 391-1885. Bidders/proposers who have submitted requests will receive a response by no later than two (2) calendar days prior to the date bids or proposals are due, provided, however, that if that date would fall on a weekend or holiday, a response will be provided by close-of-business on the business day before such weekend or holiday date.

2. The Subcontractor Participation Goals established for this Contract are set forth on Schedule B, Part I to this Contract (see Page 1, line (2) and/or line (3)). The Subcontractor Participation Goals represent a percentage of the total dollar value of all construction and/or professional services subcontracts under this Agreement for amounts under \$1 million.

3. If Subcontractor Participation Goals have been established for this Contract, Contractor agrees or shall agree as a material term of the Agreement that, with respect to the total amount of the Agreement to be awarded to one or more subcontractors pursuant to subcontracts for amounts under \$1 million, Contractor shall be subject to the Subcontractor Participation Goals, unless the goals are modified by Agency in accordance with Local Law 129 and Part A, Section 11 below.

4. If Subcontractor 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, Part II Subcontractor Utilization Plan (see Page 2-3) indicating: (a) the percentage of work it intends to subcontract; (b) the percentage of work it intends to

award to subcontractors for amounts under \$1 million; (c) in cases where the prospective contractor intends to award subcontracts for amounts under \$1 million, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs; and (d) the general time frames in which such work by MBEs and/or WBEs is scheduled to occur. In the event that this Subcontractor Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to award the **Target Subcontracting Percentage**, 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 **Target Subcontracting Percentage** in accordance with Local Law 129 and Part A, Section 10 below.

THE BIDDER/PROPOSER MUST COMPLETE THE SUBCONTRACTOR UTILIZATION PLAN INCLUDED HEREIN (SCHEDULE B, PART II). SUBCONTRACTOR UTILIZATION PLANS WHICH DO NOT INCLUDE THE REQUIRED AFFIRMATIONS WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE TARGET SUBCONTRACTING PERCENTAGE IS GRANTED (SCHEDULE B PART III). IN THE EVENT THAT THE CITY DETERMINES THAT VENDOR HAS SUBMITTED A SUBCONTRACTOR UTILIZATION PLAN WHERE THE REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE PLAN ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE AFFIRMATION, THE VENDOR 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 PLAN 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 EMAILED OR FAXED (IF THE VENDOR HAS PROVIDED AN EMAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where a Subcontractor 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. **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 Subcontractor Participation Goals established for this Contract by proposing one or more subcontractors that are M/WBEs for any portion of the Wicks trade work if the amount to be awarded to such M/WBE subcontractor is under \$1 million. 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. M/WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the M/WBE participation goals. Such certification must occur prior to the firms' commencement of work as subcontractors. A list of M/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.

7. Where a Subcontractor 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 paid to subcontractors (including subcontractors that are not MBEs or WBEs); the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor pursuant to such plan as well as 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 paid to subcontractors (including subcontractors that are not MBEs or WBEs); 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 hired pursuant to such plan, 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 Subcontractor Utilization Plan, Agency shall take appropriate action, in accordance with Local Law 129 and Article II below, unless the Contractor has obtained a modification of its Subcontractor Utilization Plan in accordance with Local Law 129 and Part A, Section 11 below.

9. Where a Subcontractor Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds 10 percent of the Agreement, Agency shall establish participation goals for the work to be performed pursuant to the change order.

10. Pre-award waiver of **Target Subcontracting Percentage**. Agency may grant a full or partial waiver of the **Target Subcontracting Percentage** to a bidder or proposer, as applicable, who demonstrates—before submission of the bid or proposal—that it has legitimate business reasons for proposing the level of subcontracting in its Subcontractor Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder or proposer, 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 for under one million dollars represented by the **Target Subcontracting Percentage**. In making such determination, Agency may consider whether the Subcontractor Utilization Plan is consistent with past subcontracting practices of the bidder or proposer, as applicable, and whether the bidder or proposer, as applicable, has made good faith efforts to identify portions of the Contract that it intends to subcontract.

11. Modification of Subcontractor Utilization Plan. A Contractor may request a modification of its Subcontractor Utilization Plan (**Subcontractor Participation Goals**) 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 Subcontractor Utilization Plan as part of its bid submission.** The Agency may grant a request for Modification of a Contractor's Subcontractor 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 **Subcontractor Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

- (a) 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;
- (b) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
- (c) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs and WBEs that their interest in the Contract was solicited;
- (d) 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 Subcontractor Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (e) 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;
- (f) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts;
- (g) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;
- (h) 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.

12. If this Contract is for an indefinite quantity of construction or professional services or is a requirements type contract and the Contractor has submitted a Subcontractor Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Subcontractor Participation Goals**, the Contractor will not be deemed in violation of the M/WBE 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 **Subcontractor Participation Goals** have been established for 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 Subcontractor 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 Subcontractor Utilization Plan.
2. Pursuant to DSBS rules, construction contracts that include a requirement for a Subcontractor Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Administrative Code Section 6-108.1.
3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and WBEs in contracts.
4. Prospective contractors are encouraged to enter into joint ventures with MBEs and WBEs.
5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE requirements set forth herein and the pertinent provisions of Local Law 129 of 2005, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE requirements of this Contract and pertinent provisions of Local Law 129 of 2005, 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 M/WBE's to meet the required **Subcontractor 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 Subcontractor Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering 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 this Section 6-129, including, but not limited to any Subcontractor 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) assess liquidated damages or reduction of fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the program established by Section 6-129, 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) exercise 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) take any other appropriate remedy.

4. If a Subcontractor Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to award subcontracts to MBEs and/or WBEs sufficient to meet the Subcontractor Participation Goals contained in its Subcontractor Utilization Plan or the Subcontractor 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 subcontracts required to be awarded to MBE and/or WBE subcontractors to meet the Subcontractor Participation Goals and the dollar amount the Contractor actually awarded and paid to MBE and/or WBE subcontractors. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the Subcontractor 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 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), 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.

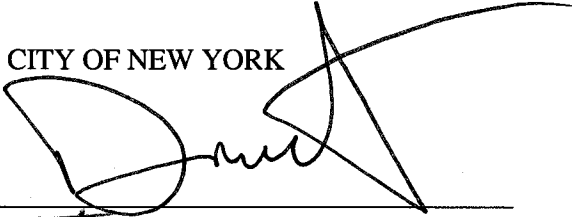
6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE 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 Subcontractor Utilization Plan shall be a factor in the evaluation of its performance. Whenever a contracting agency determines that a contractor's compliance with a Subcontractor Utilization Plan has been unsatisfactory, the agency shall, after consultation with the city chief procurement officer, file an advice of caution form for inclusion in VENDEX as caution data.

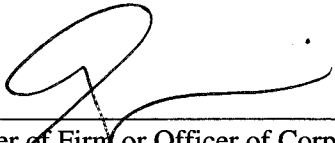
Deputy

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

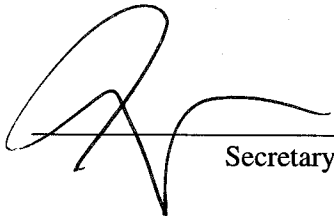
By: 
Deputy Commissioner

CONTRACTOR:

By: 
(Member of Firm or Officer of Corporation)

Title: Secretary

(Where Contractor is a Corporation, add):
Attest:


Secretary

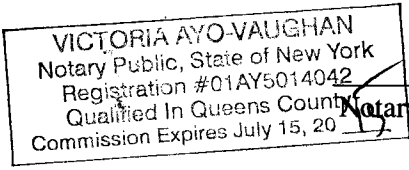
(Seal)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Queens ss:

On this 14th day of Nov, 2013, before me personally came Anna Kougentakis to me known, who, being by me duly sworn did depose and say that he resides at Brooklyn, NY that he is the Secretary

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.



[Signature]
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:

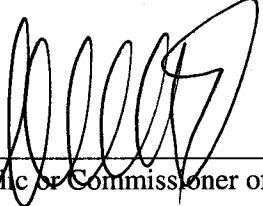
On this _____ day of _____, before me personally appeared _____ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT BY COMMISSIONER

State of New York County of Queens ss:

On this 14th day of Nov. 2013 before me personally came David Resnick 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 he acknowledged to me that he executed the same as Deputy Commissioner for the purposes therein mentioned.



Notary Public or Commissioner of Deeds

VICTORIA AYO-VAUGHAN
Notary Public, State of New York
Registration #01AY5014042
Qualified In Queens County
Commission Expires July 15, 2015

AUTHORITY

MAYOR'S CERTIFICATE NO. CBX
BUDGET DIRECTOR'S CERTIFICATE NO.

DATED
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

*Eleven Million Eight Hundred Twenty-Seven Thousand
Six Hundred Eighty-Six and 00/100*

Dollars (\$ 11,827,686.00)

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.

[Signature]

Deputy 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**

Performance Bond #1 (Pages 80 to 83): 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 (Page 1)

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;





CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

11/12/2013

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 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 City Underwriting Agency Inc. 2001 Marcus Avenue Suite W180 Lake Success NY 11042	CONTACT NAME: Brendan Mulholland
	PHONE (A/C, No., Ext.): 516-358-3535 FAX (A/C, No.): 516-358-3540 E-MAIL ADDRESS: bmulholland@cuagency.com
INSURED Beys Specialty, Inc 2520 Coney Island Avenue Brooklyn NY 11223	INSURER(S) AFFORDING COVERAGE NAIC #
	INSURER A: The Phoenix Insurance Company 25623
	INSURER B: Standard Security Life Ins. Co. of 69078
	INSURER C:
	INSURER D:
	INSURER E:
INSURER F:	

COVERAGES

CERTIFICATE NUMBER: 1046588032

REVISION NUMBER:

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.

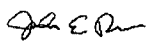
INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> 5,000 GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC		DTCO1B73176213PHX	12/31/2012	12/31/2013	EACH OCCURRENCE \$1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$300,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$1,000,000 GENERAL AGGREGATE \$2,000,000 PRODUCTS - COMP/OP AGG \$2,000,000 \$
A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS		BA1B73768613CNS	12/31/2012	12/31/2013	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$					EACH OCCURRENCE \$ AGGREGATE \$ \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N <input type="checkbox"/> N/A	DTNUB1B73768613	1/1/2013	1/1/2014	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
B	Disability Benefits		D89997	5/8/2008	1/1/2029	Statutory

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

RE: New Construction of the Bronx River House - DDC PIN: 8502013PV004C

The City of New York, including its officials and employees are included as an additional insured as required by written contract.

CERTIFICATE HOLDER**CANCELLATION**

New York City Department of Design and Construction 30-30 Thomson Avenue 1st Floor Long Island City NY 11101	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 
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STATE OF NEW YORK
WORKERS' COMPENSATION BOARD

CERTIFICATE OF NYS WORKERS' COMPENSATION INSURANCE COVERAGE

<p>1a. Legal Name & Address of Insured (Use street address only)</p> <p>Beys Specialty, Inc. □ 2520 Coney Island Avenue □ Brooklyn, NY 11223</p> <p>Work Location of Insured (Only required if coverage is specifically limited to certain locations in New York State, i.e., a Wrap-Up Policy)</p> <p>New Construction of the Bronx River House</p>	<p>1b. Business Telephone Number of Insured</p> <p>718 627-7780</p> <p>1c. NYS Unemployment Insurance Employer Registration Number of Insured</p> <p>1d. Federal Employer Identification Number of Insured or Social Security Number</p> <p>562566527</p>
<p>2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder)</p> <p>New York City Department of Design and Construction 30-30 Thomson Avenue Long Island City, NY 11101</p>	<p>3a. Name of Insurance Carrier</p> <p>The Phoenix Insurance Company</p> <p>3b. Policy Number of entity listed in box "1a"</p> <p>DTNUB1B7376813</p> <p>3c. Policy effective period</p> <p>01/01/2013 to 01/01/2014</p> <p>3d. The Proprietor, Partners or Executive Officers are</p> <p><input checked="" type="checkbox"/> included. (Only check box if all partners/officers included)</p> <p><input type="checkbox"/> all excluded or certain partners/officers excluded.</p>

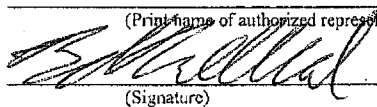
This certifies that the insurance carrier indicated above in box "3" insures the business referenced above in box "1a" for workers' compensation under the New York State Workers' Compensation Law (To use this form, New York (NY) must be listed under Item 3A on the **INFORMATION PAGE** of the workers' compensation insurance policy). The Insurance Carrier or its licensed agent will send this Certificate of Insurance to the entity listed above as the certificate holder in box "2".

The Insurance Carrier will also notify the above certificate holder within 10 days IF a policy is canceled 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 the 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.

Please Note: Upon the cancellation of the workers' compensation 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 Workers' Compensation Coverage or other authorized proof that the business is complying with the mandatory coverage requirements of the New York State Workers' Compensation Law.

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 the coverage as depicted on this form.

Approved by: Brendan Mulholland
(Print name of authorized representative or licensed agent of insurance carrier)

Approved by:  11/13/13
(Signature) (Date)

Title: ACCOUNT EXECUTIVE

Telephone Number of authorized representative or licensed agent of insurance carrier: 516-358-3535

Please Note: Only insurance carriers and their licensed agents are authorized to issue Form C-105.2 Insurance brokers are **NOT** authorized to issue it

Workers' Compensation Law

Section 57. Restriction on issue of permits and the entering into contracts unless compensation is secured.

1 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 a hazardous employment defined by this chapter, and notwithstanding 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 compensation for all employees has been secured as provided by this chapter. 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 compensation to any such employee if so employed

2. 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 a hazardous employment defined by this chapter, 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 compensation for all employees has been secured as provided by this chapter.

STATE OF NEW YORK
WORKERS' COMPENSATION BOARD

CERTIFICATE OF INSURANCE COVERAGE UNDER THE NYS DISABILITY BENEFITS LAW

PART 1. To be completed by Disability Benefits Carrier or Licensed Insurance Agent of that Carrier

<p>1a. Legal Name and Address of Insured (Use street address only) Beys Specialty Inc 2520 Coney Island Ave Brooklyn, NY 11221</p>	<p>1b. Business Telephone Number of Insured (718) 627-7780 x 1c. NYS Unemployment Insurance Employer Registration Number of Insured Pending 1d. Federal Employer Identification Number of Insured or Social Security Number 56-2566527</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>2. Name and Address of the Entity Requesting Proof of Coverage (Entity Being Listed as the Certificate Holder) New York City Department of Design and Construction 30-30 Thomson Avenue Long Island city, NY 11101</p>	<p>3a. Name of Insurance Carrier STANDARD SECURITY LIFE INSURANCE CO., OF NY 3b. Policy Number of entity listed in box "1a": D89997-000 3c. Policy effective period: 5/8/2013 to 11/13/2014</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

4. Policy covers:

a. All of the employer's employees eligible under the New York Disability Benefits Law

b. Only the following class or classes of the 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 Benefits Insurance coverage as described above.

Date Signed 11/14/2013 By *Bella A. Schmitt*
(Signature of insurance carrier's authorized representative or NYS Licensed Insurance Agent of that insurance carrier)

Telephone Number (212) 355-4141 Title SUPERVISOR/POLICY SERVICES

IMPORTANT: If box "4a" is 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" is checked, this certificate is NOT COMPLETE for purposes of Section 220, Subd. 8 of the Disability Benefits Law. It must be mailed for completion to the Workers' Compensation Board, DB Plans Acceptance Unit, 20 Park Street, Albany, New York 12207.

PART 2. To be completed by NYS Workers' Compensation Board (Only if box "4b" of Part 1 has 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 Benefits Law with respect to all of his/her employees.

Date Signed _____ By _____
(Signature of NYS Workers' Compensation Board Employee)

Telephone Number _____ Title _____

Please Note: Only insurance carriers licensed to write NYS disability 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 benefits under the New York State Disability Benefits Law. The Insurance Carrier or its licensed agent will send this Certificate of Insurance to the entity listed as the certificate holder in box "2". *This Certificate is valid for the earlier of one year after this form is approved by the insurance carrier or its licensed agent, or the policy expiration date listed in box "3c".*

Please Note: Upon the cancellation of the disability 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 NYS Disability Benefits Coverage or other authorized proof that the business is complying with the mandatory coverage requirements of the New York State Disability Benefits Law.

DISABILITY 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 notwithstanding 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 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 for all employees has been secured as provided by this article.

CERTIFICATION BY BROKER

The undersigned insurance broker or insurer represents to the City of New York that the attached Certificate of Insurance, dated 11/12/2013, concerning insurance policy number DTCO1B73176213PHX is accurate in all material respects, that the described insurance is effective as of the date of this Certification.

City Underwriting Agency, Inc
NAME OF BROKER OR INSURER (TYPEWRITTEN)

2001 Marcus Ave, Lake Success, NY 11042
ADDRESS OF BROKER OR INSURER
(TYPEWRITTEN)

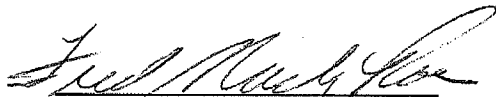


SIGNATURE OF AUTHORIZED OFFICIAL OR
BR

Brendan Mulholland, Account Executive
NAME AND TITLE OF AUTHORIZED OFFICIAL
(TYPEWRITTEN)

Sworn to before me this

12 day of Nov, 2013



NOTARY PUBLIC

FRED NASH ROE

Notary Public, State of New York

No. 01RO-4815494

Qualified in Nassau County

Commission Expires July 1, 2015

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2

Bond #KO 89 06 20 8

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

Beys Specialty, Inc.

2520 Coney Island Avenue

Brooklyn, NY 11223

hereinafter referred to as the "Principal", and _____

Westchester Fire Insurance Company

10 Exchange Pl.

Jersey City, NJ 07302

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

Eleven Million Eight Hundred Twenty Seven Thousand Six Hundred Eighty Six and

00/100

(\$ 11,826,686.00) 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

FMS ID: P-1CROT16 - E-PIN: 85013B0023001 - DDC PIN: 8502013PV0004C

New Construction of the Bronx River House

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;



Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page2)

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 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 3)

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 12th day of November, 2013.

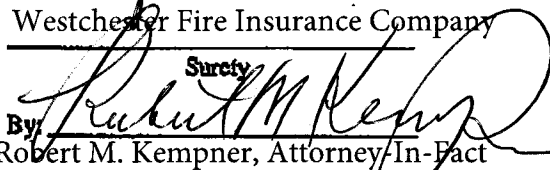
(Seal)

Beys Specialty, Inc. _____ (L.S.)
Principal

By: 

(Seal)

Westchester Fire Insurance Company _____
Surety

By: 
Robert M. Kempner, Attorney-In-Fact

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

By: _____

(Seal)

Surety

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 #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of KINGS ss:

On this 12th day of Nov, 202013, before me personally came ANNA G. KOUGENTAKIS to me known, who, being by me duly sworn did depose and say that he/she resides at 2720 WHITMAN DR BROOKLYN NY 11234; that he/she is the VICE PRESIDENT of the BERS SECURITY INC corporation described in and which executed the foregoing instrument; and that he signed his 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

IOANNA KATSIMBRAKIS
Notary Public, State of New York
No.01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 2014

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.



ACKNOWLEDGEMENT OF PRINCIPAL, OF 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 the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

COUNTY OF Nassau

ss:

On this 12th day of November, 2013, before me personally came Robert M. Kempner to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Westchester Fire Insurance Company the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and 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 Resolutions thereof.

LYNN ANN INFANTI
Notary Public, State of New York
No. 011N8004351
Qualified in Suffolk County
Commission Expires March 23, 2014



My commission expires _____

Notary Public



Power of Attorney

WESTCHESTER FIRE INSURANCE COMPANY

Know all men by these presents: That WESTCHESTER FIRE INSURANCE COMPANY, a corporation of the Commonwealth of Pennsylvania pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

Does hereby nominate, constitute and appoint Joseph Sforzo, Robert M Kempner, Robert W O'Kane, Susan P Hammel, all of the City of PLAINVIEW, New York, each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Five million dollars & zero cents (\$5,000,000.00) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office.

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the Corporate seal of the said WESTCHESTER FIRE INSURANCE COMPANY this 16 day of October 2012.

WESTCHESTER FIRE INSURANCE COMPANY

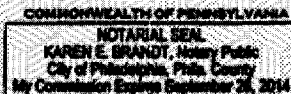
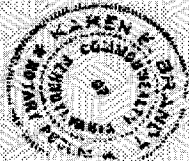



Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA ss

On this 16 day of October, AD 2012 before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the WESTCHESTER FIRE INSURANCE COMPANY to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company; that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.




Notary Public

I, the undersigned Assistant Secretary of the WESTCHESTER FIRE INSURANCE COMPANY, do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 21th of November 2013




William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER October 16, 2014.

Please look for the following additional security features before accepting this document. IF NOT PRESENT, DO NOT RESIGNATE THE DOCUMENT.

- * Lines drawn on the back of document should be in alignment or the document is not authentic - watch for not too paste.
- * Microprinting - under magnification, the inside border on the front of this document should read: "Standard Register Standardized Security".
- * Thermochromic Ink - Standard Register mark on back of document fades from black to clear when heat is applied.
- * An Artificial Watermark is present and is visible at an angle.
- * SECURITY word pattern on front if copied.

WESTCHESTER FIRE INSURANCE COMPANY - NAIC# 10030

FINANCIAL STATEMENT

DECEMBER 31, 2012

ADMITTED ASSETS

BONDS	\$1,915,932,115
SHORT - TERM INVESTMENTS	22,465,390
STOCKS	0
REAL ESTATE	0
CASH ON HAND AND IN BANK	(41,292,474)
PREMIUM IN COURSE OF COLLECTION*	56,678,650
INTEREST ACCRUED	17,136,830
OTHER ASSETS	148,350,304
TOTAL ASSETS	<u>\$2,119,270,815</u>

LIABILITIES

RESERVE FOR UNEARNED PREMIUMS	\$215,324,197
RESERVE FOR LOSSES	1,103,762,744
RESERVE FOR TAXES	3,515,562
FUNDS HELD UNDER REINSURANCE TREATIES	4,484,136
OTHER LIABILITIES	(21,519,017)
TOTAL LIABILITIES	<u>1,305,567,622</u>

CAPITAL: 70,000 SHARES, \$71.43 PAR VALUE	5,000,100
CAPITAL: PAID IN	292,187,374
AGGREGATE WRITE-INS FOR SPECIAL SURPLUS FUNDS	111,710,473
SURPLUS (UNASSIGNED)	404,805,246
SURPLUS TO POLICYHOLDERS	<u>813,703,193</u>
TOTAL	<u>\$2,119,270,815</u>

(*EXCLUDES PREMIUM MORE THAN 90 DAYS DUE.)

STATE OF PENNSYLVANIA

COUNTY OF PHILADELPHIA

John P. Taylor, being duly sworn, says that he is Vice President of Westchester Fire Insurance Company and that to the best of his knowledge and belief the foregoing is a true and correct statement of the said Company's financial condition as of the 31 st day of December, 2012.

Sworn before me this March 15, 2013

John P. Taylor
Vice President

Diane Wright
Notary Public

August 8, 2015
My commission expires

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Diane Wright, Notary Public
City of Philadelphia, Philadelphia County
My Commission Expires Aug. 8, 2015
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES



Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND

PAYMENT BOND (Page 1)
Bond #KO 89 06 20 8

KNOW ALL PERSONS BY THESE PRESENTS, That we, _____

Beys Specialty, Inc.

2520 Coney Island Avenue

Brooklyn, NY 11223

hereinafter referred to as the "Principal", and _____

Westchester Fire Insurance Company

10 Exchange Pl.

Jersey City, NJ 07302

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

Eleven Million Eight Hundred Twenty Seven Thousand Six Hundred Eighty Six and

and 00/100

(\$ 11,827,686.00) 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

FMS ID: P-1CROT16 - E-PIN: 85013B0023001 - DDC PIN: 8502013PV0004C

New Construction of the Bronx River Hosue

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



Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.**PAYMENT BOND (Page 2)**

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 placed 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 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 3)

IN WITNESS HEREOF, 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 12th day of November, 2013.

(Seal)

Beys Specialty, Inc. _____ (L.S.)
Principal

By: _____

(Seal)

Westchester Fire Insurance Company

Surety
By: Robert M. Kempner
Robert M. Kempner, 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.



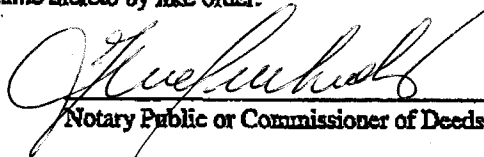
Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Kings ss:

On this 12th day of Nov, 2013 before me personally came Anna G. Kougentakis to me known, who, being by me duly sworn did depose and say that he resides at 2720 Washington St Brooklyn NY 11234 that he is the VICE 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.


Notary Public or Commissioner of Deeds

IOANNA KATSIMBRAKIS
Notary Public, State of New York
No.01KA5069243
Qualified in Richmond County
Commission Expires Nov. 25, 2014

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



ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

STATE OF _____

ss:

COUNTY OF _____

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 the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

ss:

COUNTY OF Nassau

On this 12th day of November, 2013, before me personally came Robert M. Kempner to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Westchester Fire Insurance Company the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and 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 Resolutions thereof.

LYNN ANN INFANTI
Notary Public, State of New York
No. 011N6004351
Qualified in Suffolk County 2014
Commission Expires March 23, _____



My commission expires _____

Notary Public



Power of Attorney

WESTCHESTER FIRE INSURANCE COMPANY

Know all men by these presents: That WESTCHESTER FIRE INSURANCE COMPANY, a corporation of the Commonwealth of Pennsylvania pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

Does hereby nominate, constitute and appoint Joseph Sforzo, Robert M Kempner, Robert W O'Kane, Susan P Hammel, all of the City of PLAINVIEW, New York, each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Five million dollars & zero cents (\$5,000,000.00) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office.

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the Corporate seal of the said WESTCHESTER FIRE INSURANCE COMPANY this 16 day of October 2012.

WESTCHESTER FIRE INSURANCE COMPANY

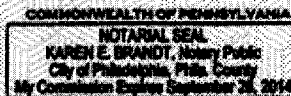
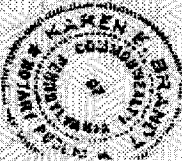



Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA ss.

On this 16 day of October, AD 2012 before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the WESTCHESTER FIRE INSURANCE COMPANY to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company; that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.




Notary Public

I, the undersigned Assistant Secretary of the WESTCHESTER FIRE INSURANCE COMPANY, do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 21st day of November 2013




William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER October 16, 2014.

Take note for the following additional security features below accepting this document. IF NOT PRESENT, DO NOT NEGOTIATE THE DOCUMENT

- * *Left lines* on the back of document should be in alignment of the document is not authentic - watch for cut and paste.
- * *Microprinting* - under magnification, the inside border on the right of the document should read: "Standard Register Standardize Security".
- * *Thermochromic ink* - Standard Register mark on back of document fades from blue to clear when heat is applied.
- * An *Artificial Ultraviolet* mark is present and is viewable at an angle.
- * *Security void pattern* on back if copied.

WESTCHESTER FIRE INSURANCE COMPANY - NAIC# 10030

FINANCIAL STATEMENT

DECEMBER 31, 2012

ADMITTED ASSETS

BONDS	\$1,915,932,115
SHORT - TERM INVESTMENTS	22,465,390
STOCKS	0
REAL ESTATE	0
CASH ON HAND AND IN BANK	(41,292,474)
PREMIUM IN COURSE OF COLLECTION*	56,678,650
INTEREST ACCRUED	17,136,830
OTHER ASSETS	148,350,304
TOTAL ASSETS	<u>\$2,119,270,815</u>

LIABILITIES

RESERVE FOR UNEARNED PREMIUMS	\$215,324,197
RESERVE FOR LOSSES	1,103,762,744
RESERVE FOR TAXES	3,515,562
FUNDS HELD UNDER REINSURANCE TREATIES	4,484,136
OTHER LIABILITIES	(21,519,017)
TOTAL LIABILITIES	<u>1,305,567,622</u>

CAPITAL: 70,000 SHARES, \$71.43 PAR VALUE	5,000,100
CAPITAL: PAID IN	292,187,374
AGGREGATE WRITE-INS FOR SPECIAL SURPLUS FUNDS	111,710,473
SURPLUS (UNASSIGNED)	404,805,246
SURPLUS TO POLICYHOLDERS	<u>813,703,193</u>
TOTAL	<u>\$2,119,270,815</u>

(*EXCLUDES PREMIUM MORE THAN 90 DAYS DUE.)

STATE OF PENNSYLVANIA

COUNTY OF PHILADELPHIA

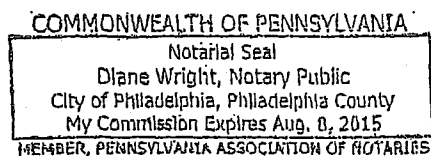
John P. Taylor, being duly sworn, says that he is Vice President of Westchester Fire Insurance Company and that to the best of his knowledge and belief the foregoing is a true and correct statement of the said Company's financial condition as of the 31 st day of December, 2012.

Sworn before me this March 15, 2013

John P. Taylor
Vice President

Diane Wright
Notary Public

August 8, 2015
My commission expires





Performance Bond #1 (Pages 80 to 83): 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 (Page 2)

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 (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.

Performance Bond #1 (Pages 80 to 83): 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 (Page 3)

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 _____, _____.

(Seal) _____ (L.S.)
Principal

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 80 to 83): 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 (Page 4)

ACKNOWLEDGMENT 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

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

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2

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;

Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page2)

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 84 to 87): Use if the total contract price is more than \$5 Million.

PERFORMANCE BOND #2 (Page 3)

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 _____, _____.

(Seal) _____ (L.S.)
Principal

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

By: _____

(Seal) _____
Surety

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 #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.

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 signed his 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 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.

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 1)

PAYMENT BOND

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 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

Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 2)

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 placed 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 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 3)

IN WITNESS HEREOF, 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 _____, _____.

(Seal) _____ (L.S.)
Principal

By: _____

(Seal) _____
Surety

By: _____

(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 88 to 91): Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 4)

ACKNOWLEDGMENT 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

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

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

LABOR LAW §220 PREVAILING WAGE SCHEDULE

Pursuant to Labor Law §220 (3) 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 contracts. Contracting agencies anticipating doing work which requires the employment of a trade or classification not included in this schedule must request the Comptroller to establish a proper classification for the work pursuant to Labor Law §220 (3-a) (a). The prevailing rate schedule as promulgated by the Comptroller, must, in compliance with law, be annexed to and form part of the contract.

The appropriate schedule of prevailing wages and benefits must be posted at all public work sites pursuant to Labor Law §220 (3-a) (a).

This schedule is applicable for work performed during the effective period, unless otherwise noted. You will be notified of any changes to this schedule by addenda published on our web site at www.comptroller.nyc.gov. The rate of wages and supplemental benefits to be paid or provided are those that prevail at the time the work is being performed. Preliminary schedules for future one-year periods are published annually in the City Record on or about June 1st of each succeeding year. Final schedules are published on or about July 1st in the City Record and on our web site at www.comptroller.nyc.gov.

The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasył Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

Prevailing rates and ratios for apprentices are attached to this schedule in the Appendix. 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 employed on a public work project. Workers who are not journey persons or not registered apprentices pursuant to Labor Law §220 (3-e) may not be substituted for apprentices and must be paid as journey persons.

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. Contractors are solely responsible for maintaining original payroll records which delineate, among other things, the hours each employee worked within a given classification. Contractors using rates and/or classifications not promulgated by the Comptroller do so at their own risk. Additionally, prior to bid, Agency Chief Contracting Officers must contact the Bureau of Labor Law when the need arises for a work classification not published in this schedule.

Prevailing Rate Schedule Information: The information below is intended to assist you in meeting your prevailing wage rate obligation.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Covered Workers: Any and all individuals who are engaged, employed or otherwise occupied as Workers, Laborers or Mechanics on the public work site.

Supplemental Benefits: Employers may meet supplemental benefits obligation by paying the hourly supplemental benefits rate to their employees in cash. Such cash payments are considered income to the employee. Employers who elect to provide bona fide supplemental benefits to their employees will be given hourly cash credit for such benefits up to the hourly benefits rate set forth in the applicable schedule for the relevant trade or occupation at issue.

Particular attention should be given to the supplemental benefits requirement. Although in most instances the payment or provision for supplemental benefits is for each hour worked, some classifications require the payment or provision of supplemental benefits for each hour paid. Consequently, some prevailing practices require benefits to be purchased at the overtime, shift differential, Holiday, Saturday, Sunday or other premium time rate.

Contractors are advised to review the applicable Collective Bargaining Agreements and the Comptroller's Prevailing Wage Schedule before bidding on Public Work. If there are any questions concerning prevailing wages, benefits, overtime, Holiday pay, shift differentials or any prevailing practice, please contact this office.

Public Work construction, reconstruction, demolition, excavation, rehabilitation, repair, renovation, alteration, or improvement contracts 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 <http://www.nyc.gov/html/mocs/html/vendors/pla.shtml>.

All the provisions of Labor Law section 220 remain applicable to PLA work including, but not limited to, the enforcement of prevailing wage requirements by the Comptroller; however, we will enforce shift, premium, overtime and other non-standard rates as they appear in a project's pre-negotiated labor agreement.

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.

Benefits are paid for EACH HOUR WORKED unless otherwise noted.

Wasył Kinach, P.E.
Director of Classifications
Bureau of Labor Law

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§220 PREVAILING WAGE SCHEDULE

ASBESTOS HANDLER

(Hazardous Material; Disturbs, removes, encapsulates, repairs, or encloses friable asbestos material)

Asbestos Handler

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.10**

Supplemental Benefit Rate per Hour: **\$14.85**

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 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)

BLASTER

Blaster

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$43.20**

Supplemental Benefit Rate per Hour: **\$37.29**

Blaster (Hydraulic)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$43.95**

Supplemental Benefit Rate per Hour: **\$37.29**

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§220 PREVAILING WAGE SCHEDULE

Blaster - Trac Drill Hydraulic

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.96

Supplemental Benefit Rate per Hour: \$37.29

Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.24

Supplemental Benefit Rate per Hour: \$37.29

Blaster - Operators of Jack Hammers

Chippers: Spaders: Concrete Breakers: and all other pneumatic tools of like usage: Walk Behind Self Propelled Hydraulic Asphalt and Concrete Breakers: Hydro (Water) Demolition

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.29

Supplemental Benefit Rate per Hour: \$37.29

Blaster - Powder Carriers

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.73

Supplemental Benefit Rate per Hour: \$37.29

Blaster - Hydraulic Trac Drill Chuck Tender

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$32.57

Supplemental Benefit Rate per Hour: \$37.29

Blaster - Chuck Tender & Nipper

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$31.88

Supplemental Benefit Rate per Hour: \$37.29

Blaster - Magazine Keepers: (Watch Person)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$19.26

Supplemental Benefit Rate per Hour: \$37.29

Overtime Description

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§220 PREVAILING WAGE SCHEDULE

For Blaster - Magazine Keepers: (Watch Person) only - time and one half the regular rate for work after an 8 hour day, Saturday, Sunday and holidays listed below.

Overtime

Double time 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
Presidential Election Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

Shift Rates

A single shift shall be 8 hours plus an unpaid lunch, starting at 8:00 A.M. (or between 6:00 A.M. and 10:00 A.M. on weekdays). When two (2) shifts are employed, each shift shall be 8 hours plus ½ hour unpaid lunch. When three (3) shifts are employed, each shift will work seven and one-half (7 ½) hours, but will be paid for eight (8) hours, since only one-half (½) hour is allowed for mealtime. When two (2) or more shifts are employed, single time will be paid for each shift. The first 8 hours of any and all work performed Monday through Friday inclusive of any off-shift shall be at the single time rate.

(Local #29)

BOILERMAKER

Boilermaker

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$47.98

Supplemental Benefit Rate per Hour: \$37.88

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$56.36; For double overtime - \$74.86.

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.

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§220 PREVAILING WAGE SCHEDULE

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

When shifts are required, the first shift shall work eight (8) hours at the regular straight-time hourly rate. The second shift shall work seven and one-half (7 ½) hours and receive eight hours at the regular straight time hourly rate plus twenty-five cents (\$0.25) per hour. The third shift shall work seven (7) hours and receive eight hours at the regular straight time hourly rate plus fifty cents (\$0.50) per hour. A thirty (30) minute lunch period shall not be considered as time worked. Work in excess of the above shall be paid overtime at the appropriate new construction work or repair work overtime wage and supplemental benefit hourly rate.

(Local #5)

BRICKLAYER

Bricklayer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.44

Supplemental Benefit Rate per Hour: \$27.53

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.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

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

Overtime rates to be paid outside the regular scheduled work day.

(Bricklayer District Council)

CARPENTER - BUILDING COMMERCIAL

Building Commercial

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.15

Supplemental Benefit Rate per Hour: \$38.50

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
Columbus Day
Presidential Election Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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.

(Carpenters District Council)

CARPENTER - HEAVY CONSTRUCTION WORK (Construction of Engineering Structures and Building Foundations)

Heavy Construction Work

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.74

Supplemental Benefit Rate per Hour: \$42.37

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 10:00 P.M. shall work eight and one half hours allowing for one half hour for lunch, but will be paid for 9 hours including benefits at the straight time rate for 8 hours.

(Carpenters District Council)

CEMENT & CONCRETE WORKER

Cement & Concrete Worker

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.98**

Supplemental Benefit Rate per Hour: **\$25.67**

Supplemental Note: **\$28.42 on Saturdays; \$31.17 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)

CEMENT MASON

Cement Mason

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$42.50**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$39.06**

Supplemental Note: Overtime supplemental benefit rate per hour: **\$57.56**

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

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 an off shift day, (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)

CORE DRILLER

Core Driller

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.44**

Supplemental Benefit Rate per Hour: **\$19.75**

Core Driller Helper

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$28.60**

Supplemental Benefit Rate per Hour: **\$19.75**

Core Driller Helper(Third year in the industry)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.74

Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$22.88

Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$20.02

Supplemental Benefit Rate per Hour: \$19.75

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

The shift day shall be the continuous eight and one-half (8½) hours from 6:00 A.M. to 2:30 P.M. and from 2:30 P.M. to 11:00 P.M., including one-half (½) hour of employees regular rate of pay for lunch. 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 seventy-five cents (\$0.75) 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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$40.50

Supplemental Benefit Rate per Hour: \$42.07

Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. \$43.49 - For work performed in Staten Island.

Derrick Person & Rigger - Site Work

For site work where no rigging is involved.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$30.00

Supplemental Benefit Rate per Hour: \$31.32

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$58.95

Supplemental Benefit Rate per Hour: \$42.37

Diver Tender (Marine)

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§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$42.10

Supplemental Benefit Rate per Hour: \$42.37

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.74

Supplemental Benefit Rate per Hour: \$42.37

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.

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\$220 PREVAILING WAGE SCHEDULE

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 10:00 P.M., shall work eight and one half hours allowing for one half hour for lunch but will be paid the straight time hourly wage for 9 hours and the straight time supplemental benefits for 8 hours.

(Carpenters District Council)

DRIVER: TRUCK (TEAMSTER)

Driver - Automobile Chauffeur (Dump Truck)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.84**

Supplemental Benefit Rate per Hour: **\$36.93**

Driver - Heavy Equipment Trailer Driver

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$37.34**

Supplemental Benefit Rate per Hour: **\$36.93**

Note: For time and one half overtime Wage Rate - **\$53.76**; for double time overtime Wage Rate - **\$71.68**

Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$36.41**

Supplemental Benefit Rate per Hour: **\$36.93**

Driver - Six Wheeler(3 Axle) Tractors & Trailers

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$36.84**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$36.93**

Note: For time and one half overtime Wage Rate - \$54.62; for double time overtime Wage Rate - \$72.82

Driver - Boom Truck

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$37.09**

Supplemental Benefit Rate per Hour: **\$36.93**

Note: For time and one half overtime Wage Rate - \$54.62; for double time overtime Wage Rate - \$72.82

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).

President's Day

Columbus Day

Veteran's Day

Day after Thanksgiving

Triple time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Driver - Redi-Mix Driver (Sand & Gravel)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.47

Supplemental Benefit Rate per Hour: \$38.65

Overtime Description

For Paid Holidays: Employees working two (2) days in the calendar week in which the holiday falls are to paid for these holidays, provided they shape each remaining workday during that calendar 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).

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

Veteran's Day

Thanksgiving Day

Christmas Day

(Local #282)

ELECTRICIAN

(Including all low voltage cabling carrying data; video; and voice in combination with data and or video.)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Electrician "A" (Regular Day)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$51.00
Supplemental Benefit Rate per Hour: \$42.45

Electrician "A" (Regular Day Overtime)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$76.50
Supplemental Benefit Rate per Hour: \$45.13

Electrician "A" (Day Shift)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$51.00
Supplemental Benefit Rate per Hour: \$42.45

Electrician "A" (Day Shift Overtime After 8 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$76.50
Supplemental Benefit Rate per Hour: \$45.13

Electrician "A" (Swing Shift)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$59.84
Supplemental Benefit Rate per Hour: \$48.20

Electrician "A" (Swing Shift Overtime After 7.5 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$89.76
Supplemental Benefit Rate per Hour: \$51.36

Electrician "A" (Graveyard Shift)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$67.03
Supplemental Benefit Rate per Hour: \$53.07

Electrician "A" (Graveyard Shift Overtime After 7 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$100.55
Supplemental Benefit Rate per Hour: \$56.60

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\$220 PREVAILING WAGE SCHEDULE

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

When so elected by the Employer, one or more shifts of at least five days duration may be scheduled as follows:

Day Shift: 8:00 am to 4:30 pm, Swing Shift 4:30 pm to 12:30 am, Graveyard Shift: 12:30 am to 8:00 am.

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.

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.30

Supplemental Benefit Rate per Hour: \$17.52

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.95

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$18.85

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: 7/1/2012 – 3/9/2013

Wage Rate per Hour: \$29.90

Supplemental Benefit Rate per Hour: \$13.70

Supplemental Note: \$12.20 only after 8 hours worked in a day

Effective Period: 3/10/2013 - 6/30/2013

Wage Rate per Hour: \$30.40

Supplemental Benefit Rate per Hour: \$13.90

Supplemental Note: \$12.40 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.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

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.
Double time 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
- Veterans 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 8:00 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

(Local #3)

ELECTRICIAN-STREET LIGHTING WORKER

Electrician - Electro Pole Electrician

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$51.00
Supplemental Benefit Rate per Hour: \$44.18

Electrician - Electro Pole Foundation Installer

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$38.66
Supplemental Benefit Rate per Hour: \$34.12

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Electrician - Electro Pole Maintainer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.10

Supplemental Benefit Rate per Hour: \$30.84

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: 7/1/2012 - 3/16/2013

Wage Rate per Hour: \$55.20

Supplemental Benefit Rate per Hour: \$32.78

Effective Period: 3/17/2013- 6/30/2013

Wage Rate per Hour: \$57.01

Supplemental Benefit Rate per Hour: \$34.48

Overtime Description

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For New Construction: work performed after 7 or 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: 7/1/2012 – 3/16/2013

Wage Rate per Hour: \$43.79

Supplemental Benefit Rate per Hour: \$31.37

Effective Period: 3/17/2013 - 6/30/2013

Wage Rate per Hour: \$45.14

Supplemental Benefit Rate per Hour: \$33.02

Overtime Description

For Service Work: Double time - all work 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.

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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

For Modernization Work (4pm to 12:30am) - regularly hourly rate plus a (15%) fifteen percent differential.

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

Cherry pickers 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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$58.75

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$94.00

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, Cherry pickers. 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 Loaders 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

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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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$57.00

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$91.20

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$56.74

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$90.78

Engineer - Heavy Construction Maintenance Engineer II

On Base Mounted Tower Cranes

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$74.44

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$119.10

Engineer - Heavy Construction Maintenance Engineer III

On Generators, Light Towers

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.56

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$60.10

Engineer - Heavy Construction Maintenance Engineer IV

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on Pumps and Mixers including mud sucking

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.53**

Supplemental Benefit Rate per Hour: **\$31.07**

Supplemental Note: **\$55.74** on overtime

Shift Wage Rate: **\$61.65**

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$54.09**

Supplemental Benefit Rate per Hour: **\$31.07**

Supplemental Note: **\$55.74** on overtime

Shift Wage Rate: **\$86.54**

Engineer - Heavy Construction Oilers I

Gradalls, Cold Planer Grader, Concrete Pumps, Driving Truck Cranes, Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$51.19**

Supplemental Benefit Rate per Hour: **\$31.07**

Supplemental Note: **\$55.74** on overtime

Shift Wage Rate: **\$81.90**

Engineer - Heavy Construction Oilers II

All gasoline, electric, diesel or air operated Shovels, Draglines, Backhoes, Keystones, Pavers, Gunite Machines, Battery of Compressors, Crawler Cranes, two-person Trenching Machines.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.50**

Supplemental Benefit Rate per Hour: **\$31.07**

Supplemental Note: **\$55.74** on overtime

Shift Wage Rate: **\$56.80**

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$54.33**

Supplemental Benefit Rate per Hour: **\$29.66**

Supplemental Note: **\$53.17** on overtime

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Shift Wage Rate: \$86.93

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$50.91

Supplemental Benefit Rate per Hour: \$29.66

Supplemental Note: \$53.17 on overtime

Shift Wage Rate: \$81.46

Engineer - Steel Erection Oiler II

On a Crawler Crane

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$39.04

Supplemental Benefit Rate per Hour: \$29.66

Supplemental Note: \$53.17 on overtime

Shift Wage Rate: \$62.46

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

Election 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

Engineer - Building Work Maintenance Engineers I

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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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$51.62

Supplemental Benefit Rate per Hour: \$29.66

Supplemental Note: \$53.17 on overtime

Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$40.34

Supplemental Benefit Rate per Hour: \$29.66

Supplemental Note: \$53.17 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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$49.12

Supplemental Benefit Rate per Hour: \$29.66

Supplemental Note: \$53.17 on overtime

Engineer - Building Work Oilers II

Oilers on Crawler Cranes, Backhoes, Trenching Machines, Gunite Machines, Compressors (three or more in Battery).

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.75

Supplemental Benefit Rate per Hour: \$29.66

Supplemental Note: \$53.17 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.

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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

Off Shift: double time the regular hourly rate.

(Local #15)

ENGINEER - CITY SURVEYOR AND CONSULTANT

Party Chief

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: **\$34.61**
Supplemental Benefit Rate per Hour: **\$17.30**

Instrument Person

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: **\$28.59**
Supplemental Benefit Rate per Hour: **\$17.30**

Rodperson

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: **\$24.79**
Supplemental Benefit Rate per Hour: **\$17.30**

Overtime Description

Overtime Benefit Rate - \$23.63 per hour (time & one half) \$29.95 per hour (double time).
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

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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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$53.64**

Supplemental Benefit Rate per Hour: **\$26.95**

Supplemental Note: Overtime Benefit Rate - \$37.48 per hour (time & one half) \$48.00 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$41.94**

Supplemental Benefit Rate per Hour: **\$26.95**

Supplemental Note: Overtime Benefit Rate - \$37.48 per hour (time & one half) \$48.00 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$27.52**

Supplemental Benefit Rate per Hour: **\$26.95**

Supplemental Note: Overtime Benefit Rate - \$37.48 per hour (time & one half) \$48.00 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

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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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$60.28

Supplemental Benefit Rate per Hour: \$29.73

Supplemental Note: Overtime benefit rate - \$41.40 per hour (time & one half), \$53.06 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$44.28

Supplemental Benefit Rate per Hour: \$29.73

Supplemental Note: Overtime benefit rate - \$41.40 per hour (time & one half), \$53.06 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.11

Supplemental Benefit Rate per Hour: \$29.73

Supplemental Note: Overtime benefit rate - \$41.40 per hour (time & one half), \$53.06 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

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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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$54.50**

Supplemental Benefit Rate per Hour: **\$26.95**

Supplemental Note: Overtime benefit rate - \$37.48 per hour (time & one half), \$48.00 per hour (double time).

Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$42.63**

Supplemental Benefit Rate per Hour: **\$26.95**

Supplemental Note: Overtime benefit rate - \$37.48 per hour (time & one half), \$48.00 per hour (double time).

Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$28.84**

Supplemental Benefit Rate per Hour: **\$26.95**

Supplemental Note: Overtime benefit rate - \$37.48 per hour (time & one half), \$48.00 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

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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

(Local #15-D)

ENGINEER - OPERATING

Operating Engineer - Road & Heavy Construction I

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$64.38**

Supplemental Benefit Rate per Hour: **\$28.65**

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: **\$103.01**

Operating Engineer - Road & Heavy Construction II

Backhoes, Power Shovels, Hydraulic Clam Shells, Steel Erection, Moles and machines of a similar nature.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$66.70**

Supplemental Benefit Rate per Hour: **\$28.65**

Supplemental Note: 51.85 overtime hours

Shift Wage Rate: **\$106.72**

Operating Engineer - Road & Heavy Construction III

Mine Hoists, Cranes, etc. (Used as Mine Hoists)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$68.86**

Supplemental Benefit Rate per Hour: **\$28.65**

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: **\$110.18**

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.

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Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$67.21

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$107.54

Operating Engineer - Road & Heavy Construction V

Pile Drivers & Rigs (employing Dock Builder foreperson): Derrick Boats, Tunnel Shovels.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$65.86

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$105.38

Operating Engineer - Road & Heavy Construction VI

Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power Houses (Low Air Pressure Units).

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$62.51

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$100.02

Operating Engineer - Road & Heavy Construction VII

Barrier Movers , Barrier Transport and Machines of a Similar Nature.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$50.27

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$80.43

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.37

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$46.38

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

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Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$56.24
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$89.98

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$54.50
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$87.20

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$42.11
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$67.38

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$63.18
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$101.09

Operating Engineer - Road & Heavy Construction XIII

Concrete Pumps, Concrete Plant, Well Drilling Machines, Stone Crushers, Double Drum Hoist, Power Houses (other than above).

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$61.14
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$97.82

Operating Engineer - Road & Heavy Construction XIV

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Concrete Mixer

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$58.34
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$93.49

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: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$39.03
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$62.45

Operating Engineer - Road & Heavy Construction XVI

Concrete Breaking Machines, Single Drum Hoists, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$55.73
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$89.17

Operating Engineer - Road & Heavy Construction XVII

On-Site concrete plant engineer, On-site Asphalt Plant Engineer, and Vibratory console.

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$56.19
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours
Shift Wage Rate: \$89.90

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$81.09
Supplemental Benefit Rate per Hour: \$28.65
Supplemental Note: \$51.85 overtime hours

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§220 PREVAILING WAGE SCHEDULE

Shift Wage Rate: \$129.74

Operating Engineer - Paving I

Asphalt Spreaders, Autogrades (C.M.I.), Roto/Mil

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$59.25

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$94.80

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$57.65

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$92.24

Operating Engineer - Paving III

Asphalt Plants

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$48.46

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$77.54

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$63.49

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.91

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Operating Engineer - Concrete III

Micro-traps (Negative Air Machines), Vac-All Remediation System.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$50.31

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$67.62

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$108.19

Operating Engineer - Steel Erection II

Cranes, 2 Drum Derricks, Hydraulic Cranes and Fork Lifts.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$64.91

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$103.86

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.87

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$60.59

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.00

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$57.60

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Operating Engineer - Building Work I

Forklifts, House Cars, Rack and Pinion, Plaster (Platform machine), Plaster Bucket, Concrete Pump and all other equipment used for hoisting material.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$53.09

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Building Work II

Compressors, Welding Machines (Cutting Concrete-Tank Work), Paint Spraying, Sandblasting, Pumps (with the exclusion of Concrete Pumps), House Car (settlement basis only), All Engines irrespective of Power (Power-Pac) used to drive Auxiliary Equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$39.35

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$60.66

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$64.35

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$59.17

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Operating Engineer - Building Work VI

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$58.53**

Supplemental Benefit Rate per Hour: **\$28.65**

Supplemental Note: **\$51.85** overtime hours

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

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

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$46.15**

Supplemental Benefit Rate per Hour: **\$38.50**

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§220 PREVAILING WAGE SCHEDULE

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
Presidential Election Day
Thanksgiving Day
Day after Thanksgiving
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

Two shifts may be utilized with the first shift working 8:00 A.M. to the end of the shift at the straight time of pay. The second shift will receive one hour at double time rate for the last hour of the shift. (eight for seven, nine for eight).

(Carpenters District Council)

GLAZIER (New Construction, Remodeling, and Alteration)

Glazier

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$40.00

Supplemental Benefit Rate per Hour: \$32.89

Supplemental Note: Supplemental Benefit Overtime Rate: \$40.54

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$40.50

Supplemental Benefit Rate per Hour: \$33.24

Supplemental Note: Supplemental Benefit Overtime Rate: \$41.24

Overtime Description

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§220 PREVAILING WAGE SCHEDULE

An optional 8th hour can be worked at straight time rate. If 9th hour is worked, then both hours or more (8th & 9th or more) will be at the double time rate of pay.

Overtime

Double time the regular rate after a 7 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
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

None

Shift Rates

Shifts shall be any 7 hours beyond 4:00 P.M. for which the glazier shall receive 8 hours pay for 7 hours worked.

(Local #1281)

GLAZIER - REPAIR & MAINTENANCE

(For the Installation of Glass - All repair and maintenance work on a particular building, whenever performed, where the total cumulative contract value is under \$105,000. Except where enumerated (i.e. plate glass windows) does not apply to non-residential buildings.)

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: 7/1/2012 - 4/30/2013

Wage Rate per Hour: \$23.40

Supplemental Benefit Rate per Hour: \$18.04

Effective Period: 5/1/2013 - 6/30/2013

Wage Rate per Hour: \$23.50

Supplemental Benefit Rate per Hour: \$18.54

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Overtime

Time and one half the regular rate after an 8 hour day.

Double time the regular rate for Sunday.

Time and one half the regular hourly rate after 40 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

(Local #1281)

HEAT AND FROST INSULATOR

Heat & Frost Insulator

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$54.28

Supplemental Benefit Rate per Hour: \$31.36

Overtime Description

Double time shall be paid for supplemental benefits during overtime work.

8th hour paid at time and one half.

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

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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. Off hour work in occupied or retail buildings may be worked on weekdays with an increment of \$1.00 per hour and eight hours pay for seven (7) hours worked. Double time will apply for over seven (7) hours worked on weekdays, weekends or holidays.

(Local #12)

HOUSE WRECKER (TOTAL DEMOLITION)

House Wrecker - Tier A

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.00

Supplemental Benefit Rate per Hour: \$24.15

House Wrecker - Tier B

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$23.05

Supplemental Benefit Rate per Hour: \$17.85

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).

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§220 PREVAILING WAGE SCHEDULE

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$41.50

Supplemental Benefit Rate per Hour: \$39.52

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

For off shift work - 8 hours pay for 7 hours of work. When two or three shifts are employed on a job, Monday through Friday, the workday for each shift shall be seven hours and paid for ten and one-half hours at the single

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

time rate. When two or three shifts are worked on Saturday, Sunday or holidays, each shift shall be seven hours and paid fifteen and three-quarters hours.

(Local #580)

IRON WORKER - STRUCTURAL

Iron Worker - Structural

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$45.05

Supplemental Benefit Rate per Hour: \$57.85

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.

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

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.

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.

(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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.70**

Supplemental Benefit Rate per Hour: **\$31.75**

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.

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

Presidential Election 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)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

LANDSCAPING

(Landscaping tasks, as well as tree pruning, tree removing, spraying and maintenance in connection with the planting of street trees and the planting of trees in city parks but not when such activities are performed as part of, or in connection with, other construction or reconstruction projects.)

Landscaper (Above 6 years experience)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$24.25

Supplemental Benefit Rate per Hour: \$12.30

Landscaper (3 - 6 years experience)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$23.25

Supplemental Benefit Rate per Hour: \$12.30

Landscaper (up to 3 years experience)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$20.75

Supplemental Benefit Rate per Hour: \$12.30

Groundperson

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$20.75

Supplemental Benefit Rate per Hour: \$12.30

Tree Remover / Pruner

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$29.25

Supplemental Benefit Rate per Hour: \$12.30

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$19.25

Supplemental Benefit Rate per Hour: \$12.30

Watering – Plant Maintainer

Effective Period: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$14.25**

Supplemental Benefit Rate per Hour: **\$12.30**

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$49.19**

Supplemental Benefit Rate per Hour: **\$32.24**

Marble Finisher

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$39.05**

Supplemental Benefit Rate per Hour: **\$31.43**

Marble Polisher

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$34.73**

Supplemental Benefit Rate per Hour: **\$24.60**

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§220 PREVAILING WAGE SCHEDULE

Overtime Description

Supplemental Benefit contributions are to be made at the applicable overtime rates. Time and one half the regular rate after a 7 hour day or time and one half the regular rate after an 8 hour day - chosen by Employer at the start of the project and then would last for the full duration of the project.

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
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Paid Holidays

One

(Local #7)

MASON TENDER

Mason Tender

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$34.24

Supplemental Benefit Rate per Hour: \$24.40

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

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§220 PREVAILING WAGE SCHEDULE

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.

(Local #79)

MASON TENDER (INTERIOR DEMOLITION WORKER)

(The erection, building, moving, servicing and dismantling of enclosures, scaffolding, barricades, protection and site safety structures etc., on Interior Demolition jobs.)

Mason Tender Tier A

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.87

Supplemental Benefit Rate per Hour: \$19.22

Mason Tender Tier B

On Interior Demolition job sites 33 1/3 % of the employees shall be classified as Tier A Interior Demolition Workers and 66 2/3 % shall be classified as Tier B Interior Demolition Workers; provided that the employer may employ more than 33 1/3 % Tier A Interior Demolition Workers on the job site. Where the number of employees on a job site is not divisible by 3, the first additional employee (above the number of employees divisible by three) shall be a Tier B Interior Demolition Worker, and the second additional employee shall be a Tier A Interior Demolition Worker.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$23.07

Supplemental Benefit Rate per Hour: \$13.53

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

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§220 PREVAILING WAGE SCHEDULE

President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

(Local #79)

METALLIC LATHER

Metallic Lather

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$41.23

Supplemental Benefit Rate per Hour: \$38.35

Supplemental Note: Supplemental benefits for overtime are paid at the appropriate overtime rate.

Overtime Description

Overtime would be time and one half the regular rate after a seven (7) or eight (8) hours workday, which would be set at the start of the job.

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
Washington's Birthday
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Presidential Election 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

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§220 PREVAILING WAGE SCHEDULE

There shall be either two (2) or three (3) shifts, each shift shall be eight (8) hours with nine (9) hours pay, including one half (½) hour for lunch. Off-Hour Start shall commence after 3:30 P.M. and shall conclude by 6:00 A.M. The first consecutive seven (7) hours shall be at straight time with a differential of twelve dollars (\$12.00) per hour. Fringes shall be paid at the straight time rate.

(Local #46)

MILLWRIGHT

Millwright

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.19

Supplemental Benefit Rate per Hour: \$45.67

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

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

The first shift shall receive the straight time rate of pay. The second shift receives the straight time rate of pay plus fifteen (15%) per cent. Members of the second shift shall be allowed one half hour to eat, with this time being included in the hours of the workday established. There must be a first shift to work a second shift. All additional hours worked shall be paid at the time and one-half rate of pay plus fifteen (15%) per cent for weekday hours.

(Local #740)

MOSAIC MECHANIC

Mosaic Mechanic - Mosaic & Terrazzo Mechanic

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$43.93**

Supplemental Benefit Rate per Hour: **\$33.08**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$44.05 per hour.

Mosaic Mechanic - Mosaic & Terrazzo Finisher

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$42.36**

Supplemental Benefit Rate per Hour: **\$33.08**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$44.05 per hour.

Mosaic Mechanic - Machine Operator Grinder

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$42.36**

Supplemental Benefit Rate per Hour: **\$33.08**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$44.05 per hour.

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: 7/1/2012 – 10/31/2012

Wage Rate per Hour: **\$35.50**

Supplemental Benefit Rate per Hour: **\$25.12**

Supplemental Note: **\$29.75 on overtime**

Effective Period: 11/1/2012 - 4/30/2013

Wage Rate per Hour: **\$36.00**

Supplemental Benefit Rate per Hour: **\$25.12**

Supplemental Note: **\$29.75 on overtime**

Effective Period: 5/1/2013 - 6/30/2013

Wage Rate per Hour: **\$37.50**

Supplemental Benefit Rate per Hour: **\$25.12**

Supplemental Note: **\$29.75 on overtime**

Spray & Scaffold / Decorative / Sandblast

Effective Period: 7/1/2012 – 10/31/2012

Wage Rate per Hour: **\$38.50**

Supplemental Benefit Rate per Hour: **\$25.12**

Supplemental Note: **\$29.75 on overtime**

Effective Period: 11/1/2012 - 4/30/2013

Wage Rate per Hour: **\$39.00**

Supplemental Benefit Rate per Hour: **\$25.12**

Supplemental Note: **\$29.75 on overtime**

Effective Period: 5/1/2013 - 6/30/2013

Wage Rate per Hour: **\$40.50**

Supplemental Benefit Rate per Hour: **\$25.12**

Supplemental Note: **\$29.75 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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Thanksgiving Day
Christmas Day

Paid Holidays

None

(District Council of Painters #9)

PAINTER - SIGN

Designer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.15

Supplemental Benefit Rate per Hour: \$9.66

Journey person

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.62

Supplemental Benefit Rate per Hour: \$9.66

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.

Double 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

All work performed outside the regular 8 hour work day (either 7:00 A.M to 3:30 P.M or 8:00 A.M. to 4:30 P.M) shall be paid at time and one half the regular hourly rate.

Local #8A-28A)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

PAINTER - STRIPER

Striper (paint)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$31.00**

Supplemental Benefit Rate per Hour: **\$10.56**

Supplemental Note: Overtime Supplemental Benefit rate - **\$6.46**

Lineperson (thermoplastic)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.00**

Supplemental Benefit Rate per Hour: **\$10.56**

Supplemental Note: Overtime Supplemental Benefit rate - **\$6.46**

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.

Time and one half the regular rate for work on the following holiday(s).

Paid Holidays

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Shift Rates

15% night shift premium differential for all work performed after 9:00 P.M.

Vacation

Employees with one to three 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 three to ten years service receive two weeks vacation. Employees with ten or more years service receive three weeks vacation. Vacation must be taken during winter months.

(Local #917)

PAINTER - STRUCTURAL STEEL

Painters on Structural Steel

Effective Period: 7/1/2012 - 9/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$46.25

Supplemental Benefit Rate per Hour: \$31.58

Effective Period: 10/1/2012 - 6/30/2013

Wage Rate per Hour: \$47.00

Supplemental Benefit Rate per Hour: \$32.08

Painter - Power Tool

Effective Period: 7/1/2012 - 9/30/2013

Wage Rate per Hour: \$52.25

Supplemental Benefit Rate per Hour: \$31.58

Effective Period: 10/1/2012 - 6/30/2013

Wage Rate per Hour: \$53.00

Supplemental Benefit Rate per Hour: \$32.08

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

Regular hourly rates plus a ten per cent (10%) differential

(Local #806)

PAPERHANGER

Paperhanger

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.44

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$29.23**

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$42.86**

Supplemental Benefit Rate per Hour: **\$32.15**

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 before the installation of rubberized materials and similar surfaces; installation and repair of temporary construction fencing; slurry seal coating, maintenance of safety surfaces; play equipment installation, and other related work.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.99**

Supplemental Benefit Rate per Hour: **\$32.15**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$45.00

Supplemental Benefit Rate per Hour: \$32.15

Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$44.49

Supplemental Benefit Rate per Hour: \$32.15

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$41.20

Supplemental Benefit Rate per Hour: \$32.15

Overtime Description

Veteran's Day is a Paid Holiday for employees working on production paving.

If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 15%, except if an employee works on production paving on New Year's Day or Christmas Day, they receive the single time rate plus one day's pay for the holiday worked.

Employees who work on a holiday listed below receive the straight time rate plus one day's pay 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.

Paid Holidays

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

Shift Rates

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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 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 fifteen percent (15%) over the single time rate, except that production paving work shall be paid at 25% over the single time rate. 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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$40.78

Supplemental Benefit Rate per Hour: \$26.80

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.

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

Martin Luther King Jr. 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

When it is not possible to conduct alteration work during regular work hours, in a building occupied by tenants, said work shall proceed on a shift basis: however work over seven (7) hours in any twenty four (24) hour period, the time after seven (7) hours shall be considered overtime.

The second shift shall start at a time between 3:30 p.m. and 7:00 p.m. and shall consist of seven (7) working hours and shall receive eight (8) hours of wages and benefits at the straight time rate. The workers on the

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Second shift shall be allowed one-half (½) hour to eat with this time being included in the seven (7) hours of work.

(Local #530)

PLASTERER - TENDER

Plasterer - Tender

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$34.24

Supplemental Benefit Rate per Hour: \$24.40

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

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: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$51.76**

Supplemental Benefit Rate per Hour: **\$37.19**

Supplemental Note: Overtime supplemental benefit rate per hour: **\$74.10**

Overtime Description

Double time the regular rate after a 7 hour day - unless for new construction site work where the plumbing contract price is \$1 million or less, and for public works jobs where the plumbing contract is \$1.5 million or less, the hours of labor can be 8 hours per day at the employers option. On Alteration jobs when other mechanical trades at the site are working an eighth hour at straight time, then the plumber shall also work an eighth hour at straight time.

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

Shift Rates

Shift work, when directly specified in public agency or authority documents where plumbing contract is \$8 million or less, will be permitted. 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 (MECHANICAL EQUIPMENT AND SERVICE)

(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$32.96**

Supplemental Benefit Rate per Hour: **\$15.93**

Overtime

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.69

Supplemental Benefit Rate per Hour: \$25.46

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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
(Installation and Maintenance)

Plumber - Pump & Tank

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$52.31

Supplemental Benefit Rate per Hour: \$31.56

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)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

**POINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING
RENOVATION)**

Pointer - Waterproofer, Caulker Mechanic

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$44.63**

Supplemental Benefit Rate per Hour: **\$23.10**

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 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

ROOFER

Roofer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.00**

Supplemental Benefit Rate per Hour: **\$27.07**

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

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
Presidential Election 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.

(Local #8)

SANDBLASTER - STEAMBLASTER (Exterior Building Renovation)

Sandblaster / Steamblaster

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$44.63

Supplemental Benefit Rate per Hour: \$23.10

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

SHEET METAL WORKER

Sheet Metal Worker

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$45.65

Supplemental Benefit Rate per Hour: \$40.50

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$12.90

Supplemental Benefit Rate per Hour: \$8.07

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.52

Supplemental Benefit Rate per Hour: \$40.50

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

Labor Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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 (seven 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. No journeyman engaged in fan maintenance shall work in excess of forty (40) hours in any work week.

(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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$40.09

Supplemental Benefit Rate per Hour: \$22.06

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

Paid Holidays

None

(Local #28)

SIGN ERECTOR
(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$41.55**

Supplemental Benefit Rate per Hour: **\$39.32**

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
Washington's Birthday
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)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

STEAMFITTER

Steamfitter I

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$50.75

Supplemental Benefit Rate per Hour: \$49.68

Supplemental Note: Overtime supplemental benefit rate: \$98.62

Overtime

Double time the regular rate after a 7 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

Work performed between 3:30 P.M. and 7:00 A.M. and on Saturdays, Sundays and Holidays shall be at double time the regular hourly rate and paid at the overtime supplemental benefit rate above.

Steamfitter II

For heating, ventilation, air conditioning and mechanical public works contracts with a dollar value not to exceed \$15,000,000 and for fire protection/sprinkler public works contracts not to exceed \$1,500,000.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$50.75

Supplemental Benefit Rate per Hour: \$49.68

Supplemental Note: Overtime supplemental benefit rate: \$98.62

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.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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. A shift shall consist of eight working hours. All work performed in excess of eight hours shall be paid at double time. No shift shall commence after 7:00 P.M. on Friday or 7:00 P.M. the day before holidays. All work performed after 12:01 A.M. Saturday or 12:01 A.M. the day before a Holiday will be paid at double time. When shift work is performed the wage rate for regular time worked is a thirty percent premium together with fringe benefits.

On Transit Authority projects, where work is performed in the vicinity of tracks all shift work on weekends and holidays may be performed at the regular shift rates.

Local #638

**STEAMFITTER - REFRIGERATION AND AIR CONDITIONER
(Maintenance and Installation Service Person)**

Refrigeration and Air Conditioner Mechanic

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.30

Supplemental Benefit Rate per Hour: \$11.76

Refrigeration and Air Conditioner Service Person V (4th year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$29.82

Supplemental Benefit Rate per Hour: \$10.71

Refrigeration and Air Conditioner Service Person IV (3rd year)

Effective Period: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$24.71

Supplemental Benefit Rate per Hour: \$9.80

Refrigeration and Air Conditioner Service Person III (2nd year)

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.21

Supplemental Benefit Rate per Hour: \$9.12

Refrigeration and Air Conditioner Service Person II (2nd six months)

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$17.60

Supplemental Benefit Rate per Hour: \$8.50

Refrigeration and Air Conditioner Service Person I (1st six months)

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 6/30/2013

Wage Rate per Hour: \$10.95

Supplemental Benefit Rate per Hour: \$7.90

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

Martin Luther King Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Christmas Day

(Local #638B)

STONE MASON - SETTER

Stone Mason - Setters

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$47.72

Supplemental Benefit Rate per Hour: \$35.28

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)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

TAPER

Drywall Taper

Effective Period: 7/1/2012 – 12/25/2012

Wage Rate per Hour: \$43.32

Supplemental Benefit Rate per Hour: \$21.66

Effective Period: 12/26/2012 - 6/30/2013

Wage Rate per Hour: \$43.82

Supplemental Benefit Rate per Hour: \$21.66

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.

Shift Rates

Time and one half the regular rate outside the regular work hours (8:00 A.M. through 3:30 P.M.)

(Local #1974)

TELECOMMUNICATION WORKER (Voice Installation Only)

Telecommunication Worker

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$35.94

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Supplemental Benefit Rate per Hour: \$13.19

Supplemental Note: The above rate applies for Manhattan, Bronx, Brooklyn, Queens. \$12.64 for Staten Island only.

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

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.)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

TILE FINISHER

Tile Finisher

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.17

Supplemental Benefit Rate per Hour: \$26.76

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$47.75

Supplemental Benefit Rate per Hour: \$30.83

Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$42.63

Supplemental Benefit Rate per Hour: \$41.99

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

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 PREVAILING WAGE SCHEDULE

Paid Holidays

None

Shift Rates

Off shift work, commencing between 5:00 P.M. and 10:00 P.M., shall work eight and one half hours but will be paid for 9 hours, including benefits at the straight time rate for 8 hours.

(Local #1536)

TUNNEL WORKER

Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$52.00

Supplemental Benefit Rate per Hour: \$46.85

Tunnel Workers (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$50.19

Supplemental Benefit Rate per Hour: \$45.29

Top Nipper (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$49.27

Supplemental Benefit Rate per Hour: \$44.51

Outside Lock Tender, Outside Gauge Tender, Muck Lock Tender (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$48.37

Supplemental Benefit Rate per Hour: \$43.67

Bottom Bell & Top Bell Signal Person: Shaft Person (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$48.37

Supplemental Benefit Rate per Hour: \$43.67

Changehouse Attendant: Powder Watchperson (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Wage Rate per Hour: \$42.09

Supplemental Benefit Rate per Hour: \$41.41

Blasters (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$49.62

Supplemental Benefit Rate per Hour: \$44.75

Tunnel Workers (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$47.48

Supplemental Benefit Rate per Hour: \$42.84

All Others (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$43.87

Supplemental Benefit Rate per Hour: \$39.62

Microtunneling (Free Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.98

Supplemental Benefit Rate per Hour: \$34.27

Overtime Description

For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, or for Saturday, or for Sunday. Double time the regular rate for work on a holiday.

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

Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 PREVAILING WAGE SCHEDULE

(Local #147)

**WELDER
TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE
PERFORMING THE WORK.**

OFFICE OF THE COMPTROLLER

CITY OF NEW YORK

220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

APPENDIX

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 employed on a public work project.

Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the journey person wage rate for the classification of work he 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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ASBESTOS HANDLER

(Ratio of Apprentice Journeyperson: 1 to 1, 1 to 3)

Asbestos Handler (First 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 78% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$14.85

Asbestos Handler (Second 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$14.85

Asbestos Handler (Third 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 83% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$14.85

Asbestos Handler (Fourth 1000 Hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 89% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$14.85

(Local #78)

BOILERMAKER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Boilermaker (First Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$27.41

Boilermaker (Second Year: 1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$28.91

Boilermaker (Second Year: 2nd Six Months)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$30.40

Boilermaker (Third Year: 1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$31.89

Boilermaker (Third Year: 2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 85% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$33.38

Boilermaker (Fourth Year: 1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$34.88

Boilermaker (Fourth Year: 2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 95% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$36.38

(Local #5)

BRICKLAYER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Bricklayer (First 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Second 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Third 750 Hours)

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Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 95% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer District Council)

CARPENTER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Carpenter (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

Carpenter (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

Carpenter (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

Carpenter (Fourth Year)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

(Carpenters District Council)

CEMENT MASON
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Cement Mason (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyperson's Rate

Cement Mason (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's Rate

Cement Mason (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's Rate

(Local #780)

CEMENT AND CONCRETE WORKER
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Cement & Concrete Worker (0 - 500 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$17.54

Cement & Concrete Worker (501 - 1000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$18.37

Cement & Concrete Worker (1001 - 2000 hours)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$23.75

Cement & Concrete Worker (2001 - 4000 hours)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Benefit Rate Per Hour: \$24.57

(Cement Concrete Workers District Council)

DERRICKPERSON & RIGGER (STONE)
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)

Derrickperson & Rigger (stone) - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Benefit Rate Per Hour: 50% of Journeyman's rate

Derrickperson & Rigger (stone) - Second Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

Derrickperson & Rigger (stone) - Second Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

Derrickperson & Rigger (stone) - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyman's rate
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

(Local #197)

DOCKBUILDER/PILE DRIVER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Dockbuilder/Pile Driver (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

Dockbuilder/Pile Driver (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Benefit Rate Per Hour: \$27.69

(Carpenters District Council)

ELECTRICIAN

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Electrician (First Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$14.25
Supplemental Benefit Rate per Hour: \$11.19
Overtime Wage Rate Per Hour: \$21.38
Overtime Supplemental Rate Per Hour: \$11.96

Electrician (First Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$11.50
Supplemental Benefit Rate per Hour: \$9.86
Overtime Wage Rate Per Hour: \$17.25
Overtime Supplemental Rate Per Hour: \$10.48

Electrician (Second Year - Hired before 5/10/07)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$17.05
Supplemental Benefit Rate per Hour: \$12.54
Overtime Wage Rate Per Hour: \$25.58
Overtime Supplemental Rate Per Hour: \$13.47

Electrician (Second Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$13.50
Supplemental Benefit Rate per Hour: \$10.83
Overtime Wage Rate Per Hour: \$20.25
Overtime Supplemental Rate Per Hour: \$11.56

Electrician (Third Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$19.15
Supplemental Benefit Rate per Hour: \$13.56
Overtime Wage Rate Per Hour: \$28.73
Overtime Supplemental Rate Per Hour: \$14.60

Electrician (Third Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$15.50
Supplemental Benefit Rate per Hour: \$11.79
Overtime Wage Rate Per Hour: \$23.25
Overtime Supplemental Rate Per Hour: \$12.63

Electrician (Fourth Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$21.10
Supplemental Benefit Rate per Hour: \$14.50
Overtime Wage Rate Per Hour: \$31.65
Overtime Supplemental Rate Per Hour: \$15.65

Electrician (Fourth Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$17.50
Supplemental Benefit Rate per Hour: \$12.76
Overtime Wage Rate Per Hour: \$26.25
Overtime Supplemental Rate Per Hour: \$13.71

Electrician (Fifth Year - Hired before 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$25.30
Supplemental Benefit Rate per Hour: \$17.52

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Overtime Wage Rate Per Hour: \$37.95
Overtime Supplemental Rate Per Hour: \$18.85

Electrician (Fifth Year - Hired on or After 5/10/07)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$21.50
Supplemental Benefit Rate per Hour: \$15.71
Overtime Wage Rate Per Hour: \$32.25
Overtime Supplemental Rate Per Hour: \$16.84

Overtime Description

For "A" rated Apprentices (work in excess of 7 hours per day)
For "M" rated Apprentices (work in excess of 8 hours per day)

(Local #3)

ELEVATOR CONSTRUCTOR

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

Elevator (Constructor) - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$25.40
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$26.87

Elevator (Constructor) - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$26.43
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$27.92

Elevator (Constructor) - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$27.84
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$29.38

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$29.25
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$30.84

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Local #1)

ELEVATOR REPAIR & MAINTENANCE

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Rate Per Hour: \$25.33

Effective 3/17/2013 - Supplemental Benefit Per Hour: \$26.79

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 55% of Journeyman's rate

Supplemental Rate Per Hour: \$25.65

Effective 3/17/2013 - Supplemental Benefit Per Hour: \$27.12

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Rate Per Hour: \$26.92

Effective 3/17/2013 - Supplemental Benefit Per Hour: \$28.43

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 75% of Journeyman's rate

Supplemental Rate Per Hour: \$28.19

Effective 3/17/2013 - Supplemental Benefit Per Hour: \$29.74

(Local #1)

ENGINEER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 5)

Engineer - First Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.64

Supplemental Benefit Rate per Hour: \$20.07

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Engineer - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$27.05
Supplemental Benefit Rate per Hour: \$20.07

Engineer - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$29.75
Supplemental Benefit Rate per Hour: \$20.07

Engineer - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$32.45
Supplemental Benefit Rate per Hour: \$20.07

(Local #15)

ENGINEER - OPERATING

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Operating Engineer - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour 40% of Journeyperson's Rate
Supplemental Benefit Per Hour: \$18.65

Operating Engineer - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's Rate
Supplemental Benefit Per Hour: \$18.65

Operating Engineer - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's Rate
Supplemental Benefit Per Hour: \$18.65

(Local #14)

FLOOR COVERER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Floor Coverer (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Rate Per Hour: \$25.75

(Carpenters District Council)

GLAZIER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Glazier (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$11.97

Glazier (Second Year)

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$21.01

Effective Period: 11/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$21.13

Glazier (Third Year)

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: \$23.38

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$23.54

Glazier (Fourth Year)

Effective Period: 7/1/2012 - 10/31/2012
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: \$28.14

Effective Period: 11/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyperson's rate
Supplemental Rate Per Hour: \$28.34

(Local #1281)

**HEAT & FROST INSULATOR
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)**

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Heat & Frost Insulator (Third Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

Local #12)

**HOUSE WRECKER
(TOTAL DEMOLITION)
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

House Wrecker - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$20.06
Supplemental Benefit Rate per Hour: \$15.45

House Wrecker - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$21.06
Supplemental Benefit Rate per Hour: \$15.45

House Wrecker - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$22.56
Supplemental Benefit Rate per Hour: \$15.45

House Wrecker - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$25.06
Supplemental Benefit Rate per Hour: \$15.45

(Local #79)

**IRON WORKER - ORNAMENTAL
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

Iron Worker (Ornamental) - 1st Four Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$32.06

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
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Iron Worker (Ornamental) 5 - 10 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyman's rate
Supplemental Rate Per Hour: \$32.89

Iron Worker (Ornamental) 11 - 16 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Rate Per Hour: \$33.73

Iron Worker (Ornamental) 17 - 22 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyman's rate
Supplemental Rate Per Hour: \$35.39

Iron Worker (Ornamental) 23 - 28 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 85% of Journeyman's rate
Supplemental Rate Per Hour: \$36.22

Iron Worker (Ornamental) 29 - 36 Months - Hired on or Before 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 95% of Journeyman's rate
Supplemental Rate Per Hour: \$37.89

Iron Worker (Ornamental) - 1st Ten Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$30.40

Iron Worker (Ornamental) - 11 - 16 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$31.23

Iron Worker (Ornamental) - 17 - 22 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$32.06

Iron Worker (Ornamental) - 23 - 28 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyman's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Rate Per Hour: \$33.73

Iron Worker (Ornamental) - 29 - 36 Months - Hired After 8/1/08

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$35.39

(Local #580)

IRON WORKER - STRUCTURAL

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Iron Worker (Structural) - 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$23.62

Supplemental Benefit Rate per Hour: \$41.21

Iron Worker (Structural) - 7- 18 Months

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$24.22

Supplemental Benefit Rate per Hour: \$41.21

Iron Worker (Structural) - 19 - 36 months

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$24.82

Supplemental Benefit Rate per Hour: \$41.21

(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 200 hours

Effective Period: 7/1/2012 - 6/30/2013

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Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$31.75

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) -
Second 1000 hours**

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$31.75

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Third
1000 hours**

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$31.75

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) -
Fourth 1000 hours**

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 90% of Journeyman's rate
Supplemental Rate Per Hour: \$31.75

(Local #731)

**MARBLE MECHANICS
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

Cutters & Setters - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 55% of Journeyman's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 65% of Journeyman's rate

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Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Polishers & Finishers - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Polishers & Finishers - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Polishers & Finishers - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

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: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$20.33

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Supplemental Benefit Rate per Hour: \$16.16

Mason Tender - Second Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.33

Supplemental Benefit Rate per Hour: \$16.16

Mason Tender - Third Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$22.83

Supplemental Benefit Rate per Hour: \$16.16

Mason Tender - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.33

Supplemental Benefit Rate per Hour: \$16.16

(Local #79)

METALLIC LATHER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Metallic Lather (First Year – Called Prior to 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.91

Supplemental Benefit Rate per Hour: \$22.79

Metallic Lather (Second Year - Called Prior to 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$32.51

Supplemental Benefit Rate per Hour: \$24.44

Metallic Lather (Third Year - Called Prior to 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.57

Supplemental Benefit Rate per Hour: \$25.59

Metallic Lather (First Year – Called On Or After 6/29/11)

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Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$17.71

Supplemental Benefit Rate per Hour: \$19.85

Metallic Lather (Second Year – Called On Or After 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$22.71

Supplemental Benefit Rate per Hour: \$19.85

Metallic Lather (Third Year – Called On Or After 6/29/11)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.71

Supplemental Benefit Rate per Hour: \$19.85

(Local #46)

MILLWRIGHT

Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Millwright (First Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.40

Supplemental Benefit Rate per Hour: \$28.67

Millwright (Second Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$30.02

Supplemental Benefit Rate per Hour: \$31.87

Millwright (Third Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$34.64

Supplemental Benefit Rate per Hour: \$36.19

Millwright (Fourth Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$43.88

Supplemental Benefit Rate per Hour: \$41.50

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(Local #740)

PAVER AND ROADBUILDER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Paver and Roadbuilder - First Year (Minimum 1000 hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.72

Supplemental Benefit Rate per Hour: \$15.75

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.29

Supplemental Benefit Rate per Hour: \$15.75

(Local #1010)

PAINTER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Painter - Brush & Roller - First Year

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$14.20

Supplemental Benefit Rate per Hour: \$10.88

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$14.40

Supplemental Benefit Rate per Hour: \$10.88

Painter - Brush & Roller - Second Year

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$17.75

Supplemental Benefit Rate per Hour: \$14.73

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$18.00

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Supplemental Benefit Rate per Hour: \$14.73

Painter - Brush & Roller - Third Year

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$21.30

Supplemental Benefit Rate per Hour: \$17.64

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.60

Supplemental Benefit Rate per Hour: \$17.64

Painter - Brush & Roller - Fourth Year

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$28.40

Supplemental Benefit Rate per Hour: \$23.02

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$28.80

Supplemental Benefit Rate per Hour: \$23.02

(District Council of Painters)

PAINTER - STRUCTURAL STEEL

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Painters - Structural Steel (First Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #806)

PLASTERER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Plasterer - First Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$14.61

Plasterer - First Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 45% of Journeyman's rate
Supplemental Rate Per Hour: \$15.09

Plasterer - Second Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$17.06

Plasterer - Second Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$18.14

Plasterer - Third Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Rate Per Hour: \$20.31

Plasterer - Third Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyman's rate
Supplemental Rate Per Hour: \$21.39

(Local #530)

PLUMBER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Plumber - First Year: 1st Six Months

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Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$0.71

Plumber - First Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$2.96

Plumber - Second Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$17.96

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Third Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$20.06

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$22.91

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$24.31

Supplemental Benefit Rate per Hour: \$16.25

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$36.38

Supplemental Benefit Rate per Hour: \$16.25

(Plumbers Local #1)

**WINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING
RENOVATION)**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Pointer - Waterproofor, Caulker Mechanic - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$25.00
Supplemental Benefit Rate per Hour: \$3.45

Pointer - Waterproofor, Caulker Mechanic - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$27.25
Supplemental Benefit Rate per Hour: \$8.40

Pointer - Waterproofor, Caulker Mechanic - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$32.23
Supplemental Benefit Rate per Hour: \$11.15

Pointer - Waterproofor, Caulker Mechanic - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$38.66
Supplemental Benefit Rate per Hour: \$11.15

(Bricklayer District Council)

ROOFER
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

Rofer - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 35% of Journeyman's Rate

Rofer - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 50% of Journeyman's Rate

Rofer - Third Year

Effective Period: 7/1/2012 - 6/30/2013
Wage and Supplemental Rate Per Hour: 60% of Journeyman's Rate

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Roofer - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyman's Rate

(Local #8)

SHEET METAL WORKER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Sheet Metal Worker - First Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 30% of Journeyman's rate

Supplemental Rate Per Hour: \$15.37

Sheet Metal Worker - Second Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 35% of Journeyman's rate

Supplemental Rate Per Hour: \$18.24

Sheet Metal Worker - Third Year (1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 40% of Journeyman's rate

Supplemental Rate Per Hour: \$20.06

Sheet Metal Worker - Third Year (2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 45% of Journeyman's rate

Supplemental Rate Per Hour: \$21.87

Sheet Metal Worker - Fourth Year (1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Rate Per Hour: \$23.69

Sheet Metal Worker - Fourth Year (2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 55% of Journeyman's rate

Supplemental Rate Per Hour: \$25.33

Sheet Metal Worker - Fifth Year (1st Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyman's rate
Supplemental Rate Per Hour: \$27.47

Sheet Metal Worker - Fifth Year(2nd Six Months)

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyman's rate
Supplemental Rate Per Hour: \$31.23

(Local #28)

SIGN ERECTOR

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Sign Erector - First Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 35% of Journeyman's rate
Supplemental Rate Per Hour: \$5.96

Sign Erector - First Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 40% of Journeyman's rate
Supplemental Rate Per Hour: \$6.75

Sign Erector - Second Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 45% of Journeyman's rate
Supplemental Rate Per Hour: \$7.55

Sign Erector - Second Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 50% of Journeyman's rate
Supplemental Rate Per Hour: \$8.34

Sign Erector - Third Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 55% of Journeyman's rate
Supplemental Rate Per Hour: \$9.13

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Sign Erector - Third Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 60% of Journeyperson's rate
Supplemental Rate Per Hour: \$9.92

Sign Erector - Fourth Year: 1st Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 65% of Journeyperson's rate
Supplemental Rate Per Hour: \$10.72

Sign Erector - Fourth Year: 2nd Six Months

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 70% of Journeyperson's rate
Supplemental Rate Per Hour: \$11.51

Sign Erector - Fifth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 75% of Journeyperson's rate
Supplemental Rate Per Hour: \$12.30

Sign Erector - Sixth Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate Per Hour: 80% of Journeyperson's rate
Supplemental Rate Per Hour: \$12.30

(Local #137)

STEAMFITTER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Steamfitter - First Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

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Effective Period: 7/1/2012 - 6/30/2013

Wage Rate and Supplemental Rate per Hour: 65% of Journeyman's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate and Supplemental Rate Per Hour: 80% of Journeyman's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate and Supplemental Rate Per Hour: 85% of Journeyman's rate.

(Local #638)

STONE MASON - SETTER
(Ratio Apprentice of Journeyman: 1 to 1, 1 to 2)

Stone Mason - Setters - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 60% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Third 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 70% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

Stone Mason - Setters - Fifth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 90% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

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Stone Mason - Setters - Sixth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 100% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

(Bricklayers District Council)

TAPER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Drywall Taper - First Year

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

Drywall Taper - Second Year

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Drywall Taper - Third Year

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #1974)

TILE LAYER - SETTER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 55% of Journeyman's rate

Tile Layer - Setter - Third 750 Hours

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Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

(Local #7)

TIMBERPERSON

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Timberperson - First Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.49

Timberperson - Second Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.49

Timberperson - Third Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.49

Timberperson - Fourth Year

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Rate Per Hour: \$27.49

(Local #1536)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

This schedule of prevailing wages and supplemental fringe benefits must be posted at the public work site as required by New York State Labor Law § 231 (6).

LABOR LAW § 230 BUILDING SERVICE EMPLOYEES

In accordance with Labor Law §230 et seq. the Comptroller of the City of New York has promulgated this schedule of prevailing wages and supplemental benefits for building service employees engaged on building service contracts in excess of \$1,500.00. Prevailing rates are required to be annexed to and form part of the contract pursuant to §231 (4); however, only rates for trades anticipated by the contracting agency to be required on the work need be annexed to the contract.

Contracting agencies that anticipate doing work that may require building service trades or classifications not included in this schedule may request the Comptroller to establish a proper classification and wage determination for the work. Contractors using trades and/or classifications for which the Comptroller has not promulgated wages and benefits do so at their own risk.

Labor Law § 231 (6) requires contractors to post on the site of the work a current copy of this schedule of wages and supplements.

This schedule is applicable to work performed during the effective period, unless otherwise noted. Changes to this schedule are published on our web site www.comptroller.nyc.gov. Contractors must pay the wages and supplements in effect when the building service employee 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 www.comptroller.nyc.gov.

Building service employees on public contracts must receive not less than the prevailing rate of wage and supplements for the classification of work performed. Contractors are solely responsible for maintaining original payroll records delineating, among other things, the hours worked by each employee within a given classification.

Employers may pay cash supplements; however, cash payments made in lieu of providing bona fide benefits is considered income to the employee. Employers providing bona fide benefits are credited for the cost of such benefits up to the prevailing benefits rate for the trade at issue. Employers may combine cash supplements with in-kind supplements to meet the prevailing rate minimum.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Contractors are advised to review the applicable Comptroller's Prevailing Wage Schedule before bidding on public work. Any Prevailing Wage Rate error made by the Contracting Agency, whether in a contract document or other communication, will not preclude a finding against the contractor of a prevailing-wage violation.

Some of the rates in this schedule are based on collective bargaining agreements. These agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classifications Unit by calling (212) 669-7974. Please direct all other compliance issues to; Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

Benefits are paid for **EACH HOUR WORKED** unless otherwise noted.

Wasyl Kinach, P.E.
Director of Classifications
Bureau of Labor Law

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BOILER SERVICEPERSON/TANK CLEANER MECHANIC (LOW PRESSURE)

Boiler Service Person/Tank Cleaner Mechanic (Low Pressure)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$11.37

Supplemental Benefit Rate per Hour: \$5.57

Overtime Description

Work in excess of 8 hours performed on a Sunday or Holiday shall be paid two and one half times the regular 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.

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
- Good Friday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Thanksgiving Day
- Day after Thanksgiving
- Christmas Day
- Employee's Birthday

Vacation

- 1 year service.....five (5) days
- 3 years service or more.....ten (10) days
- 8 years service or more.....fifteen (15) days
- 13 years service or more.....twenty (20) days

SICK LEAVE:

- 1-2 years employment.....4 days
- 2-3 years employment.....5 days
- 3-4 years employment.....6 days
- 4-5 years employment.....8 days
- 6 years or more employment.....10 days

(Local #32 B/J)

BUILDING CLEANER AND MAINTAINER (OFFICE)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Office Building Class "A" Handyperson (Over 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.77

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$25.10

Supplemental Benefit Rate per Hour: \$9.51

Office Building Class "A" Foreperson, Starter (Over 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.66

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$24.99

Supplemental Benefit Rate per Hour: \$9.51

Office Building Class "A" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$22.65

Supplemental Benefit Rate per Hour: \$9.13

Supplemental Note: for new employee 0-12 months of employment - \$6.64; for new employee 13-24 months of employment - \$8.81

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$22.97

Supplemental Benefit Rate per Hour: \$9.51

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Office Building Class "B" Handyperson (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.74

Supplemental Benefit Rate per Hour: \$9.13

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: \$25.07
Supplemental Benefit Rate per Hour: \$9.51

Office Building Class "B" Foreperson, Starter (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: \$24.63
Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: \$24.95
Supplemental Benefit Rate per Hour: \$9.51

Office Building Class "B" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 120,000 and less than 280,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: \$22.62
Supplemental Benefit Rate per Hour: \$9.13
Supplemental Note: for new employee 0-12 months of employment - \$6.64; for new employee 13-24 months of employment - \$8.81

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: \$22.94
Supplemental Benefit Rate per Hour: \$9.51
Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Office Building Class "C" Handyperson (Less than 120,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: \$24.70
Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: \$25.02
Supplemental Benefit Rate per Hour: \$9.51

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Office Building Class "C" Foreperson, Starter (Less than 120,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: \$24.59
Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: \$24.91
Supplemental Benefit Rate per Hour: \$9.51

Office Building Class "C" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Less than 120,000 square feet gross area)

Effective Period: 7/1/2012 - 12/31/2012
Wage Rate per Hour: \$22.57
Supplemental Benefit Rate per Hour: \$9.13
Supplemental Note: for new employee 0-12 months of employment - \$6.64; for new employee 13-24 months of employment - \$8.81

Effective Period: 1/1/2013 - 6/30/2013
Wage Rate per Hour: \$22.90
Supplemental Benefit Rate per Hour: \$9.51
Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Overtime

Time and one half the regular rate after an 8 hour day.
Time and one half the regular rate for work on a holiday plus the day's pay.
Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day
President's Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Day after Thanksgiving
Christmas Day

Vacation

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Less than 6 months of work.....no vacation
6 months of work.....three (3) days
1 year of work.....ten (10) days
5 years of work.....fifteen (15) days
15 years of work.....twenty (20) days
21 years of work.....twenty-one (21) days
22 years of work.....twenty-two (22) days
23 years of work.....twenty-three (23) days
24 years of work.....twenty-four (24) days
25 years or more of work.....twenty-five (25) days
Plus two Personal Days per year.

Sick Leave:

10 sick days per year.

Unused sick leave paid in the succeeding January, one full day pay for each unused sick day.

(Local #32 B/J)

BUILDING CLEANER AND MAINTAINER (RESIDENTIAL)

Residential Building Class "A" Handyperson

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2012 – 4/20/2013

Wage Rate per Hour: **\$22.94**

Supplemental Benefit Rate per Hour: **\$8.68**

Supplemental Note: Effective 1/1/2013 - \$9.43

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: **\$23.57**

Supplemental Benefit Rate per Hour: **\$9.43**

Residential Building Class "A" Cleaner/Porter

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: **\$20.77**

Supplemental Benefit Rate per Hour: **\$8.68**

Supplemental Note: for new employee 0-12 months of employment - \$6.37; for new employee 13-24 months of employment - \$8.43

Effective 1/1/2013 - \$9.43; for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

Effective Period: 4/21/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
\$230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$21.34

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Residential Building Class "B" Handyperson

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: \$22.88

Supplemental Benefit Rate per Hour: \$8.68

Supplemental Note: Effective 1/1/2013 - \$9.43

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: \$23.51

Supplemental Benefit Rate per Hour: \$9.43

Residential Building Class "B" Cleaner/Porter

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: \$20.71

Supplemental Benefit Rate per Hour: \$8.68

Supplemental Note: for new employee 0-12 months of employment - \$6.37; for new employee 13-24 months of employment - \$8.43

Effective 1/1/2013 - \$9.43; for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: \$21.28

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Residential Building Class "C" Handyperson

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Residential Building Class "C": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: \$22.83

Supplemental Benefit Rate per Hour: \$8.68

Supplemental Note: Effective 1/1/2013 - \$9.43

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: \$23.45

Supplemental Benefit Rate per Hour: \$9.43

Residential Building Class "C" Cleaner/Porter

Residential Building Class "C": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: \$20.65

Supplemental Benefit Rate per Hour: \$8.68

Supplemental Note: for new employee 0-12 months of employment - \$6.37; for new employee 13-24 months of employment - \$8.43

Effective 1/1/2013 - \$9.43; for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: \$21.23

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for work on a holiday plus the day's pay.

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Christmas Day

Vacation

6 months.....three (3) days
1 year.....ten (10) days
5 years.....fifteen (15) days
15 years.....twenty (20) days
21 years.....twenty-one (21) days
22 years.....twenty-two (22) days
23 years.....twenty-three (23) days
24 years.....twenty-four (24) days
25 years.....twenty-five (25) days
Plus two Personal Days per year.

SICK LEAVE

After 1 year of service.....ten (10) days per year

(Local #32 B/J)

BUILDING HVAC SERVICES OPERATOR

Engineer (Refrigeration)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$34.15**

Supplemental Benefit Rate per Hour: **\$15.44**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$35.18**

Supplemental Benefit Rate per Hour: **\$15.78**

Fireperson

Fireperson (Helper): Assists the Engineer

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$26.59**

Supplemental Benefit Rate per Hour: **\$15.09**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$27.39**

Supplemental Benefit Rate per Hour: **\$15.41**

Overtime Description

All hours worked on a holiday shall be paid at two and one half times the regular wage rate in lieu of the paid day off.

Overtime

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Saturday.
Time and one half the regular rate for Sunday.

Paid Holidays

New Year's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day
Plus six (6) floating Holidays

Vacation

6 months three (3) days
1 year ten (10) days
5 years fifteen (15) days
15 years twenty (20) days
21 years twenty-one (21) days
22 years twenty-two (22) days
23 years twenty-three (23) days
24 years twenty-four (24) days
25 years twenty-five (25) days

(Local #94)

CLEANER (PARKING GARAGE)

Garage Cleaner

Effective Period: 7/1/2012 - 6/30/2013
Wage Rate per Hour: \$10.00
Supplemental Benefit Rate per Hour: \$1.50

Overtime

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(NYC Administrative Code §6-109)

FUEL OIL

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (5th Year and above)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: \$30.11
Supplemental Benefit Rate per Hour: \$18.80

Effective Period: 12/16/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$30.61
Supplemental Benefit Rate per Hour: \$19.80
Supplemental Note: Effective 1/1/2013 - \$20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (4th Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: \$27.50
Supplemental Benefit Rate per Hour: \$18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: \$28.00
Supplemental Benefit Rate per Hour: \$19.80
Supplemental Note: Effective 1/1/2013 - \$20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (3rd Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: \$25.50
Supplemental Benefit Rate per Hour: \$18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: \$26.00
Supplemental Benefit Rate per Hour: \$19.80
Supplemental Note: Effective 1/1/2013 - \$20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (2nd Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: \$23.50
Supplemental Benefit Rate per Hour: \$18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: \$24.00
Supplemental Benefit Rate per Hour: \$19.80
Supplemental Note: Effective 1/1/2013 - \$20.42

Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (1st Year)

Effective Period: 7/1/2012 - 12/15/2012
Wage Rate per Hour: \$21.50
Supplemental Benefit Rate per Hour: \$18.80

Effective Period: 12/16/2012 - 6/30/2013
Wage Rate per Hour: \$22.00
Supplemental Benefit Rate per Hour: \$19.80
Supplemental Note: Effective 1/1/2013 - \$20.42

Overtime

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

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).

- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day

Triple time the regular rate for work on the following holiday(s).

- New Year's Day
- Thanksgiving Day
- Christmas Day

Paid Holidays

- New Year's Day
- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day
- Thanksgiving Day
- Christmas Day

Vacation

- Less than 75 days worked.....no vacation.
- 75 days worked, but less than 110 days worked in a calendar year.....five (5) days the following year.
- 110 days or more worked in a calendar year.....ten (10) days the following year.

SICK LEAVE:

1 day sick leave earned for each 40 days worked in the preceding calendar year for a maximum of five (5) days per calendar year.

(Local #553)

GARDENER

Gardener

Effective Period: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$17.04

Supplemental Benefit Rate per Hour: \$1.72

Overtime

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

LOCKSMITH

Locksmith

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.46

Supplemental Benefit Rate per Hour: \$5.89

Overtime

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

MEDICAL WASTE REMOVAL

Driver

Effective Period: 7/1/2012 - 3/31/2013

Wage Rate per Hour: \$17.75

Supplemental Benefit Rate per Hour: \$8.79

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: \$18.00

Supplemental Benefit Rate per Hour: \$9.34

Helper

Effective Period: 7/1/2012 - 3/31/2013

Wage Rate per Hour: \$14.00

Supplemental Benefit Rate per Hour: \$8.79

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: \$14.25

Supplemental Benefit Rate per Hour: \$9.34

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Tractor Trailer Driver

Effective Period: 7/1/2012 - 3/31/2013

Wage Rate per Hour: \$20.25

Supplemental Benefit Rate per Hour: \$8.79

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: \$20.50

Supplemental Benefit Rate per Hour: \$9.34

Overtime Description

Time and one half the regular hourly rate after an 8 hour day or after 40 hours in any work week. The seventh day of work in a workweek is paid at double time the regular hourly rate. Time and one half the regular hourly rate for work on a holiday plus days pay for below paid holidays.

Paid Holidays

Presidents' Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Vacation

1 year of service but less than five years.....10 days
5 years of service but less than ten years.....15 days
10 years of service.....16 days
11 years.....17 days
12 years.....18 days
13 years.....19 days
14 years.....20 days
20 years.....21 days
21 years.....22 days
22 years.....23 days
23 years.....24 days
24 years.....25 days
Plus 5 Personal Days

(Local #813)

MOVER – OFFICE FURNITURE AND EQUIPMENT

Heavy and Tractor Trailer Truck Driver

Tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$23.11

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$4.10

Light Truck Driver

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$18.08

Supplemental Benefit Rate per Hour: \$4.10

Laborer and Freight, Stock, and Material Movers, Hand

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$17.68

Supplemental Benefit Rate per Hour: \$4.10

Overtime

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

REFUSE REMOVER

Refuse Remover

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.62

Supplemental Benefit Rate per Hour: \$4.10

Overtime

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

SECURITY GUARD (ARMED)

Security Guard (Armed)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$27.75

Supplemental Benefit Rate per Hour: \$4.73

Supplemental Note: for new employee 0-30 days of employment - \$4.09; for new employee 31-120 days of employment - \$4.26; for new employee 121 days - 2 years of employment - \$4.37

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$28.00**

Supplemental Benefit Rate per Hour: **\$4.90**

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43; for new employee 121 days - 2 years of employment - \$4.54

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

Overtime Description

A guard who works a holiday is paid the regular rate plus receives the paid holiday.

Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

SECURITY GUARD (UNARMED)

Security Guard (Unarmed) 0 - 6 months

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$12.60**

Supplemental Benefit Rate per Hour: **\$4.37**

Supplemental Note: for new employee 0-30 days of employment - \$4.09; for new employee 31-120 days of employment - \$4.26

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§230 PREVAILING WAGE SCHEDULE

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$12.85

Supplemental Benefit Rate per Hour: \$4.54

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43

Security Guard (Unarmed) 7 - 12 months

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$13.10

Supplemental Benefit Rate per Hour: \$4.37

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$13.35

Supplemental Benefit Rate per Hour: \$4.54

Security Guard (Unarmed) 13 - 18 months

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$13.60

Supplemental Benefit Rate per Hour: \$4.37

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$13.85

Supplemental Benefit Rate per Hour: \$4.54

Security Guard (Unarmed) 19 - 24 months

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$14.10

Supplemental Benefit Rate per Hour: \$4.37

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$14.35

Supplemental Benefit Rate per Hour: \$4.54

Security Guard (Unarmed) 25 - 30 months

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$14.60

Supplemental Benefit Rate per Hour: \$4.73

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$14.85

Supplemental Benefit Rate per Hour: \$4.90

Security Guard (Unarmed) 31 months or more

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$14.75

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$4.73

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$15.15

Supplemental Benefit Rate per Hour: \$4.90

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

Overtime Description

A guard who works a holiday is paid the regular rate plus receives the paid holiday.
Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

Paid Holidays

New Year's Day
President's Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day

Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

WINDOW CLEANER

Window Cleaner

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$26.12

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$26.44

Supplemental Benefit Rate per Hour: \$9.51

Power Operated Scaffolds, Manual Scaffolds, and Boatswain Chairs

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$28.37

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$28.69

Supplemental Benefit Rate per Hour: \$9.51

Window Cleaner Apprentice (0 - 3 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$19.35

Supplemental Benefit Rate per Hour: \$0.00

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$19.59

Supplemental Benefit Rate per Hour: \$0.00

Window Cleaner Apprentice (4 - 7 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$20.92

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$21.18

Supplemental Benefit Rate per Hour: \$9.51

Window Cleaner Apprentice (8 - 11 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$22.17

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$22.44

Supplemental Benefit Rate per Hour: \$9.51

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

Window Cleaner Apprentice (12 - 15 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$23.43

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$23.72

Supplemental Benefit Rate per Hour: \$9.51

Window Cleaner Apprentice (16 - 17 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.70

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$25.01

Supplemental Benefit Rate per Hour: \$9.51

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

Martin Luther King Jr. Day

President's Birthday

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Personal Day

Vacation

After 7 months but less than 1 year of service.....5 days

1 year but less than 5 years of service.....10 days

5 years of service but less than 15 years of service.....15 days

15 years of service but less than 21 years of service.....20 days

21 years.....21 days

22 years.....22 days

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK
§230 PREVAILING WAGE SCHEDULE

3 years.....23 days
24 years.....24 days
25 years or more of service.....25 days
Plus 1 day per year for medical visit

SICK LEAVE:
10 days after one year worked. Unused sick days to be paid in cash.

(Local #32 B/J)

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SECTION 01000

**GENERAL
CONDITIONS**

APPLICABLE TO ALL CONTRACTS

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The ADDENDUM TO THE GENERAL CONDITIONS is contained in Volume 3 of the Contract Documents. Volume 3 contains the following:

- Addendum to the General Conditions
- Specifications

SECTION 01000 GENERAL CONDITIONS

PART 1 - GENERAL

1.01 Applicability of General Conditions

- A. Since there are several separate Contracts pertaining to the construction of this project, for convenience, the General Conditions are stated only once. These General Conditions are applicable to all Contracts and shall constitute an integral part of each separate Contract to the same extent as though they were repeated in full therein.
- B. The Contractor is advised that various sections of these General Conditions are amended by the Addendum to the General Conditions. This Addendum also includes various schedules referred to in these General Conditions (Schedules A through F). These schedules contain important information that is specific to this project. The Addendum, including Schedules A through F, is set forth in Volume 3 of the Contract Documents.
- C. Throughout these General Conditions, various responsibilities and obligations are assigned to each of the following four Contractors: (1) General Construction, (2) Plumbing, (3) Heating/Ventilating/Air-Conditioning/Fire Protection, and (4) Electrical. In the event the Project does not involve all four Contracts, the responsibilities and obligations of each omitted Contract shall be assigned to one of the Contracts which is included in the Project. The Addendum to the General Conditions specifies which Contractor shall perform the responsibilities and obligations of each omitted contract, as set forth in the General Conditions.

1.02 Scope and Intent

- A. DESCRIPTION OF PROJECT - Refer to the Addendum to the General Conditions for a description of this project.
- B. PROGRESS SCHEDULE
 - 1. Within 15 days after the Notice to Proceed, the Contractor for General Construction Work shall prepare a composite Job Progress Chart that shall indicate graphically and chronologically the time the various parts of the work of all Contracts shall commence and be completed. The Chart shall be in a reproducible form approved by the Commissioner.
 - 2. Immediately after the Notice to Proceed of their Contracts, the Contractors for Plumbing Work, Heating, Ventilating and Air Conditioning Work (HVAC) and Electrical Work, as applicable, shall furnish all necessary data to the Contractor for General Construction Work, and cooperate in all respects in connection with formulation of the Chart.
 - 3. The Chart shall show the sequence and interrelationship of each operation of all the Contracts.
 - 4. The Chart shall show the estimated time for fabrication and/or delivery of all materials and equipment required for the work.
 - 5. As directed by the Resident Engineer, the Contractors shall meet with each other and with the Resident Engineer to review and make the necessary adjustments to the composite Job Progress Chart, and to coordinate the work indicated thereon. (Article 12 of the Contract).
 - 6. When completed, the Job Progress Chart shall be signed and dated by each Contractor or their official representative. The Resident Engineer is authorized to sign the Chart for the Department of Design and Construction. Thereafter, the Chart shall be modified only with the Commissioner's approval. When directed by the Commissioner, the Chart shall be revised and updated. If necessary, a new revised Chart shall be prepared in the same manner as outlined above for the original Chart.

7. The approved Chart shall be distributed by the Contractor for General Construction Work, as follows: the original and two (2) copies to the Resident Engineer, two (2) copies to each Contractor, and two (2) copies to the Department of Design and Construction
 8. All Contractors shall consult the approved Progress Chart and install their work within the time limits indicated on the Chart.
 9. The Resident Engineer shall post in a prominent place in the field office a copy of the Chart and mark thereon the progress of the work, including the times when various parts of the work commenced and were completed.
- C. **COMPLETION OF WORK** - Work to be done under each separate Contract comprises the furnishing of all labor, materials, equipment and other appurtenances and obtaining of all regulatory agency approvals necessary and required to complete the construction work in accordance with the Contract.
- D. **OMISSION OF DETAILS** - All work called for in the Specifications applicable to each separate Contract but not shown on the Contract Drawings in their present form, or vice versa, is required, and shall be performed by the Contractor as though it were originally delineated or described. Such work is deemed included in the Bid Price.
- E. **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 shall be performed by the Contractor. Such work is deemed included in the Bid Price.
- F. **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, shall 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 shall be made upon that basis.
- G. **CONFLICT BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS** - Should any conflict occur in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated on the most expensive way of doing the work unless the Contractor shall have asked for and obtained a decision in writing from the Commissioner before the submission of the bid as to what shall govern.
- H. **COOPERATION BETWEEN CONTRACTORS** - Inasmuch as the completion of the project within the prescribed limit of time is dependent largely upon the close and active cooperation of all those engaged therein, it is therefore expressly understood and agreed that the Contractor shall lay out and install all work at such time or times and in such manner as not to delay or interfere with the carrying forward of the work of other Contractors. In the event of any dispute arising as to possible or alleged interference between the various Contractors which may retard the progress of the work, the dispute shall be adjudicated by the Commissioner, whose decision as to the party or parties at fault and as to the manner in which the matter may be adjudicated, shall be binding and conclusive on all parties.
- I. **"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 shall, unless expressed otherwise, imply the direction, requirements, permission, order, designation or prescription of the Commissioner.
- J. **"APPROVED," ETC.** - "Approved," "acceptable," "satisfactory," and words of similar import shall mean and intend approved, acceptable or satisfactory to the Commissioner.
- K. **CONFLICTS OF INTERESTS** - The Charter of the City of New York, Section 2604, provides a number of safeguards in relation to conflicts of interest. Such safeguards include, without limitation, the following: "No public servant shall receive compensation except from the City for performing any official duty or accept or receive any gratuity from any person whose interest may be affected by the

public servant's official action."

1. Other sections of the City Charter, the Administrative Code and the Penal Law are applicable in implementing the basic Conflicts of Interest Section and under certain circumstances penalties may be invoked against the donor as well as the recipient of any form of valuable gift.
2. Notice is hereby given that sections of the City Charter, the Administrative Code and the Penal Law alluded to herein shall apply under the terms of this Contract to circumstances relevant to conflicts of interest and shall be extended in application to subcontractors authorized to perform work, labor and services pursuant to this Contract and further, it shall be the duty and responsibility of the Contractors to so inform their respective subcontractors.

1.03 Provisions Referenced in the Contract

- 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 to the General Conditions, sets forth 1) the referenced Articles of the Contract, and 2) the specific requirements applicable to each respective Contract.
- B. Applications for Extensions of Time, as indicated in Article 13 of the Contract, shall 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 insure 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 shall 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 shall be accompanied by a schedule of the types and quantities of materials, and shall 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 shall 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 shall set apart and separately store at the place or places of storage all materials and shall clearly mark same "PROPERTY OF THE CITY OF NEW YORK", and further, shall 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 shall be stored at such locations as shall 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 shall 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 shall 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 shall be payable to the City of New York. It shall be in such terms and amounts as shall be approved by the Commissioner and shall be

placed with a company duly licensed to do business in the State of New York. The Contractor shall 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 shall 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 shall 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, shall 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 shall have and may exercise any and all other remedies at law for the recovery of such cost, charges and expenses. There shall be no increase in the Contract price for such costs, charges and expenses and the Contractor shall not make any claim or demand for compensation therefor.
6. The Contractor shall 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 shall 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, shall 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 and Specifications, the Contractor shall remove and replace, at Contractor's own cost, such defective or improperly incorporated material with materials complying with the Contract and Specifications. 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 therefor from the Comptroller. Failure on the part of the Contractor to submit satisfactory evidence that all such materials have been paid for in full, shall preclude the Contractor from payments under the Contract.
14. The Contractor shall include in each succeeding partial estimate requisition a summary of materials stored which shall 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 shall 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. **EXCISE AND TRANSPORTATION TAXES-** Pursuant to Section 6 of the "Information for Bidders", the Contractor may be exempted from the payment of Federal Excise and Transportation Taxes in accord with the following:

1. Excise Tax Exemption Certificate will be certified by the Department of Design and Construction where requested by the Contractor, for items which fall within the scope of the Contract and which may be exempt from Federal Excise Tax.
2. **TRANSPORTATION TAX** - The 3% Federal Tax has been repealed and is hereby deleted from the Contract. The 10% Federal Tax for travel remains in effect.

E. **CORRESPONDENCE** - There shall be six (6) copies of all letters of correspondence to the Department of Design and Construction. An additional copy of all correspondence shall be sent directly to the Resident Engineer at the job site.

F. **MOBILIZATION PAYMENT** - A line item for mobilization shall be allowed on the Contractor's Detailed Estimate 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 shall be deemed included in the total Contract Price. The Detailed Estimate shall reflect, and the Mobilization Payment shall be made, in accordance with the following schedule:

Contract Amount	Percent	Mobilization
Less than \$ 50,000 x	0 =	0
\$ 50,000 - \$ 100,000	= \$	6,000
\$ 100,001 - \$ 500,000 x	6 = \$	6,000 (min) - \$ 30,000 (max)

\$ 500,001 - \$ 2,500,000 x 5 = \$ 30,000 (min) - \$ 125,000 (max)
Over \$ 2,500,000 x 4 = \$ 125,000 (min) - \$ 300,000 (max)

The Contractor may requisition for one-half (1/2) of 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 bonds.
3. Approval by the Department of Design and Construction of the coordinated progress schedule for the project and the Contractor's Shop Drawing schedule.

The remaining balance of the Mobilization Payment may be requisitioned only after 10 percent (10%) of the Contract price, exclusive of the total amount of Mobilization Payments made or to be made hereunder, shall have been approved for payment.

1.04 Contract Drawings

- A. SCHEDULE C - The Contract Drawings are listed in Schedule C, which is set forth in the Addendum to the General Conditions. Such drawings referred to in the Contract, and in the applicable Specifications for the various Contracts bear the general title:

City of New York
Department of Design and Construction
Division of Structures

- B. DOCUMENTS FURNISHED TO THE CONTRACTOR - After the award of the Contract, the Contractor for General Construction Work will be furnished with five (5) sets of paper prints of all Contract Drawings mentioned in Paragraph A above.

- C. PRINTS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

Each Contractor, other than the Contractor for General Construction Work referred to in Paragraph B, will receive two (2) sets of paper prints of all Drawings listed in Paragraph A and three (3) sets of paper prints of all Contract Drawings applying directly to each Contractor's own Contract.

- D. Each Contractor will receive nine (9) complete sets of Specifications.
- E. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.
- F. COORDINATION AND COOPERATION - Since the Contracts are all related to the project, the Contractor shall consult and study the requirement of the Contract Drawings and Specifications of all Contracts furnished to the Contractor, 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.
- G. 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.
- H. COMPENSATION - Where Supplementary Drawings entail extra work, compensation therefor to the Contractor shall be subject to the terms of the "Contract". The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings.

- I. SUPPLEMENTARY DRAWING PRINTS - Three (3) copies of prints of these Supplementary Drawings will be furnished to the Contractor.
- J. COPIES TO SUBCONTRACTORS - The Contractor shall 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.
- K. CONTRACTOR TO CHECK DRAWINGS - The Contractor shall verify all dimensions, quantities and details shown on the Contract Drawings, Schedules, or other data received from the Commissioner, and shall notify the Commissioner of all errors, omissions, conflicts and discrepancies found therein. Notice of such errors shall be given before the Contractor proceeds with any work. Figures shall be used in preference to scale dimensions and large-scale drawings in preference to small-scale drawings.

1.05 Shop Drawings and Record Drawings

A. SHOP DRAWINGS

- 1. SUBMISSION OF SHOP DRAWINGS - For instructions relative to Shop Drawings involving electrical or mechanical work or equipment of any nature called for in any Contract, see the General Electrical Requirements and the General Mechanical Requirements.
- 2. SHOP DRAWINGS - The Contractor shall promptly prepare and submit layout detail and Shop Drawings of such parts of the work as are indicated in the Specifications or as required. These Shop Drawings shall be made in accordance with the Contract Drawings, Specifications and Supplementary Drawings, if any. The Shop Drawings shall 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, shall preferably be on sheets of the same size as the Contract Drawings, 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 shall be numbered consecutively and shall accurately and distinctly represent 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 thicknesses and finishes.
 - e. All other information required by the Commissioner.
- 5. TITLES AND REFERENCE - Shop Drawings shall 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, if any, under which it is, or they are required.
 - c. The locations or points 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.

NOTE: In addition to the above requirements, the Shop Drawings shall bear a stamp having the following wording:

FIELD MEASUREMENTS - The Contractor certifies that it has verified and supplemented the Contract Drawings by taking all required field measurements, that said measurements correctly reflect all field conditions and that this Shop Drawing incorporates said measurements.

6. THE SUBMISSION OF SHOP DRAWINGS - The Shop Drawings shall be accompanied by a letter of transmittal, in triplicate, containing the name of the Project, the name of the Contractor, the number of Drawings, titles and any other requirements. Re-submission of the same drawings shall bear the original number of the drawings and the original titles.
7. PRELIMINARY SUBMISSION - The Contractor shall submit one (1) set of sepia Shop Drawings to the Consultant Architect/Engineer for their approval. A satisfactory Shop Drawing will be stamped "Approved", be dated and one (1) copy thereof will be returned to the Contractor by letter. Should the Shop Drawing not be approved by the Consultant Architect/Engineer, the Commissioner will return the sepia Shop Drawings with the necessary corrections and changes to be made as indicated thereon.
8. REVISIONS - The Contractor must make such corrections and changes and again submit one (1) set of sepia drawings for the approval of the Consultant Architect/Engineer. The Contractor shall revise and resubmit the Shop Drawing as required by the Consultant Architect/Engineer until approval thereof is obtained. However, Shop Drawings which have been stamped "Approved As Noted" shall be considered an "Approved" Shop Drawing and NEED NOT be revised and resubmitted.

No work called for by the Shop Drawings shall be done until the approval of the said drawings by the Consultant Architect/Engineer is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractors which Shop Drawing indicated work related to, adjacent to, impinging upon, or affecting work to be done by other Contractors, shall be transmitted to the Contractors so affected. These approved Shop Drawings shall be delivered to the Resident Engineer for distribution to the affected Contractors at the job meetings and shall be so recorded in the minutes.

9. FINAL SUBMISSION - When approval of any Shop Drawing is obtained by the Contractor, it shall insert the date of the approval of the drawing and promptly furnish the Consultant Architect/Engineer with eight (8) additional prints of the approved Drawings. No work called for by the Shop Drawings shall be performed until the approval of the said drawings by the Commissioner is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractors which indicates work related to, adjacent to, impinging upon, or affecting work to be done by other Contractors, shall be transmitted to the Contractors so affected. These approved Shop Drawings shall be delivered to the Resident Engineer for distribution to the affected Contractors at the job meetings and shall be so recorded in the minutes.
10. VARIATIONS - If the Shop Drawings show variations from the Contract requirements because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in its letter of submittal. Approval of the Shop Drawings shall constitute approval of the subject matter thereof only and not of any structural apparatus shown or indicated.
11. CATALOGUE CUTS - Except as otherwise prescribed herein, the submission of catalogue cuts shall conform to the procedures specified for Shop Drawings.
 - a. PRELIMINARY SUBMISSION - The Contractor shall submit three (3) sets of catalogue cuts to the Consultant Architect/Engineer to approve. A satisfactory catalogue cut will be stamped

"Approved", be dated and one (1) copy thereof will be returned to the Contractor by letter. Should the catalogue cut not be approved by the Commissioner, the Commissioner will return one (1) set of such catalogue cuts with the necessary corrections and changes to be made indicated thereon.

- b. REVISIONS - The Contractor shall make such corrections and changes and again submit four (4) sets of the catalogue cuts, in duplicate, for the approval of the Commissioner. The Contractor shall revise and resubmit the catalogue cuts as required by the Consultant Architect/Engineer until approval thereof is obtained.

However, catalogue cuts which have been stamped "Approved As Noted" shall be considered an "Approved" catalogue cut and need not be revised and resubmitted.

- c. FINAL SUBMISSION - When approval of any catalogue cut is obtained by the Contractor, it shall insert the date of the approval and promptly furnish the Consultant Architect/Engineer with four (4) additional sets of the approved catalogue cuts.

12. RESPONSIBILITY OF CONTRACTOR - The approval of Shop Drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such Shop Drawings, nor for the proper fitting and construction of the work, nor of the furnishing of materials or work required by the Contract and not indicated on the Shop Drawings. Approval of Shop Drawings shall not be construed as approving departures from the Contract Drawings, Supplementary Drawings or Specifications.

13. SHOP DRAWINGS AND MATERIAL SAMPLES SCHEDULE - The Shop Drawings and Material Samples Schedule is set forth in Schedule F, which is included in the Addendum to the General Conditions. Completion of this Schedule shall be in accordance with Article 1.41 (A) of these General Conditions.

14. PROCEDURE FOR PREPARING, FORWARDING, CHECKING AND RETURN - of all Shop Drawings shall be, generally, as follows:

The Contractor shall make available to its subcontractors the necessary Contract Documents and have them determine dimensions and conditions in the field, particularly with reference to coordination with other trades or work under other Contractors. The Contractor shall direct its subcontractors to prepare Shop Drawings for submission to the Consultant Architect/Engineer in accordance with the requirements of these General Conditions. The Contractor shall also direct its subcontractors to "Ring Up" corrections made on all re-submissions for approval, so as to be readily seen, and that the symbol "sub" be used to identify the source of the correction or information that has been added.

The Contractor shall:

- a. Review and be responsible to the Commissioner, or the Commissioner's authorized representative, for information shown on subcontractor's Shop and Installation drawings and manufacturers' date, and also for conformity to Contract Documents.
- b. "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.
- c. Clearly designate which trade 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 Consultant Architect/Engineer.
- d. Stamp submissions "Recommended for Approval", date and forward to the Commissioner or the Commissioner's authorized representative.

In order to expedite Shop Drawing procedures, the Contractor shall write a Shop Drawing status letter directly to the Consultant Architect/Engineer, each week, containing the following subject matter:

- (1) A list of all Shop Drawings which have been sent to but not returned by the Architect or Engineer giving name of the subcontractor, drawing number, title and date of submission.
- (2) An indication of the desired priority of the return, if necessary.

NOTE: The status letter shall be prepared and sent at a given time each week, preferably Friday afternoon, to enable the Consultant Architect/Engineer to receive the letter on Monday morning. This procedure shall be maintained throughout the active Shop Drawing period of construction.

B. INTEGRATED DRAWINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor for General Construction Work shall provide to the Contractor for Heating, Ventilating and Air Conditioning Work reflected ceiling starting points or plans, beam soffit elevations, ceiling heights, roof openings, etc.
2. The Contractor for Heating, Ventilating and Air Conditioning Work shall prepare a drawing or drawings showing ductwork, heating and sprinkler piping. This drawing shall include location of grilles, registers, etc. and access doors in hung ceilings. Locations shall be fixed by elevations and dimensions from column center lines and/or walls.
3. The Contractor for Heating, Ventilating and Air Conditioning Work shall prepare and distribute to each of the other Contractors, the Resident Engineer and to the Consultant Architect a sepia of the above.
4. The Contractor for General Construction Work shall lay out on its sepia, the reflected ceiling plan, beam soffit elevations, ceiling heights, roof openings, etc.
5. The Contractor for Plumbing Work shall lay out its piping, valves, cleanouts, etc., indicating locations and elevations and shall indicate the necessary access doors.
6. The Contractor for Electrical Work shall indicate its fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.
7. The Resident Engineer will call as many meetings with the Contractors as are necessary to resolve any conflicts that become apparent. The Resident Engineer will call on the services of the Consultant Engineer or Architect where necessary. The Resident Engineer is responsible for the coordination of the Contract Drawings.
8. Upon resolution of the conflicts, each Contractor shall enter its own work on the Resident Engineer's sepia, which will become the Master or Integrated Drawing. The Master Sepia shall be signed by each Contractor to indicate its acceptance of the arrangement of the work.
9. A reproducible copy of the Master Integrated Drawing or Drawings will be prepared and distributed by the Contractor for Heating, Ventilating and Air Conditioning Work to each Contractor and to the Consultant Architect for information.
10. Each Contractor shall prepare its Shop Drawings in accordance with the Integrated Drawings. No work will be permitted without approved Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.
11. Contractors shall be held strictly accountable for cooperation in preparing the Integrated Drawing or Drawings.

C. RECORD DRAWINGS

1. The Department of Design and Construction, at the start of construction (kick-off meeting), will furnish to each Contractor at no cost a complete set of Contract Document mylars pertaining to the work to be performed under its Contract. It is the responsibility of each 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 drawings if necessary such as Addenda Drawings and Supplementary Drawings as may be necessary to indicate all work in detail as actually completed.

NOTE TO CONTRACTOR: All professional seals must be blocked out. Title box complete with project title and Consultants' names will remain.

2. Each Contractor shall maintain, during the progress of the work, an accurate record of the work as actually installed, on Record Drawings, on mylar, in ink. These Record Drawings shall be made available to the Resident Engineer upon request.

The Contractor's attention is particularly directed to the necessity of keeping accurate records of all subsurface and concealed work, so that the Record Drawings may contain this information in exact detail and location. Record Drawings should also show all connections, valves, gates, switches, cut-outs and similar operating equipment.

Before substantial completion payment, each Contractor shall furnish to the Commissioner one (1) complete set of mylar 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 sponsoring agency by Department of Design and Construction.

3. Record Drawings shall 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.
4. Each Record Drawing shall bear the legend "RECORD DRAWING" in heavy block lettering, one half (1/2) inch high, and contain the following data:

RECORD DRAWING

Contractor's Name _____

Contractor'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. RECORD DRAWING TITLE SHEET - Each Contractor shall prepare a title sheet, the same size as Record Drawings, which shall contain the following:
 - a. Heading:
The City of New York
Department of Design and Construction
Division of Structures
 - b. Capital Budget Project Number (CAPIS ID)

- c. Name and Location of Project
 - d. Contractor's Name and Address
 - e. Record of changes (a caption description of work affected, and the date and number of Change Order or other authorization)
 - f. List of Record Drawings
6. All changes from Contract Drawings shall be distinctly encircled and identified by Change Order number correlating to changes listed on the "Title Sheet." The Contractor shall show within the encircled areas the work as actually installed.
7. BULLETINS, OPERATING AND SERVICE MANUALS - Where the Contractor has submitted prints in the form of technical bulletins, operating and service manuals, or other printed matter as a Shop Drawing, having diagrams or drawings thereon of a material or equipment installed in the work, the Contractor shall furnish three (3) sets thereof so that the Commissioner may have all the necessary information for the proper operation maintenance and repair of the material and equipment and the ordering of spare parts. All bulletins and operating and service manuals shall be compiled and indexed in book form for each Contract.

1.06 Approval of Materials

- A. LOCAL LAWS - All materials, appliances and types or methods of construction shall be in accordance with the Specifications and shall in no event be less than that necessary to conform to the requirements of the Building Code of the City of New York, 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 shall be submitted to the Commissioner for approval, as early as possible, to afford proper review and analysis.
- C. REPUTE OF MANUFACTURER - No manufacturer will be approved for any materials to be furnished under the Contract unless it shall be of good reputation, shall have a plant of ample capacity and shall have successfully produced similar products. All required approvals for legal use of materials and equipment such as B.S.A. and M.E.A. must be obtained prior to installation.
- D. ALL MATERIALS - fixtures, fittings, supplies and equipment furnished under the Contract shall be new and unused, except as approved by the Agency, 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.
- E. INFORMATION TO SUPPLIERS - In asking for prices on materials under any item of the Contract, the Contractor shall 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 shall inform the manufacturer or dealer of all the General Conditions and requirements herein contained.
- F. STANDARD REFERENCES - Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard.
- G. REFERENCES - Reference to a technical society, organization or body may be made in the Specifications by abbreviations in accordance with the following list:

A.I.A. for American Institute of Architects

A.C.I.	for American Concrete Institute
A.G.A.	for American Gas Association
A.G.M.A.	for American Gear Manufacturer Association
A.I.E.E.	for American Institute of Electrical Engineers
A.I.S.C.	for American Institute of Steel Construction
A.S.A.	for American Standards Association
A.S.T.M.	for American Society for Testing Materials
A.W.S.C.	for American Welding Society Code
A.W.W.A.	for American Water Works Association
B.S. & A.	for New York City Board of Standards & Appeals
C.I.P.R.A.	for Cast Iron Pipe Research Association
B.G. & E.	for Bureau of Gas & Electricity of the City of New York
FED. SPEC.	for Federal Specification
I.P.C.E.A.	for Insulated Power Cable Engineer's Association
NAVY SPEC.	for Navy Department Specification
N.E.C.	for National Electric Code
N.E.M.A.	for National Electrical Manufacturers Association
N.Y.B.C.	for New York City Building Code
N.Y.E.C.	for New York City Electrical Code
N.Y. SPEC.	for New York City Department of Purchase Specification
P.P.S.	for Power Piping Society
S.A.E.	for Society of Automotive Engineers Standards
S.H.B.I.	for Steel Heating Boiler Institute

- H. 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.
- I. SAMPLES OF MATERIALS - The Contractor shall submit to the Commissioner for approval, samples of all materials specified to be used in the project.
1. For samples of materials involving electrical work of any nature, see the General Electrical Requirements.
 2. Samples shall be in triplicate, of sufficient size to show the quality, type, range of color, finish and texture of the material. However, in addition thereto, after approval, three (3) additional samples showing the material, color and texture of all interior finishes, including the finishes of exposed built-in equipment, trim, glazing, fittings and fixtures, etc., shall also be furnished. The sizes of these additional samples shall be as directed by and acceptable to the Commissioner.
 3. Each of the samples shall be labeled, bearing the name and quality of the material, the Contractor's name, date, Contract and project, and the related Specification or Contract Drawing reference to the samples submitted.
 4. A letter of transmittal, in triplicate, from the Contractor requesting approval must accompany all such samples.
 5. Transportation charges to the Commissioner's office must be prepared on all samples forwarded.
 6. Samples for testing purposes shall be as required in the Specifications.
- J. SAMPLES ON DISPLAY - When samples are specified to be equal to samples in the office of the Commissioner, they shall be carefully examined by the bidders and by those whom the bidder expects to employ for the furnishing of such materials.
- K. TIMELY SUBMISSIONS LOG/SCHEDULE - Samples shall 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 approval is received, in writing, from the Commissioner. All materials shall be furnished equal in every respect to the approved samples.

- L. THE APPROVAL OF ANY SAMPLES - will be given as promptly as possible, and shall be only for the characteristic color, texture, strength, or other feature of the material named in such approval, and no other. When this approval is issued by the Commissioner, 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 Commissioner, for the project.
- M. ACCEPTIBILITY OF TEST DATA - The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.
- N. 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.
- O. EQUIVALENT QUALITY OF MATERIALS - All materials and equipment which are designated in the Specifications by a number in the catalogue of any manufacturer or by a manufacturer's grade or trade name, are designated for the purpose of describing the article and fixing the standard or the quality and finish. Materials and equipment, which are, in the opinion of the Commissioner, the equivalent to that specified, will be acceptable.
- P. The submission of any material, or article, as the equal of the materials or articles set forth in the Specifications as a standard shall be accompanied by illustrations, drawings, descriptions, catalogues, records of tests, samples and any and all other information essential for judging the equality to the materials, finish and durability of that specified as standard, as well as information indicating satisfactory use under similar operating conditions.
- Q. MANUFACTURER'S DIRECTIONS - Where the Specifications provide that the manufacturer's directions are to be used, such printed directions shall be submitted to the Commissioner.
- R. COMMISSIONER TO SELECT INSPECTORS - Except as specifically provided in the Specifications, the Commissioner will select and designate all persons, firms, or corporations to make or witness each and every inspection, test or analyses, with or without reports.
- S. NOTICE - The Contractor shall 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 shall 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.
- T. NO SHIPPING BEFORE INSPECTION - The Contractor shall comply with the foregoing before shipping any material.
- U. CERTIFICATE OF MANUFACTURE - When the Commissioner so requires, the Contractor shall 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 shall 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 B.S.A., M.E.A., B.E.C. Advisory Board, etc.

- V. ACCEPTANCE - When materials or manufactured products shall comprise 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.
- W. TESTING COMPLIANCE - The testing personnel shall make the necessary inspections and tests, and the reports thereof shall 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.
- X. REPORTS - Six (6) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Commissioner as prerequisite for the acceptance of any material or equipment.
- Y. 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 without cost to the City.
- Z. FURNISH DESIGNATED MATERIAL - Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Specifications, the Contractor shall immediately proceed to furnish the designated material or equipment.
- AA. COST OF TESTS BORNE BY CITY - Where the City directs test 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.
- BB. COST OF TESTS BORNE BY CONTRACTOR - Where tests are specifically called for in the Specifications to be made by the Contractor, the cost thereof shall be borne by the Contractor and shall be deemed to be included in the Contract price. The expenses of the testing personnel assigned by the City shall not be the Contractor's obligation. The Contractor shall reimburse the City for expenditures incurred in the making of tests on materials and equipment submitted by the Contractor as the equivalent of that specifically named in the Specifications and rejected for non-compliance.

1.07 Delivery of Materials

- A. MATERIAL ORDERS - The Contractor shall furnish to the Commissioner a copy of each material order, indicating date of order and quantity of material, and shall also notify the Commissioner when materials have been delivered to the site and in what quantities.
- B. AMPLE QUANTITIES - The Contractor shall deliver materials in ample quantities to insure 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 shall be delivered with unbroken seals and shall bear proper labels.
- D. THE CONTRACTOR SHALL COORDINATE DELIVERIES - in order to avoid delaying or impeding the progress of the work of any related Contractor.
- E. STACKING - All materials shall be properly stacked in convenient places adjacent to the site, or where directed, and protected in a satisfactory manner. Stacked materials shall be so arranged as to not interfere with visibility of traffic control devices.
- F. OVERLOADING - If authority is given to store materials in any part of the project area, they shall be so stored as to cause no overloading.
- G. 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 other Contractor, the relevant Contractor shall remove and restack such materials at no additional cost to the City.

1.08 Temporary Structures

- A. **FIELD OFFICE FOR CONTRACTOR** - The Contractor shall establish a temporary field office for its own use at the site during the period of construction, at which readily accessible copies of all Contract Documents shall be kept.
- B. The field office shall 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** - In charge of each office there shall be a responsible and competent representative of the Contractor, duly authorized to receive orders and directions and to put them into effect.
- D. **TELEPHONE ARRANGEMENTS** - Arrangements shall be made by the Contractor whereby its representative may be readily accessible by telephone.
- E. **MATERIAL SHEDS** - used by the Contractor for the storage of its materials shall 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.
- F. **SUBSTANTIAL CONSTRUCTION** - All temporary structures shall be of substantial construction and neat appearance, and shall be painted a uniform gray unless otherwise directed by the Commissioner.
- G. **ADVERTISING PRIVILEGES** - The City reserves the right to all advertising privileges. The Contractor shall not cause any signs of any kind to be displayed at the site unless specifically required herein or authorized by the Commissioner.
- H. **CONTRACTOR'S SIGN** - The Contractor shall post and keep posted, on the outside of its field office, office or exterior fence or wall at site of work, a legible sign giving 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 event of an emergency at any time.

1.09 Surveys (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **LINE AND GRADE** - The City will establish a baseline and bench mark near the site of the work for use of the Contractor in connection with the performance of the work.
- B. **RESPONSIBILITY** - The Contractor shall establish all other lines and elevations required for its work and shall be solely responsible for the accuracy thereof.
- C. **SAFEGUARD ALL POINTS** - Each Contractor shall safeguard all points, stakes, grade marks and bench marks made or established by the Contractor on the work, shall re-establish same if disturbed and bear the entire expense of rectifying the work improperly installed due to not maintaining, not protecting or removing without authorization such established points, stakes, or marks.
- D. **CITY MONUMENTS AND MARKS** - No work shall be performed near City monuments or marks so as to disturb them until the said monuments or marks have been referenced or reset or otherwise disposed of by the relevant Agency or party who installed them.
- E. **FOUNDATIONS** - The Contractor for General Construction Work shall 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 shall 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 for General Construction Work shall establish the permanent lines of exterior walls. Such Contractor shall furnish promptly, 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 for General Construction Work shall 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, shall be a licensed Surveyor and shall be subject to the approval of the Commissioner. The Surveyor shall not be a regular employee of the Contractor, nor shall the Surveyor have any interest in the Contract. The Surveyor shall not be employed by the Contractor in laying out any work, it being intended that the Surveyor's certification shall represent an independent and disinterested verification of such layout. The Surveyor shall report to the Department of Design and Construction's 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 shall 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 drawings shall be noted on the final certificate and there shall be included 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 for General Construction Work shall submit to the Department of Design and Construction for submission to the Department of Buildings a final Survey by the licensed Surveyor showing the location of the new Structure, before completion of the Structure. This Survey shall 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 Structures on the plan, together with the location and boundaries of the lot or plot upon which the Structure is constructed, curb cuts, all yard dimensions, etc.

1.10 Contractor's Superintendent

- A. **SUPERINTENDENT** - The Contractor shall devote its time and personal attention to the work and shall employ and retain at the project site, from the commencement until the entire completion of the work, a Contractor's Superintendent competent and capable of maintaining proper supervision and care of the work and acceptable to the Commissioner, who, in the absence of the Contractor, and irrespective of any superintendent or foreman employed by any subcontractor, shall see that the instructions of the Commissioner are carried out.
- B. **REPLACEMENT** - The Contractor's Superintendent on the job shall not be changed or removed without the consent of the Commissioner.

1.11 Permits

The Contractor shall 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 shall be responsible for all costs in connection with such regulatory compliance, unless otherwise specified in the Contract.

1.12 Transportation

- A. **AVAILABILITY** - It shall be the duty of the Contractor to determine the availability of transportation facilities and dockage for the use of its employees, equipment and material 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 shall 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.

1.13 Sleeves And Hangers (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **COORDINATE TO PROGRESS SCHEDULE** - Contractors required to furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment necessary to be built into the work to be performed by the Contractor for General Construction Work, shall promptly furnish and set such sleeves or other materials in conformity with the requirements of the project.
- B. **COOPERATION OF CONTRACTORS** - All Contractors shall 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** - In the event that timely delivery of sleeves and other materials cannot be made, and to avoid delay, the affected 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 for General Construction Work shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors responsible therefore.
- D. **INSERTS** - The Contractor for General Construction Work 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.

1.14 Cutting And Patching

- A. **RESPONSIBILITY** - Each Contractor shall do all cutting, patching and restoration required by its work, unless otherwise particularly specified in the Specifications of its Contract.
- B. **RESTORE WORK** - Each Contractor shall restore any work they damage that is the work of another Contractor.
- C. **COMPETENT WORKERS** - All restoration work shall 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 shall be replaced immediately by competent workers.
- D. **REMOVALS** - Each 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 article on REMOVAL OF RUBBISH AND SURPLUS MATERIALS.

1.15 Temporary Heat (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

A. GENERAL

1. Definition - The provision of Temporary Heat shall mean 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 shall include the provision of heat to permit normal operations in such occupied areas.
 - a. The provision of Temporary Heat shall be in accordance with the temperature requirements set forth in Paragraph (c) below.
 - b. The provision of Temporary Heat shall 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 shall mean that minimum force required for the safe day to day operation of the system for the provision of Temporary Heat and shall include, without limitation, heating maintenance labor and/or Firewatch as required by NYC Fire Department regulations. Operating labor may be required seven (7) days per week and during other than normal 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 shall include the provision of domestic hot water at the same temperature as the system which is being replaced. Domestic hot water shall be provided in accordance with the phasing requirements set forth in the Contract Documents.
2. Responsibility – The Contractor responsible for the provision of Temporary Heat, and all expenses in connection therewith, shall be 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 Paragraph (b) below, each Contractor shall be responsible for the provision of its own Temporary Heat.
 - (2) Post Enclosure - Once the Commissioner determines that the building, or any portion thereof, has been enclosed, as set forth in Paragraph B below, the Contractor for Heating, Ventilating and Air Conditioning Work ("HVAC Work") shall be 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). The Contractor for HVAC Work shall, 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 for HVAC Work shall 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 for HVAC Work provided for herein is subject to the exception set forth in Paragraph H.3.b.(2) below.
 - 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 for HVAC Work shall be responsible for the provision of Temporary Heat, except as otherwise provided in Paragraph H.3.b.(2) below.

- (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 Paragraph H.3.b.(1) below, determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat and such Contractor shall be paid for the same in accordance with Paragraph H.3.b.(1).

B. ENCLOSURE OF STRUCTURES

1. Notification - The Contractor for General Construction Work shall notify all other Contractors and the Resident Engineer at least 30 days prior to the anticipated date that the building(s) will be enclosed.
2. Commissioner Determination - The Commissioner shall determine whether the building, or any portion thereof, has been enclosed. As indicated in Paragraph A above, once the building has been enclosed, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat. The Commissioner's determination with respect to building enclosure shall 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 shall 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 in Paragraph (c) below.
 - (2) Intermediate floor structures of multi-floor buildings shall 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 10 mil. plastic, 2) minimum 12 ounce waterproof canvas tarpaulins, or 3) a minimum three-eighths (3/8) inch thickness exterior grade plywood.
 - d. Temporary covers for openings shall be the responsibility of the Contractor for General Construction Work, and such work shall be deemed included in the Contractor for General Construction Work's bid price.

C. TEMPERATURE REQUIREMENTS

1. Unoccupied Buildings - The temperature requirement for the provision of Temporary Heat in unoccupied buildings shall be the GREATER of the following: 1) 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, shall be the GREATER of the following: 68 degrees Fahrenheit or the temperature requirement for the particular type of work set forth in the Contract Documents.

D. DURATION

1. The Contractor for HVAC Work shall be required to provide Temporary Heat 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 Contractor for HVAC Work shall 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 for HVAC Work shall include in its Total Bid 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 consecutive calendar days in Schedule A of the General Conditions. The Table set forth below indicates the number of full heating seasons that are deemed included in various contract durations, which are specified in consecutive calendar days (ccds). At a minimum, a full heating season shall extend from October 15th to April 15th.

Contract Duration	Full Heating Seasons Required
up to 360 ccds	1 full heating season
360 to 720 ccds	2 full heating seasons
more than 720 ccds	3 full heating seasons

E. METHOD OF TEMPORARY HEAT

1. The method of temporary heat shall be in conformance with all applicable laws, rules and regulations. Prior to implementation, such method shall be subject to the written approval of the Commissioner.
2. The method of temporary heat shall:
 - 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.
3. No open fires will be permitted.
4. Electric heating will not be permitted unless required by Contract Documents and Specifications or otherwise approved by the Commissioner.
5. Direct-fired equipment will be allowed in construction areas where the use of such equipment will not damage or deteriorate the construction or finishes or be harmful to persons working in the area.

F. TEMPORARY HEATING SYSTEM

1. The temporary system for the provision of Temporary Heat provided by the Contractor for HVAC

Work following enclosure of the building shall be complete including, but not limited to, torpedo blowers and/or propane heaters subject to provisions of paragraph E above), boilers and fuel storage, pumps, radiators, unit heaters, water and heating piping, insulation and controls. The temporary system for the provision of Temporary Heat shall be capable of maintaining the minimum temperature requirements set forth in Paragraph C above.

G. THE CONTRACTOR FOR GENERAL CONSTRUCTION WORK

1. The Contractor for General Construction Work shall coordinate with the Contractor for HVAC Work in the work of providing Temporary Heat, and shall so coordinate its operations as to insure sufficient and timely performance of the work under all Contracts. The Contractor for General Construction Work shall 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 for General Construction Work shall include all expenses in connection with the supply of water for Temporary Heat in its Total Bid Price. During the period in which Temporary Heat in an enclosed building is being furnished and maintained by the Contractor for HVAC Work, the Contractor for General Construction Work shall, in order to provide proper ventilating and drying, open and close the windows and other openings when necessary for the proper execution of the work and also when directed by DDC. The Contractor for General Construction Work shall maintain all permanent or temporary enclosures at its own expense.

H. THE CONTRACTOR FOR HVAC WORK

1. Use of Permanent Heating System for Temporary Heat after Building Enclosure
 - a. The Contractor for HVAC Work shall provide all labor and materials to promptly furnish and set all required equipment and 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 shall 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, shall be made by the Contractor for HVAC Work at his expense. The starting date for the warranty or guarantee period for such equipment shall be the date of Substantial Completion acceptance.
 - c. In the event that the Contractor for HVAC Work 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 for HVAC Work shall 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 shall be placed so as to comply with the requirements specified hereinbefore, and shall 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 for HVAC Work, including the placing of ancillary system equipment, shall be coordinated with the operations of all Contractors so as to insure sufficient and timely performance of the work of all Contractors. Once the permanent heating system is operating properly, the Contractor for HVAC Work shall remove all portions of the system for Temporary Heat which are not part of the permanent heating system.
3. Temporary Heat Allowance for Special Conditions or and/or Unforeseen Circumstances.
 - a. The City has established an allowance in the Contract for HVAC Work for payment of costs and expenses in connection with the provision of Temporary Heat as set forth herein. The amount of such allowance is set forth on the Bid Form for the Contract for HVAC Work and shall be included in the Total Bid Price of the Contractor for HVAC Work. The Contractor for HVAC Work shall 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 shall 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 for HVAC Work shall be responsible for the provision of Temporary Heat, as directed by the Commissioner. The City shall pay such Contractor for all costs for labor, material, and equipment necessary and required for the same. Payment shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall be as set forth in Paragraph (c) below.
- (2) In the event that after enclosure of the building, the Commissioner determines that (i) Contractors other than the Contractor for HVAC Work have not sufficiently advanced the work of their contracts that is necessary and required to permit the Contractor for HVAC Work to use the permanent or other heating equipment for the provision of Temporary Heat, and (ii) the Contractor for HVAC Work does not bear any responsibility for such other Contractors' failure to advance the work, the City shall pay the Contractor for HVAC Work for all differential costs for labor, material, and equipment necessary and required for the provision of a substitute system(s) for the provision of Temporary Heat or portions thereof in lieu of the permanent or other systems intended for Temporary Heat. Payment shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall be as set forth in Paragraph (c) below.
- (3) In the event the Commissioner determines that there is a need for maintenance of the permanent heating system by the Contractor for HVAC Work after written acceptance by the Commissioner of the work of all Contractors, and that the need for such maintenance is not the fault of the Contractor for HVAC Work, the Contractor for HVAC Work shall provide the required maintenance of the permanent heating system for the period of time directed by the Commissioner. The City shall pay the Contractor for HVAC Work 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 shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall 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 shall be limited to the direct cost of such fuel. The Contractor for HVAC Work shall not be entitled to any overhead and/or profit for such fuel costs. In order to receive payment for such fuel costs, the Contractor for HVAC Work must present original invoices for the same. DDC reserves the right to furnish the required fuel.

d. Deduction - In the event that any amount of the allowance set forth herein is expended for payment to the Contractor for HVAC Work under the circumstances set forth in Paragraph b.(2) above, the Commissioner shall deduct and retain such amount out of moneys that are due and owing hereunder to the other Contractor(s) responsible for the failure to advance the work, as determined by the Commissioner. In the event the amount expended from the allowance exceeds the total sum due and owing to such other Contractor(s), such excess shall be paid to the City by such other Contractor(s) immediately upon demand.

I. THE CONTRACTOR FOR ELECTRICAL WORK

1. The Contractor for Electrical Work shall be responsible for providing the items set forth below and shall include all expenses in connection with such items in its Total Bid Price. The Contractor for Electrical Work shall provide such items promptly when required and shall in all respects coordinate its work with the Contractor for General Construction Work and the Contractor for HVAC Work in order to facilitate the provision of Temporary Heat by the Contractor for HVAC Work.
 - a. The Contractor for Electrical Work shall 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 his Contract.
 - b. The Contractor for Electrical Work shall 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 by the Contractor for HVAC Work. Such power shall be provided by the Contractor for Electrical Work for the duration the Contractor for HVAC Work is required to provide Temporary Heat, as set forth in Paragraph D above.
2. In providing the items set forth in Paragraph 1 above, the Contractor for Electrical Work is advised that labor may be required seven (7) days a week and/or during other than normal working hours for the period of time required by seasonal weather conditions.

J. THE CONTRACTOR FOR PLUMBING WORK

1. The Contractor for Plumbing Work shall 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 his Contract. The Contractor for Plumbing Work shall include all expenses in connection with such items of work in its Total Bid Price. The Contractor for Plumbing Work shall provide such items of work promptly when required and shall in all respects coordinate its work with the Contractor for General Construction Work and the Contractor for HVAC Work in order to facilitate the provision of Temporary Heat by the Contractor for HVAC Work.
2. In the event portions of the permanent plumbing equipment furnished by the Contractor for Plumbing Work as part of the work of his Contract are used for the provision of Temporary Heat by the Contractor for HVAC Work, either during construction or prior to acceptance by the City of the complete plumbing system, the Contractor for Plumbing Work shall be responsible to provide such plumbing equipment to the City in near perfect condition and shall make any repairs required, other than for ordinary wear and tear on the equipment, at his expense. The starting date for warranty and/or guarantee period for such plumbing equipment shall be the date of Substantial Completion acceptance by the City.
3. For Projects requiring the installation of new and/or modified gas service, as well as associated meter installations, the Contractor for Plumbing Work shall 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).

1.16 Scaffolding and Platforms

- A. **CONFORMANCE:** Unless otherwise indicated, the Contractor for General Construction is responsible for providing, erecting, installing and maintaining all temporary scaffolding and platforms which shall comply with requirements of Chapter 33 (Safeguards During Construction or Demolition) of the NYC Building Code, NYC Local Law 52 of 2005, OSHA Construction Standard 1926 Subpart L, and furnishing the following items.
- B. **RESPONSIBILITY**
 1. A Jobsite Monitor who shall be a competent person, designated and employed by the contractor who has a daily presence on the site during scaffold use. This designee must possess and

maintain a valid New York City Department of Buildings supported scaffold certificate of completion. An alternate shall also be designated, in the event that the Jobsite Monitor is absent. The Jobsite Monitor shall:

- a. Verify completeness of documentation and submittals (as described below).
 - b. Verify that inspections are performed, including pull tests (see below), reports are filed and reported deficiencies are corrected.
 - c. Monitor trades using scaffold.
 - d. Limit access to scaffold areas that are tagged for non-use.
 - e. Inform trades of scaffold load limitations.
 - f. Monitor loading of decks.
 - g. Verify that any ties that are temporarily removed are properly restored in the same shift.
 - h. Verify that outriggers and planks that are moved are properly set up and secured.
 - i. Verify that all scaffold decks in use have proper access/egress.
 - j. Verify that all open sides of decks in excess of 14 inches have proper guardrails and toe-boards.
 - k. 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.
 - l. Keep a log of significant actions and events connected with the scaffolding.
2. The Contractor shall be responsible for erection, maintenance and dismantling of the scaffold / shed in conformance with the New York City Building Code and OSHA requirements, contract documents and engineering specifications. The Contractor shall also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.
 3. Scaffold Engineer is a New York State licensed PE engaged by the scaffold contractor / erector and responsible to ensure that the installation design conforms to the New York City Building Code and OSHA requirements, that the design comports with the capabilities of the components and the characteristics of the site, that scaffold loads on the host building, including netting, have been properly considered and that the design documents communicate information for erectors and users.
 4. Scaffold users are trade contractors assigned to work on the scaffold. Training certificates from a New York City Department of Buildings approved training provider are mandatory. These users have the duty to become familiar with the New York City Building Code and OSHA requirements germane to users, to obey the instructions of the Jobsite Monitor and inform the Jobsite Monitor of known hazards, non-conformances or violations.

C. JOBSITE DOCUMENTATION AND SUBMITTALS:

1. NYC Department of Buildings 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;
2. Site logistics plan / site safety plan;
3. Installation drawing(s), design and product data to be provided for all scaffold(s) and shed(s) must include, at a minimum:
 - a. Plan(s);
 - b. Elevation(s);
 - c. Duty load designation; "standard" (150 psf live load) or "heavy duty" (300 psf live load).
 - d. Details including base support, anchors and ties;
 - e. Notes and specifications including load limits, number of planked levels, tie spacing, netting, and sequence of installation and removal.
 - f. Anchorage into sound material.
 - g. Load limits based on pull tests;
 - h. Specifications for pull test(s), method, proof load and the number of trials;
 - i. Elevations, levels or heights, where anchorage is made into masonry;

- j. Specifications for frames, planks, screw jacks, anchors, and any other ancillary hardware;
- k. Samples for anchors, ties and netting;
- l. Sequence of operations for erection and demolition;
- m. Location plan, heights, widths, "jumps" over doorways and driveways;
- n. Specify size, maximum span and maximum spacing of headers and stringers;
- o. Specify legs, girts, braces, nailing and connections;
- p. All sidewalk sheds shall be designed, engineered, signed and sealed by a Professional Engineer licensed in the State of New York;
 - 1) Generic (not job specific) engineering drawings are satisfactory for standard sheds and arrangements.
 - 2) Special engineering is required for custom sheds, site-specific problems or non-standard arrangements.

D. INSPECTIONS:

1. Signed inspection reports shall be issued for each inspection and pull-test below, and shall be logged and maintained on site by the Jobsite Monitor for the duration of the project.
2. Pull testing shall be required during design, and during or post erection, where anchorage is made into masonry. The Scaffold Engineer shall specify the test method, proof load and the number of trials.
3. Sidewalk sheds shall be inspected after initial installation, major modification, or damage and thence every three months. Inspections shall be by a Scaffold Engineer for custom sheds and by a competent person employed by the Contractor for standard sheds.
4. Scaffolds shall be inspected by the Scaffold Engineer during erection, post-erection and prior to use and thence every three months. The Scaffold Engineer shall repeat inspections after major alteration/modification, damage.
5. A qualified person assigned by the Contractor shall 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.
6. A qualified person assigned by the Contractor shall 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.
7. Scaffolds shall be inspected daily by the Jobsite Monitor or alternate prior to use by scaffold users.
8. At the completion of the project, submit all inspection documents to the Commissioner for record purposes.

E. LADDERS AND STAIRS: The Contractor for General Construction Work shall 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.

F. ACCESS AND EXITS: The ladders or temporary stairs shall 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.

1.17 Hoists and Hoistways

A. RESPONSIBILITY - The Contractor for General Construction Work shall provide adequate numbers of material hoists for the most expeditious performance of all parts of its work. All other Contractors are required to provide their own facilities for the hoisting of materials under their respective Contracts. However, these Contractors may make arrangements, whenever possible, with the Contractor for General Construction Work for the use of its hoist upon such terms and conditions as it may prescribe.

- B. LOCATIONS - No hoists shall be constructed at such locations as will interfere with, or affect the construction of, floor arches, or the work of other Contractors. 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 shall 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 meets with the Building Code of the City of New York and the approval of the Commissioner, and providing further it entails no interference with the progress of the work of any Contractor.
- D. PROTECTION FOR INTERIOR HOISTS - All interior material hoistways shall be enclosed on each floor and shall be adequately protected with appropriate safety guards. In no event shall the protection be less than that required by law.

1.18 Certificates of Approval

- A. RESPONSIBILITY - Each Contractor shall be responsible for and shall obtain all final approvals for the work installed under its 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 shall be forwarded to the Commissioner through the Resident Engineer before final acceptance of the work of the Contract.

1.19 Acceptance Tests

- A. GOVERNMENTAL AGENCIES - All equipment and appliances furnished and installed under the Contract shall conform with the requirements of the Specifications, and shall 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 TEST - Whenever the Specifications and/or any governmental agency having jurisdiction requires the acceptance test, the Contractor shall give written notice to all concerned 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 shall 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 shall 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 Controlled 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 shall only proceed as directed by the Resident Engineer. Additional costs resulting from retesting, reinspecting, replacing of material and/or damage to the work of other trades and any delay caused to the schedule shall be borne by the Contractor.

1.20 Progress Photographs (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. PHOTOGRAPHER - The Contractor for General Construction Work shall employ and pay for the services of a competent photographer who shall take photographs showing the progress of the work.
- B. PHOTOGRAPHS - There shall be four (4) photographs taken each month from the commencement of the Contract to the time of completion. These photographs shall show as far as possible, the work

completed within and on the exterior of the structure. The first series of photographs shall be taken prior to the actual commencement of work at the site. In addition thereto before final payment, there shall be six (6) photographs taken of unobstructed views of the completed project or projects and site, as directed by the Commissioner and after all scaffolding, hoists, shanties, field offices or other temporary work has been removed and final cleaning done. (For demolition work included in the Contract there shall be four (4) photographs taken before commencement of demolition operations; four (4) at the mid-point of operations; and four (4) at the completion of demolition operations). The prints shall be 8" x 10" gloss finish, mounted with a one (1) inch binding flap of muslin on the left side. They shall be marked on the back with date of exposure; the title of the project; and the specific location. Three (3) copies of each photograph shall be furnished free of charge to the Department of Design and Construction. Photographs shall be taken as ordered by the Commissioner.

1.21 Job Meetings

- A. MEETINGS SCHEDULE - Meetings shall be held as scheduled by the Resident Engineer in his office at the site, at which time Contractors for all separate Contracts shall have their representatives present to discuss all details relative to the execution of the work.
- B. ACCOMODATIONS - The Contractor for General Construction Work shall provide ample tables and chairs to accommodate all present at the meetings, and table space for Contract Drawings.
- C. AGENDA - The Resident Engineer shall preside over these meetings. Prior to each meeting, the Resident Engineer will consult with the Contractors 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 each Contractor will then dictate a brief statement for the record.

The Contractor for General Construction Work shall furnish all necessary typing and printing of the minutes prepared by the Consultant Architect/Engineer. Ample copies of the printed minutes shall be furnished to the Resident Engineer for distribution to all Contractors and representatives of the Commissioner.

- D. COORDINATION - Job meetings shall also be called by the Contractor for General Construction Work for the purpose of coordinating, expediting and scheduling the work of all Contracts in accordance with the master coordinated Job Progress Chart. All Contractors and their subcontractors, material suppliers or vendors whose presence is necessary, are required to attend. These meetings may, at the discretion of the Contractor for General Construction Work, be held at the same place and immediately following the Job Meetings held by the Resident Engineer. Minutes of these meetings shall be recorded, typed and printed by the Contractor for General Construction Work and distributed to all parties concerned.

1.22 Guarantees and Warranties - Refer to the Addendum to the General Conditions for the applicability of this article.

- A. SCHEDULE B - Requirements for guarantees and warranties for the Project are set forth in Schedule B, which is included as part of the Addendum to the General Conditions.
- B. FORM - For all guarantee requirements set forth in Schedule B, the Contractor shall provide a written guaranty, in the form set forth on the following page.

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

Subscribed and sworn to before me this

day of _____, year _____

Notary Public

1.23 Removal of Rubbish and Surplus Materials

- A. RUBBISH - Rubbish shall not be thrown from the windows or other parts of the project. Mason's rubbish, dirt and other dust-producing material shall be wetted down periodically.
- B. LOCATION - Each Contractor shall sweep up and deposit, at a location designated on each floor by the Contractor for General Construction Work, all of its rubbish, debris and waste materials, as it accumulates and when directed by the Resident Engineer. Wood cratings shall be broken up, neatly bundled, tied and stacked ready for removal and be deposited at a location designated on each floor by the Contractor for General Construction Work.
- C. LABORERS - The Contractor for General Construction Work shall be responsible for the removal of all rubbish, etc., from the site. The Contractor shall remove from the designated locations all piles of rubbish, debris, waste material and wood cratings as they accumulate and when directed by the Resident Engineer, and shall remove them from the site. The Contractor shall employ and keep engaged for this purpose an adequate number of laborers.
- D. SURPLUS MATERIALS - Each Contractor shall remove from the site all surplus materials when there is no further use for same.
- E. TOOLS AND MATERIALS - At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly removed.

1.24 Cleaning

Each Contractor shall thoroughly clean all equipment and materials furnished and installed and shall deliver such materials and equipment undamaged in a clean and new appearing condition at time of substantial completion.

1.25 Inspections by Other City Agencies

- A. LETTER OF COMPLETION - Just prior to substantial completion of this 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, each Contractor will be required to arrange for all final inspections by the inspectional staff of the Department of Buildings 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.

1.26 Security Guards/Fire Guards on the Site (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. SECURITY GUARDS (WATCHMEN)
 - 1. The Contractor for General Construction Work shall provide competent Security Guards on the site until final completion of the project or earlier if so notified in writing by the Commissioner. The Security Service shall commence with the start of work. There shall be no less than one (1) Security Guard on duty every day, including Saturdays, Sunday and Holidays, 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 trades. This exception during the working day shall not apply after the finishing painting of the plaster work is commenced; thereafter, not less than one (1) Security Guard shall be on duty continuously, 24 hours a day, until final completion of the project or earlier if so notified in writing by the Commissioner.

2. Every Security Guard shall be required to hold a "Certificate of Fitness" issued by the Fire Department. Every Security Guard shall, during their tour of duty, perform the duties of Fire Guard in addition to their security obligations.
 3. Should the Commissioner find that any Security Guard is unsatisfactory, such guard shall be replaced by the Contractor for General Construction Work upon the written demand of the Commissioner.
 4. Each Security Guard furnished by the Contractor for General Construction Work shall be instructed by the Contractor for General Construction Work to include in their duties the entire construction site including the Field Office, temporary structures, and equipment, materials, etc.
 5. Should the Contractor for General Construction Work or any other Contractor consider the security requirements outlined above inadequate, it shall 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 who provides the additional protection.
 6. Nothing contained in this Article shall diminish in any way the responsibility of each Contractor 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 for General Construction Work shall employ Security Guards/Fire Guards at all times, 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 shall be borne by the Contractor for General Construction Work.
- C. RESPONSIBILITY - All Contractors will be responsible for safeguarding and protecting their own work, materials, tools and equipment.

1.27 Contractor's Daily Reports

- A. DAILY REPORTS - As soon as the Contractor has started work on the Project, it shall submit to the Resident Engineer written daily reports of the work performed the previous day by any of its employees, including the employees of its subcontractors.
- B. INFORMATION - The reports shall be prepared by the Contractor's Superintendent and shall bear the Contractor's Superintendent signature. Each report shall contain the following information:
1. The type of materials and/or major equipment being installed by the Contractor and the total number of employees working in each category on that particular day.
 2. The names of the subcontractors working and the type of materials and/or major equipment being installed by each, together with the total number of employees working for each subcontractor on that particular day.
 3. The major construction equipment being used by each Contractor and/or subcontractor.

1.28 Alternate or Substitute Equipment

- A. In general, the Contract Drawings and Specifications show and describe arrangements suitable for the specific items of equipment either named or described. In the event that a Contractor submits for approval, and receives such approval, a device or piece of equipment which requires connections (vacuum, gas, steam, water, air, electric, etc.) or arrangements of these services, differing from those indicated or described in the Contract Documents, it shall be incumbent upon the Contractor submitting the alternate or substitute equipment to give timely notice to the other Contractors involved so that they may make suitable alterations in the work to accommodate the substitute or alternate equipment. The Contractor making the substitution shall be responsible for any and all additional

costs incurred by any of the Contractors by virtue of the substitution of equipment for the equipment named or described in the Contract Documents.

1.29 Sleeve and Penetration Drawings (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- 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 Contractors for the engineering trades (Plumbing, Heating, Ventilating and Air Conditioning, and Electrical) shall submit to the Department of Design and Construction 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 that it may be determined if such penetrations will materially weaken the project's structure. The sketch will be stamped and returned if approved and/or comments will be transmitted. The engineering Contractors shall continue to submit sketches as the pouring schedule and the concrete work progresses and, until approvals for the penetration sketches have been given, shall not predicate their layout work on unapproved sketches.

1.30 Location of Partitions (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. Within three (3) weeks after the concrete slabs have been poured on each floor level, the Contractor for General Construction Work shall immediately locate accurately all of the partitions, including the door openings, on the floor slabs in a manner approved by the Resident Engineer.

1.31 Furniture and Equipment

- A. RESPONSIBILITY - Each Contractor is responsible for moving all loose furniture and/or equipment in all areas when 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.

1.32 Overtime Work (Ordered by Commissioner)

- A. OVERTIME - The Commissioner reserves right to order and pay for overtime work.
1. The Commissioner can order overtime work when in the Commissioner's opinion, delay occurs and such delay is not the fault of the Contractor, or
 2. When work is of such an important nature that delay in carrying such work to completion would result in serious disadvantage to the public.
- B. ORDER FOR OVERTIME WORK - When overtime work is ordered by the Commissioner, such "Order" will be issued by the Commissioner on a special form letter over the signature of the Commissioner.
- C. CONTRACTOR'S PROCEDURE PRIOR TO COMMENCING WORK
1. Make immediate application to the Commissioner of Department of Labor, State of New York, for dispensation in accordance with Subdivision 2 of Section 220 of the Labor Law.
 2. Upon receipt of such dispensation, proceed expeditiously with ordered overtime work.

1.33 Compliance with OSHA Regulations

These Contract Documents and the work hereby contemplated shall be governed, at all times, by the following Federal Laws:

- A. William Steiger Occupational Safety and Health Act of 1970, Public Law 91-596;

- B. Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
- C. Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

1.34 Temporary Services

PART A (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. TEMPORARY WATER - during construction shall be furnished in the following manner:
 - 1. Immediately after the Contractor for General Construction Work has been ordered by the Commissioner to start work, it shall file an application with the Dept. of Environmental Protection for the schedule of charges for water use during construction. The Contractor for General Construction Work will be responsible for payment of water charges.
 - 2. Immediately after the Contractor for Plumbing Work has been ordered by the Commissioner to start work, it shall file an application with the Department of Environmental Protection's Bureau of Water Supply and obtain its permit to install the temporary water supply system. The system shall be installed and maintained for the use of all Contractors. A copy of the above mentioned permit shall be filed with the Commissioner. The Contractor for Plumbing Work shall 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 for Plumbing Work shall 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 for Plumbing Work shall take the necessary precautions to prevent the temporary systems from freezing.
- B. TOILET FACILITIES - both exterior and interior, for the use of all Contractors, shall be furnished and installed in the following manner:
 - 1. Toilet fixtures shall be furnished, installed and maintained in a satisfactory operating condition by the Contractor for Plumbing Work.
 - 2. Enclosures for the toilet fixtures shall be erected and maintained by the Contractor for General Construction Work.
 - 3. Heating for the enclosures shall be furnished, installed and maintained by the Contractor for General Construction Work.
 - 4. Electric lighting for the enclosures shall be furnished, installed and maintained by the Contractor for Electrical Work.
 - 5. The Contractor for General Construction Work shall keep the temporary toilet fixtures and enclosures in a clean and sanitary manner.
 - 6. No Contractor shall cause any sanitary nuisances to be committed by its employees in or about the work. Each Contractor shall enforce all sanitary regulations of the City and State Health Authorities.
- C. OVERTIME USE - Whenever any Contractor(s) work before or after the regular work hours hereinafter specified under Subparagraph D, or on a Saturday, Sunday or Holiday of any trade, such Contractor(s) shall pay the Contractor for Plumbing Work for the activation of the temporary water system and toilet facility services during such overtime periods. When more than one (1) Contractor is involved in overtime work, the costs thereof shall be prorated as determined by the Resident Engineer. When overtime is required by any or all Contractors on the work, the provisions for payment for regular time use of the temporary water supply system as specified in Subparagraph D shall apply.

- D. **ACTIVATION** - The Contractor for Plumbing Work shall bear the cost of keeping the temporary water supply system activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning, to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week which is established as a regular working day for aforementioned trades and holds until completion and final acceptance of the work of the Contractor for Plumbing Work or until the services are terminated by instructions from the Commissioner.

PART B (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **WATER** - The Contractor for General Construction Work will be responsible for payment of water charges. Billing will be in accordance with the Department of Environmental Protection schedule of charges for Building Purposes.
- B. **ELECTRICITY** - for temporary light and the operation of small tools, is available in the area of this project and will be furnished to the Contractor for General Construction Work by the Contractor for Electrical Work without cost.
- C. **TOILET FACILITIES** - The Contractor for General Construction Work shall arrange with the Commissioner for the temporary use of certain toilets or washrooms within the project for the use of all employees during the execution of the work.
- D. **MAINTENANCE** - The Contractor for General Construction Work shall maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs due to misuse.
- E. **NUISANCES** - The Contractors shall not cause any sanitary nuisance to be committed by its employees in or about the work, and shall enforce all sanitary regulations of the City and State Health Authorities.

1.35 Temporary Use, Operation and Maintenance of Elevators during Construction

PART A - FOR NEW BUILDINGS UP TO AND INCLUDING 15 STORIES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. **INSTALLATION** - The Contractor for General Construction Work shall install and complete, as indicated herein, one (1) selected main elevator in the Project for temporary operation by the Contractor for General Construction Work for the transporting of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction of work at the project. The Contractor for General Construction Work shall furnish, install and maintain for such elevators, 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 and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall 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 for General Construction shall 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. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of the temporary elevator or parts utilized in connection therewith, if required.

- C. **ACTIVATION TIME** - The Contractor for General Construction Work shall keep the temporary elevator activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.
- D. **COMMENCEMENT OF SERVICE** - The Contractor for General Construction Work shall begin to provide temporary elevator service using the selected main passenger elevator no later than eight (8) weeks (40 working 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 (15 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed the following work shall have been completed:
1. The shaft shall have been completely enclosed by either the permanent or a temporary enclosure meeting the requirements of the law.
 2. The machine room shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
 3. There shall have been installed on all floors at the shaftway entrances to the elevator, solid substantial frames and either sliding or swing doors with substantial hardware and door locks and any necessary approved wire mesh barricades for adjacent shaftways.
 4. There shall have been furnished and installed solid substantial enclosures at front, back, sides and top of car platform enclosure, with emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION** - The Contractor for Electrical Work, not later than 20 calendar days after the machine room roof slab or that portion of its surrounding the elevator has been placed, shall have furnished and installed temporary or permanent power and light feeders as required for the elevator used for temporary service and shall have connected 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 shaftway and for the car control and signal traveling cables. The Contractor for Electrical Work shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- F. **REMOVAL** - When elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor for General Construction Work shall remove the temporary enclosures and all temporary elevator equipment and promptly proceed with the installation of the permanent equipment as is required under the Contract.
- G. **INSPECTION** - Before temporary elevator equipment has been removed, a joint inspection of the equipment shall be made by the Contractor for General Construction Work 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 for General Construction Work shall furnish and install new governor and compensating ropes, new traveling cables and new controller parts, etc. The car and counterweight safeties shall 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 shall be installed and payment therefor will be made in accordance with Article 26 of the Contract.
- H. **REPLACEMENT** - The Contractor for General Construction Work shall replace with new, any of the equipment or parts of the temporary elevator installation that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheave spaces used for temporary operation of elevators shall be thoroughly

cleaned. Where lubricated rails are used they shall 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., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.

- I. COSTS - The Contractor for Electrical Work shall pay the costs of all electrical current used for operating the temporary elevators. The Contractor for General Construction Work shall provide all necessary conduit and wiring connections for the proper operation of the elevator and the signaling of the temporary elevators.
- J. LIMITATIONS OF USE - The temporary elevator shall not be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representatives of City Departments and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the various Contractors 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. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged damage to the elevator installation within 24 hours after the elevator has been employed for the hoisting of materials by the particular Contractor(s).
- K. PAYMENT FOR USE - The Contractor for General Construction Work shall be paid for its operation and maintenance of the temporary elevator or permanent elevator used for temporary service at the daily rate indicated under the Item of its Contract. All other costs in connection with the elevator installation and equipment, excepting electrical work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- L. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide the temporary elevator service described in this section beginning with the 41st working 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 for General Construction Work.
- M. OVERTIME USE - All Contracts. Whenever any Contractor or Contractors work before or after the regular work hours as indicated in Paragraph B above, or on a Saturday, Sunday or Holiday, such Contractor or Contractors shall pay the Contractor for General Construction Work for the operation and maintenance of the temporary elevator, if required by such Contractor or Contractors, at the daily rate indicated in the Contract but increased to reflect the difference between regular wage rates and overtime wage rates. The basic hourly charge shall be considered as one ninth (1/9) of the amount shown in the Item of the Bid form of the General Construction Work Contract. The City will not pay any Contractor for such overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

PART B - FOR NEW BUILDINGS OVER 15 STORIES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. INSTALLATION - The Contractor for General Construction Work shall install and complete, as indicated herein, two (2) selected main elevators in the Project for temporary operation by the Contractor for General Construction Work for the transporting of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction over work at the project. The Contractor for General Construction Work shall furnish, install and maintain for such elevators, 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 and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall 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 will not be operated simultaneously.

- B. **RESPONSIBILITY** - The Contractor for General Construction shall 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. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of the temporary elevator or parts utilized in connection therewith, if required.
- C. **ACTIVATION TIME** - The Contractor for General Construction Work shall keep the temporary elevator activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.
- D. **LOW RISE ELEVATOR** - The Contractor for General Construction Work shall begin to provide temporary elevator service using one (1) selected main passenger elevator no later than six (6) weeks (30 working days) after the 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) working days, after the 12th Floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped the following work shall have been completed:
1. The shaft shall have been completely enclosed up to the 12th Floor by either the permanent or a temporary enclosure meeting the requirements of the law.
 2. A temporary machine room enclosure shall have been provided at the 11th Floor and shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
 3. There shall have been installed on all floors up to and including the 9th Floor at the shaft entrances to the elevator, solid substantial wood frames and either sliding or swing doors with substantial hardware and door locks, also any necessary approved wire mesh barricades for adjacent shaftways.
 4. There shall have been furnished and installed solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION** - The Contractor for Electrical Work, not later than 10 calendar days after the 12th Floor slab or that portion of it surrounding the elevator, has been poured and stripped, shall have furnished and installed temporary or permanent power and light feeders as required for the elevator used for temporary service and shall have connected such feeders to the terminals on the starter panels or controllers in the temporary machine room, to the low voltage transformers and car light outlets in the center of the shaftway and for the car control and signal traveling cables. The Contractor for Electrical Work shall make all these required connections as soon as the Equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- F. **HIGH RISE ELEVATOR** - The Contractor for General Construction Work shall begin to provide temporary elevator service to all floors, using a selected main passenger elevator, no later than eight (8) weeks (40 working 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 (15 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed, the following work shall have been completed:

1. The shaft shall have been completely enclosed by either the permanent or temporary enclosure, meeting the requirements of the law.
 2. The machine room shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
 3. There shall have been installed on all floors at the shaftway entrances to the elevator, solid substantial frames and either sliding or swing doors with substantial hardware and door locks, also any necessary approved wire mesh barricades for adjacent shaftways.
 4. There shall have been furnished and installed, solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- G. The Contractor for Electrical Work, not later than 20 calendar days after the machine room slab or that portion of it surrounding the elevator shaft has been placed, shall have furnished and installed temporary or permanent power and light feeders as required for the high rise elevator to be used for temporary service and shall have connected 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 shaftway.
- The Contractor for Electrical Work shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- H. When the high rise elevator is completed and ready for temporary operation, the low rise temporary elevator shall be shut down.
- I. When one (1) or more elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor for General Construction Work shall remove the temporary enclosures and all temporary elevator equipment, and promptly proceed with the installation of the permanent equipment as is required under the Contract.
- J. Before temporary elevator equipment has been removed, a joint inspection of the equipment shall be made by the Contractor for General Construction Work 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 for General Construction Work shall furnish and install new governor and compensating ropes, new traveling cables, new controller parts, etc. The car and counterweight safeties shall 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 shall be installed and payment therefor will be made in accordance with Article 26 of the Contract.
- K. The Contractor for General Construction Work shall replace with new, any of the equipment or parts of the temporary elevator installations that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheaves spaces used for temporary operation of elevators shall be thoroughly cleaned down. Where lubricated rails are used they shall 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., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.
- L. The Contractor for Electrical Work shall pay the costs of all electrical current used for operating the temporary elevators. The Contractor for General Construction Work shall provide all necessary conduits and wiring connections for the proper operation of the elevators and the signaling of the temporary elevators.

- M. No temporary elevator shall be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representatives of City Departments and other governmental agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specific times to the various Contractors to hoist materials which, in the Resident Engineer's opinion, will not overload or damage the elevator installation, but only after such time as all plastering has been completed from the second floor up. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged damage to the elevator installation within 24 hours after the elevator has been employed for the hoisting of materials by the other Contractors.
- N. The Contractor for General Construction Work shall be paid for its operation and maintenance of each temporary elevator or permanent elevator used for temporary service at the daily rate indicated under the item of its Contract. All other costs in connection with elevator installation and equipment, excepting Electrical Work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- O. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide the temporary elevator service described in this Section beginning with the 31st working day after the 12th Floor slab, or that portion of the 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 for General Construction Work.
- P. OVERTIME USE - ALL CONTRACTS. Whenever any Contractor(s) work before or after the regular work hours as indicated in Subparagraph B above, or on a Saturday, Sunday or Holiday, such Contractor or Contractors shall pay the Contractor for General Construction Work for the operation and maintenance of the temporary elevator, if required by such Contractor or Contractors, at the rate indicated in the Item of the bid form of the General Construction Work Contract but increased to reflect the difference between regular wage rates and overtime wage rates. The basic hourly charge shall be considered as one ninth (1/9) of the amount shown in the item of the General Construction Work Contract. The City will not pay any Contractor for such overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

PART C - EXISTING BUILDINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. The Contractor for General Construction Work may use, at the Commissioner's discretion, one (1) selected elevator in the project for temporary operation by the General Construction Work Contractor for the transportation of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction over work at the Project. The Contractor for General Construction Work shall maintain for such elevators, all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices hand reset target annunciators, signal devices, and all other permanent or temporary parts. The installation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. The Contractor for General Construction shall 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. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of

the temporary elevator or parts utilized in connection therewith, if required.

- C. The Contractor for General Construction Work shall keep the temporary elevator activated from a period of time of 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.
 - D. The Contractor for General Construction Work shall replace with new any of the equipment or parts of the elevator for temporary operation installation that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheave spaces used for temporary operation of elevators shall be thoroughly cleaned down. Where lubricated rails are used they shall 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., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.
 - E. The elevator for temporary operations shall be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representative of City Departments and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the various Contractors to hoist materials which, in the Resident Engineer's opinion, will not overload or damage the elevator installation. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged employed for the hoisting of materials by the particular Contractor(s).
 - F. The Contractor for General Construction Work shall pay all costs for the operation and maintenance of the elevator for temporary operation. All other costs in connection with the elevator and equipment excepting electrical work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
 - G. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide elevator services described in this section beginning with 15 consecutive calendar days from notice to proceed. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
 - H. OVERTIME USE - ALL CONTRACTS - Whenever any Contractor(s) work before or after the regular work hours as indicated in Paragraph B above, or on a Saturday, Sunday or Holiday, such Contractor(s) shall pay the Contractor for General Construction Work for the operation and maintenance of the elevator, if required by such Contractor(s) at the union daily rates but increased to reflect the difference between regular wage rates and overtime wage rates. The City will not pay any Contractor for overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.
- 1.36 General Mechanical Requirements (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**
- A. The General Mechanical Requirements contained herein shall be followed by all Contractors furnishing mechanical equipment under their respective Contracts.
 - B. CONCEALED PIPING - and ducts shall mean 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 shall be installed in the hung ceilings.
 - C. THE 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. The Contractor shall follow these Contract Drawings in laying out the work and shall consult the Contract Drawings of the other Contracts to become familiar with all conditions affecting it and to verify the spaces in which it will be installed. The Contractor shall cooperate with the Public Utilities doing certain necessary work for this project. The attention of the Contractor is called to the Contract Drawings for General Construction Work for the location, arrangement and extent of plumbing and other fixtures and equipment. All work shall be installed in locations as shown on these Contract Drawings.

- D. **CERTIFICATES** - On completion of the work, the Contractor shall obtain certificates of inspection, approval, acceptance and of compliance with all laws from all agencies and/or entities having jurisdiction over the work and shall deliver these certificates to the Commissioner. The work shall not be deemed substantially complete until the certificates have been delivered.
- E. **SHOP DRAWING SUBMITTALS** - Contractors doing mechanical work shall submit, as directed, Shop Drawings, roughing drawings, manufacturer's Shop Drawings, field drawings, cuts, bulletins, etc., of all materials, equipment and methods of installation shown or specified.
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.
- F. **ACCESSIBILITY** - All work shall be installed by the Contractor so as to be readily accessible for inspection, operation, maintenance and repair. Minor deviations from the arrangement indicated on the Contract Drawings may be made to accomplish this, but they shall not be made without approval by the Commissioner.
- G. **CHANGES IN PIPING, DUCTS, AND EQUIPMENT** - 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 shall make such changes as directed and approved, without extra cost to the City.
- H. **CLEANING OF PIPING, DUCTS, AND EQUIPMENT** - Piping, ducts and equipment shall 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 shall pay for repairs to other work damaged in the course of removing obstructions.
- I. **STANDARDIZATION OF SIMILAR EQUIPMENT** - Unless otherwise particularly specified, all equipment of the same kind, type or classification, and used for identical purposes, shall be the product of one (1) manufacturer.
- J. **MACHINERY PARTS** - shall conform exactly to the dimensions shown on the Contract Drawings. The equivalent parts of identical machines shall be identical so that they can be interchangeable.

- K. **FITTINGS** - All grease lubricating fittings on equipment shall be of a uniform type and shall be readily accessible and types proposed to be used shall be submitted for approval.
- L. **GUARDS** - All machinery shall be designed with protecting guards conforming with the requirements of the Industrial Code of the New York State Department of Labor or OSHA, whichever is stricter.
- M. **LIMIT SWITCHES** - Unless otherwise specified, limit switches and other mechanically actuated switches shall be enclosed in tight metal boxes and be installed in the proper locations ready for conduit connections. Switches shall be complete with all supports, stops, cams, arms, tripping and operating members, which shall be adjustable where required for proper functioning.
- N. **ANCHORS, BOLTS, ETC. AND FOUNDATIONS** - Unless otherwise specified, the Contractor shall furnish the necessary anchors, bolts, guides, track rails, bearing plates, substantial templates and all other appurtenances, and build the necessary foundations, as approved by the Commissioner, for all equipment supplied by the Contractor under its Contract.
- O. **EQUIPMENT DESIGN** - Equipment and appurtenances shall be designed in conformity with ASME and AIEE standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operations. Adequate stays, braces and anchors shall be provided. All bearings and moving parts shall be adequately protected against wear by bushings, or other approved means, and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers and the like shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.
- P. **SUPPORTING STRUCTURES DESIGNED BY THE CONTRACTOR** - Unless otherwise specified, supporting structures for equipment to be furnished by the Contractor shall be designed and built by the Contractor of sufficient strength to safely withstand all stresses to which they may be subjected, within permissible deflections, and shall meet the following standards:
1. Structural Steel - ASTM Standard Specifications, AISC and NYBC.
 2. Concrete for supports for equipment shall conform to the Specifications for concrete herein, but in no case shall be less than the requirements of the NYBC for average concrete.
 3. Steel reinforcement for concrete shall be of intermediate grade and shall meet the requirements of the Standard Specifications for Billet Steel-Concrete Reinforcement Bars, ASTM.
- Q. **ENGINEER'S ASSUMED DESIGN DATA** - All structural steel, concrete and reinforcement indicated or specified to support the equipment or appurtenances and the area immediately adjacent thereto have been designed from data based on assumed average anticipated clearances and loading. The final structural design in these locations will be based on definite data received from the Contractor after the Commissioner approves the equipment and appurtenances to be installed. The Commissioner will then redesign, if necessary, the supporting structure to properly support and maintain the approved equipment and appurtenances. Necessary major changes in design will be covered by Supplementary Drawings that will be furnished to the Contractor. All changes indicated or necessary to accommodate the equipment and appurtenances, shall be incorporated into the Working Drawings submitted for approval, and the cost of furnishing and installing the work necessitated by these changes shall be borne by the Contractor furnishing the equipment.
- R. **INSTALLATION OF EQUIPMENT** - Equipment shall be erected in a neat and workmanlike manner on the foundations, at the locations and elevations shown on the Contract Drawings or as required. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between various units and with piping and equipment that may be installed under other Contracts. When required by the Specifications, the Contractor shall obtain the assistance of a competent and experienced Engineer or Superintendent, in the employ of the manufacturer, to install the equipment.

- S. ELIMINATION OF NOISE - All work provided under the Contract shall operate without objectionable noise or vibration.
1. 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 shall at its own expense make changes in piping, equipment, etc. and do all work necessary to eliminate objectionable noise or vibration.
 2. Should noise or vibration found objectionable by the Commissioner be transmitted by any pipe or portions of the structure from equipment installed under the Contract, the Contractor shall 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.
- T. GROUTING - The Contractor shall furnish all material and labor for proper bedding on Portland Cement grout, the equipment or its supporting base. Grout shall consist of one (1) part Portland Cement and one (1) part of approved sand. The top of the masonry foundation shall be properly cleaned and wetted before grouting. Grout shall completely fill all spaces between the equipment, or base, and the foundation and it shall generally average one (1) inch in thickness. Leveling wedges shall not be removed before the grout has reached its final set. Voids left by wedges shall be pointed with grout. Exposed surfaces of the grout shall have a finished appearance.
- U. PRELIMINARY FIELD TEST - As soon as conditions permit, the Contractor shall furnish all necessary labor and materials for, and shall 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 shall, prior to the acceptance test, make all changes, adjustments and replacements required.
- V. INSTRUCTIONS ON OPERATION - At the time the equipment is placed in permanent operation by the City, the Contractor shall make all adjustments and tests required by the Commissioner to prove that such equipment is in proper and satisfactory operating condition. The Contractor shall 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.

1.37 General Electrical Requirements

SCOPE - This Article 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 Article and the requirements of the Specifications and/or the Contract Drawings, whichever requirements is the most stringent, as determined by the Commissioner, shall take precedence.

PART A - PROCEDURE--ELECTRICAL APPROVALS

- SCOPE- 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 contracts for other than the Contract for Electrical Work.
- A. ELECTRIC SERVICE - The electric service supply is subject to commercial and operating variation of the utility company. Proper provision shall be made to have all apparatus operate normally under these conditions.
 - B. SUPERVISION AND ACCEPTANCE - The electrical work and equipment shall be installed under the supervision of the Commissioner's representative. Final acceptance and approval of the work will be contingent upon the inspection and test of the installation by the City regulatory agency, on completion.
 - C. TESTS - The Contractor shall notify the Commissioner when the Contractor will examine and begin

work and shall also notify the Commissioner when the Contractor has completed the work and is ready to have it inspected and tested. Upon completion of the work and prior to final payment, tests shall be made as required by the Commissioner of all electrical materials, electrical and associated mechanical equipment, and of appliances installed hereunder. The Contractor shall furnish all labor and material for such tests. Should the tests show that any of the material, appliances or workmanship are not first class or not in compliance with the Contract, the Contractor on written notice shall remove and promptly replace them with other materials in conformity with the Contract.

D. CERTIFICATE OF THE BUREAU OF ELECTRICAL CONTROL, OF THE DEPARTMENT OF BUILDINGS (B.E.C.) - Before final payment is made, there must be filed with the Department of Design and Construction, a Certificate of Inspection signed by the Director of the B.E.C., which Certificate shall certify that all materials and workmanship comply with the rules and regulations of the B.E.C. of the City of New York and with the Electrical Code of the Administrative Code of the City of New York.

E. RESPONSIBILITY FOR CARE AND PROTECTION OF EQUIPMENT

1. The Contractor furnishing any equipment shall be responsible for the equipment until it has been finally inspected, tested and accepted, in accordance with the requirements of these Specifications.
2. After delivery and before and after installation, the Contractor shall protect all equipment against theft, injury or damage from all causes. The Contractor shall carefully store all equipment received for work, which is not immediately installed. If any apparatus has been subject to possible injury by water, it shall 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 apparatus or materials of the same kind, type or classification and being used for identical types of service, shall be made by the same manufacturer.

G. CONTRACTOR'S ELECTRICAL DRAWINGS AND SAMPLES FOR APPROVAL

1. The Contractor shall submit to the Commissioner for approval, 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 shall be included. A letter, in triplicate, shall accompany each submittal.
2. The Contractor shall submit duplicate samples of such materials and appliances as may be requested by the Commissioner for approval. These samples shall 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.

H. TIMELINESS - All material shall be submitted in sufficient time for the program 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.

I. CONTRACTOR'S STATEMENT WITH SUBMITTALS - All dimensional drawings of equipment, blueprints, catalogues, models, samples and other data relative to the equipment, the materials, the work or any part thereof submitted for approval are to be accompanied by a statement that they have been examined by the Contractor and that the drawings, data and other material submitted agree with the requirements of the Contract and Specifications and shall list and describe the points of

disagreements, if any exist. In the absence of such statement, approvals will be given with the understanding that articles of equipment or materials or methods of installation are in substantial compliance with the Contract and that if the adoption of these designs, details, articles, equipment, materials, constructions, installations, places and locations necessitate changes, alterations or replacements at an increased cost to the Contractor or others, the Contractor making the substitution for the specified equipment or material shall bear all such additional expense involved.

- J. **BULLETINS AND INSTRUCTIONS** - The Contractor shall furnish and deliver to the Commissioner, 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 B - TEMPORARY LIGHTING, SITE SECURITY LIGHTING & POWER

SCOPE - This Section sets forth the General Conditions and procedures relating to Temporary Lighting, Site Security Lighting and Power during the construction period, and is applicable to, and binding on, all Contracts insofar as they are affected.

A. TEMPORARY LIGHTING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. Energy for the Temporary Lighting System for minor rehabilitation projects (those projects whose existing distribution system is not being changed or modified under the scope of this project) may be taken from the existing electrical distribution system if the existing system is of adequate capacity for the additional temporary lighting load. The Contractor for Electrical Work is to cooperate and coordinate with the facility custodian so as not to interfere with the normal operation of the facility.
2. Energy for the Temporary Lighting system for new projects and for those existing projects that are not covered in the preceding paragraph shall be provided as in the following paragraphs.
3. **CONNECTION TO UTILITY LINES** - Temporary Electric Service for use during construction shall be provided as follows: The Contractor for Electrical Work shall provide adequate service for the temporary lighting system, or a minimum of 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. The Contractor for Electrical Work shall include in its bid any charges which may be made by the Public Utility Company for extending its electrical facilities, and for making final connections. The Contractor for Electrical Work shall make payment directly to the Public Utility Company.
4. **APPLICATIONS FOR METER** - The Contractor for Electrical Work shall make 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 Lighting. The Contractor for Electrical Work shall pay to the Public Utility Company, all bills for Temporary Lighting energy used throughout the work, as they become due.
5. **SERVICE AND METERING EQUIPMENT** - The Contractor for Electrical Work shall furnish and install, at a suitable location on the site, approved service and metering equipment for the Temporary Lighting System, ready for the installation of the Public Utility Company's metering devices. The temporary service mains to and from the metering location shall be not less than 100 Amperes, 3-phase, 4-wire and shall be of sufficient capacity to take care of all demands for Temporary Lighting and Site Security Lighting and shall meet all requirements of the NYCEC.
6. The Contractor for Electrical Work shall furnish and connect to the metered service point, a system of Temporary Lighting 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 shall be located near entrance on ground floor.

7. ITEMS - The Temporary Lighting System shall 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, trailers 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.
8. The Temporary Lighting System shall be progressively installed as required for the advancement of the work under the various Contracts.
9. RELOCATION - Any Contractor requiring the relocation or extension of the original Temporary Lighting System that is not required due to the normal advancement of the work, as determined by the Commissioner's field representative, shall bear all costs thereof.
10. TRAILERS - Trailers shall be furnished with left-hand sockets with locked type guards and 40 feet of rubber covered cable. The Contractor for Electrical Work shall furnish and distribute a minimum of three (3) complete trailers to each Contractor. See the detailed Electrical Specifications for possible additional trailers required.
11. LAMPS - The Contractor for Electrical Work shall furnish and install one (1) complete set of lamps, including those for the trailers. Broken and burned out lamps in the general lighting system shall be replaced by the Contractor for Electrical Work while those in the trailers shall be replaced by the Contractor using such equipment. All lamps shall be 100 watt.
12. CIRCUIT PROTECTION - The Contractor for Electrical Work shall furnish and install GFI protection for the Temporary Lighting and Site Security Systems.
13. ENERGIZING - The Contractor for Electrical Work shall keep the Temporary Lighting System energized from a period of time, 15 minutes before the established starting time of that trade, which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week which is established as a regular working day for any trade involved in the construction of this facility and holds until completion and final acceptance of the work of the Contractor for Electrical Work or until the services are terminated by instructions from the Commissioner.
14. MAINTENANCE OF TEMPORARY LIGHTS
 - a. The Contractor for Electrical Work shall maintain the Temporary Lighting System in good working order during the scheduled hours established.
 - b. The Contractor for Electrical Work is to include in its contract all charges for energy for the Temporary Lighting System.
 - c. The Contractor is advised to show the estimated cost of the installation, maintenance and energy of temporary electrical facilities in its detailed cost estimate of its Contract so as to facilitate partial payments during construction.
15. OVERTIME USE - Any Contractor requiring Temporary Lighting Service before or after hours set forth hereinbefore, or on weekends or a Holiday for all trades involved in the construction of this facility, shall pay for the additional cost of keeping the system energized and repaired. If more than one (1) Contractor is involved, the charges shall be prorated, or shared by other acceptable means previously agreed upon by the Contractors involved. When overtime is required by all Contractors on the work, the provisions for payment for regular time use of the Temporary Lighting System shall apply.
16. SERVICE BEYOND COMPLETION DATE - When failure to comply with the terms and conditions of any Contract necessitates temporary light beyond the date set for completion of the Contract for Electrical Work, the Contractor requiring such additional service shall pay for keeping it energized. When more than one (1) Contractor requires such service, the expense thereof shall be prorated.

as determined by the Commissioner.

17. ADJUSTMENT IN CONTRACT PRICE FOR TEMPORARY LIGHTING MAINTENANCE - In the event that the temporary lighting maintenance extends beyond the Contract time through no fault of the Contractor for Electrical Work, the additional maintenance cost will be in accordance with the requirements of the following paragraphs:

- a. Payment for maintaining Temporary facilities when required will be made at the average hourly wage for electricians plus 69% of this rate, for each hour of work done upon order of the Resident Engineer. Payments will be included in partial estimates upon submission of detailed vouchers stating date, hour and time expended for each item of work.
- b. The addition of 69% of the average hourly wage rate specified above shall be deemed as the total allowance for all profit and overhead and for any and all other costs and expenses of any nature whatsoever, including but not limited to allowance for insurance, workman's compensation, unemployment insurance and other supplementary benefits.

18. REMOVAL OF TEMPORARY LIGHTING WIRING - The temporary lighting system shall be removed by the Contractor for Electrical Work when authorized by the Commissioner.

19. HAND TOOLS - The temporary electric lighting system shall not be used for power purposes, excepting that light hand tools not larger than 1/4 horsepower may be operated therefrom by any Contractor.

B. SITE SECURITY LIGHTING (FOR NEW CONSTRUCTION ONLY) (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor for the Electric Work shall furnish, install and maintain a system of site security lighting, as herein specified, to illuminate the construction site of the project, and it shall be connected to and energized from the Temporary Lighting System.
2. It is essential that the site security lighting system be completely installed and operating, at the earliest possible date. All Contractors must cooperate, coordinate and exert every effort to accomplish an early complete installation of the site security lighting system. After the system is installed and in operation, and a part of the system interferes with the work of any trade, that trade shall 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 shall consist of flood lighting by pole mounted guarded sealed-beam units. Floodlight units shall be mounted 16 feet above grade. Floodlights shall 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 shall be installed in a manner acceptable to the Resident Engineer. The first lighting unit in each circuit shall be provided with a photoelectric cell for automatic control. The photoelectric cell shall be installed as per manufacturer's recommendations.
4. All necessary poles shall be furnished and installed by the Contractor for Electrical Work.
5. The site security system shall be kept illuminated at all times during the hours of darkness. The Contractor for Electrical Work, at its own expense, shall keep the system in operation, furnishing and installing all material necessary to replace all damaged or burned out parts.
6. The Contractor for Electrical Work shall be on telephone call alert for maintaining the system during the operating period stated above.
7. All materials and equipment furnished under this section shall remain the property of the Contractor for Electrical Work and shall be removed and disposed of by the Contractor for

Electrical Work upon completion of that phase of the project.

C. TEMPORARY POWER

1. Any Contractor requiring temporary power for equipment larger than 1/4 horsepower shall arrange with the Public Utility for service and pay for all electrical energy consumed by its lines.
2. The Contractor shall provide service, metering equipment and distribution centers as required, and be responsible for keeping the system in working order.
3. When directed by the Commissioner, the Contractor shall remove its own temporary power system.

D. 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 for Electrical Work shall have the temporary lighting system changed over from the temporary service points to the main distribution panel.
2. **COST OF CHANGE OVER** - The Contractor for Electrical Work shall be responsible for all cost due to this change over of service and it shall 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 lighting specified herein shall be adhered to after change over of service.
4. **NO EXTRA COST** - The operation of the service and switchboard equipment shall be under the supervision of the Contractor for Electrical Work, but this shall 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 shall be no additional charge for supervision by the Contractor for Electrical Work.

PART C - ELECTRICAL INSTALLATION PROCEDURE

SCOPE - This Section sets forth the general installation procedure that shall apply to all electrical work and electrical equipment appearing in any of the Contracts.

- A. INTENT OF CONTRACT DOCUMENTS** - Contract Specifications and Contract Drawings 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 each Contractor shall provide whatever labor and materials are found necessary, within the scope of its 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 the Department of Design and Construction. 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 accessibility for repairs, even though this selection is the most costly.
- 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 the Department of Design and Construction during construction.

- C. SLEEVES - required for conduits passing through walls or floors, shall be furnished and set by the Contractor installing the conduits. Sleeves in waterproofed floors shall be provided with flashing extending 12 inches in all directions from sleeve and secured to waterproofing. Flashing shall be turned down into space between pipe and sleeve and caulked watertight. Flashing shall be 20 oz. cold rolled copper. Sleeves shall be supplied with welded flanges similar to those supplied by the Contractor for Plumbing Work and shall extend one (1) inch above finished floor.
- D. COORDINATION - Each Contractor shall keep in close touch with the construction progress and obtain the necessary information for the accurate placement of its work in ample time before project construction operations obstruct its work. Each 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. RESPONSIBILITY FOR ERRORS OF INSTALLATION - In case of interference with the work of others or erroneous placement of work with respect to equipment or structures, each Contractor shall cooperate with other affected Contractors for an immediate agreeable solution of the affected work with each Contractor furnishing its responsible share of the labor and materials necessary to complete the installation in an approved manner.
- F. RESTORATION - If drilling or cutting is done on finished surfaces of equipment or the structure, any marring of the surface shall be repaired or replaced by the Contractor who caused the damage. Each Contractor shall 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. Any Contractor who pierces waterproofing because of the installation of their work shall, at their own expense, restore the waterproofing to the satisfaction of the Commissioner.
- G. ELECTRICAL WORK AT SITE - Any Contractor who is required to furnish equipment consisting of a number of related electrical devices or appliances, mounted in a single enclosure, or on a common base, shall furnish this unit complete with internal wiring, connections, terminal boxes with copper connectors and/or lugs and ample electrical leads, ready for connection and operation. The cost of any wiring, re-wiring or other work required to be done on this unit in the field, shall be borne by the Contractor who furnished the unit, without cost to the City.
- H. COOPERATION AMONG CONTRACTORS - Whenever an electrically operated unit or system involves the combined work of several Contractors for its installation and successful operation, each Contractor shall exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.
- I. DEFINITIONS
1. WIRING means both wire and raceway (rigid steel, heavy wall conduit unless specifically indicated otherwise).
 2. POWER WIRING means wiring from a panelboard 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.
 3. CONTROL and/or INTERLOCK WIRING means that 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.
- J. WORK BY CONTRACTORS FURNISHING ELECTRICAL EQUIPMENT - Any Contractor who furnishes an electrically operated or motorized unit of equipment shall install same and, as part of its Contract, perform the following work in connection therewith:
1. FOUNDATIONS - Unless otherwise specified or indicated, the Contractor furnishing electrically operated equipment shall also furnish and install approved foundations for same. Special

foundations, if required, will be described in the detailed Specification.

- a. **MATERIAL** - All foundations, unless required otherwise, shall rest on a structural slab and shall be of poured concrete, of a mixture specified for reinforced concrete. Foundations shall present a neat, smooth appearance without voids, sharp corners or edges.
 - b. **DIMENSIONS** - Foundation dimensions, height above floor, methods of setting, aligning and anchoring of equipment shall be as recommended by the manufacturer of equipment and approved by the Commissioner. The minimum height of foundations above finished floor shall be four (4) inches and foundations shall extend at least six (6) inches at all sides beyond the base plates of equipment.
2. At least one (1) inch of grout shall be applied under the equipment base plate after placement and alignment of the equipment.
 3. **ITEMS** - Anchor plates, bolts, sleeves, nuts and washers and other necessary items for proper installation of equipment shall be provided. The Contractor shall also furnish and set required templates to locate accurately the positions of the hold down bolts.
 4. **VIBRATION ISOLATION** - If specifically required in the detailed Specifications for a particular unit, vibration isolators shall be provided for rotating equipment.
 5. **SUPPORTS** - If any motorized equipment is required to be mounted overhead or off a wall, the Contractor supplying the unit shall furnish and install a suitable platform, bracket or shelf, whichever is appropriate or specified, and mount the equipment thereon. This support shall be constructed of substantial steel members, plates, etc., and the whole securely fastened to the structure or to anchors previously embedded in the wall or slab. In case of excessive vibration transmitted to structure, isolating pads or other devices shall be installed. The Contractor shall apply one (1) coat of approved primer paint to the support and one (1) additional coat of approved paint in the field.
 6. **ASSOCIATED EQUIPMENT** - The Contractor who furnishes a motorized or electrically operated unit of equipment shall also furnish all associated motor starters, disconnect means, relays, control devices, lamps, or other devices, necessary for the successful functioning of the unit.
 7. **POINT OF DELIVERY** - Any item specified to be installed by the Contractor for Electrical Work and delivered to the site that can not be hand carried (due to bulk, weight or timeliness) to the location of its installation is to be delivered and set in place, leveled and secured by the Contractor furnishing the equipment. Such delivery shall be to the location where it is to be installed by the Contractor for Electrical Work.
 8. **CONTROL AND INTERLOCK WIRING**
 - a. **General Construction Work and Plumbing Work.**
 - (1) All control wiring associated with doors and door hardware is to be furnished and installed, unless otherwise indicated, by the Contractor furnishing the doors. Power for the door operation and for its controls shall be furnished and installed by the Contractor for Electrical Work.
 - (2) All other control wiring associated with equipment furnished by either the Contractor for General Construction Work or the Contractor for Plumbing Work is to be furnished and installed by the Contractor for Electrical Work.
 - b. **Contractor for Heating, Ventilating and Air Conditioning Work**
 - (1) The furnishing and installing of all control devices and all control and interlock wiring for equipment furnished under the Heating, Ventilating and Air Conditioning Contract shall be

by that Contractor, including any power required for any control device.

- (2) The Contractor for Heating, Ventilating and Air Conditioning Work shall deliver to the Contractor for Electrical Work all starters and disconnect switches specified to be furnished under the Heating, Ventilating and Air Conditioning Contract. The Contractor for Electrical Work is to install the starters and disconnect switches, and furnish and install all power wiring and make connections between the starter, disconnect switch and motor or equipment being served. The motor or equipment is to be mounted by the Contractor furnishing the motor.

9. **INSTALLATION OF BURNER** - The Contractor who furnishes and installs the gas/oil-fired boiler/furnace shall also include as part of its Contract, the work of furnishing, installing and connecting all equipment, controls with necessary conduits and wiring, to a service point provided by the Contractor for Electrical Work. Unless detailed otherwise in the Specific Requirements, the Contractor for Electrical Work shall furnish power from the power source to a junction box furnished and installed by the Contractor for the Electrical Work and located near the boiler/furnace control panel. The Contractor for Electrical Work shall also furnish and install an empty conduit and a junction box to be located at a remote location (outside of the boiler/furnace room) for an emergency shut-off switch. The shut-off switch and all other conduit and wire shall be furnished and installed by the Contractor furnishing the boiler/furnace.

K. WORK BY CONTRACTOR FOR ELECTRICAL WORK - The Contractor for Electrical Work shall perform the following work:

1. **PANELETTE** - The Contractor for Electrical Work shall furnish and install a four (4) circuit panelette in each mechanical equipment room.
2. **STARTERS AND DISCONNECT SWITCHES** - The associated disconnect switches and starters approved by the Department of Design and Construction which require mounting or wiring apart from a main equipment unit shall be delivered, prewired, to the Contractor for Electrical Work at the site of the project, who shall install and wire them. The electrical Contractor shall acknowledge acceptance in writing to the Contractor supplying them, and thereafter assume responsibility for their safe keeping until final acceptance of its work by the City.
3. **CONTROL DEVICES** - The Contractor for Electrical Work shall install conduit, wire, and make all connections for all interlock and control devices furnished under the Plumbing Work Contract and also all control and interlock devices furnished under the General Construction Work Contract, except for door control wiring. The various control and interlock devices, furnished (prewired) by the Contractors for Plumbing and General Construction Work Contractors, shall be installed and final connections made by the Contractor for Electrical Work.
4. **DOOR CONTROL WIRING** - Unless specifically detailed otherwise in the Contract Documents for Electrical Work, all door control and interlock devices are to be furnished and installed and wired by the Contractor furnishing the required control and interlock devices.
5. **TESTS** - The Contractor supplying the equipment, together with the Contractor for Electrical Work shall cooperate in making preliminary tests to establish the correctness of the installation. If a faulty operation of the unit is discovered, the Contractor whose work is the cause shall, without delay, remedy the trouble.

L. PAINTING

1. Ingredients and methods of application shall conform to that as required for similar work under the Contract for General Construction Work.
2. **ALL METAL CABINETS** - including switchboards, panelboards, boxes (pull, junction and outlet), trims, doors and covers shall be painted as follows:

All surfaces inside and outside, one (1) approved coat of primer. All accessible surfaces one (1) coat of approved paint inside and outside, in the field after installation.

3. HANGERS, CONDUITS AND FITTINGS – The Contractor who installs them shall give one (1) field applied, approved coat primer, followed by a second coat.
4. FINAL COAT--A final or third coat of paint, as directed, shall be applied by the Contractor installing them when the wall surfaces on which they are supported or the ceiling from which they are hung are not painted by the Contractor for General Construction Work. Pull boxes shall be neatly and legibly stenciled to show service.
5. PAINTING OF MOTORIZED EQUIPMENT - The Contractor furnishing electrically driven equipment shall paint motors and driven equipment, starters and controllers and other equipment provided by the Contractor. The Contractor shall provide any painting or finishing that may be required in the Specifications. For certain equipment having special corrosion resistant factory finishes, painting may be waived by special permission. Equipment shall be neatly stenciled, with legible characters to indicate service by the Contractor who supplies the equipment.
6. NAME PLATES - shall be left clean of all paint.

PART D - ELECTRICAL CONDUIT SYSTEM INCLUDING BOXES (PULL, JUNCTION AND OUTLET) - (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the requirements applying to any Contract requiring the installation of electrical conduits, boxes or fittings. Rigid steel conduit shall be used through out, unless specifically indicated otherwise. TYPES-where the word 'conduit', without a modifier such as, rigid steel, EMT, etc., is specified to be used, it shall be interpreted to mean, rigid steel, heavy wall, threaded conduit.

A. CONDUIT TYPES

1. RIGID STEEL CONDUIT - shall be interpreted to mean rigid steel, heavy wall conduit that is hot dipped galvanized inside and outside. The conduit shall 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 shall be used for all exposed work, for all underground conduits in contact with earth and for fire alarms systems as required by the Building Code. Rigid steel conduit shall be used for all underground conduits in contact with earth, for Fire Alarm Systems and as required by authorities having jurisdiction.
2. ELECTRICAL METALLIC TUBING (EMT) - shall be industry standard thin wall conduit of galvanized steel only. All elbows, bends, couplings and similar fittings which constitute a part of the conduit system shall be specifically designed for use with electric metallic tubing. Couplings and terminating fittings shall be of the pressure type as approved by the Commissioner. Set screw fittings will not be acceptable. EMT shall 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.
3. FLEXIBLE METALLIC - 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 shall 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.

B. INSTALLATIONS AND APPLICATIONS

1. Unless otherwise specified or indicated on the Contract Drawings, conduit runs shall be installed

concealed in finished spaces.

2. **CONDUIT SIZES** - The sizes of conduit shall be as indicated on the Contract Drawings. Wherever conduit sizes are not indicated, the conduit shall meet the requirements of the NYCEC to accommodate the conductors to be installed therein.
3. Conduits shall be reamed smooth after cutting. No running threads will be permitted. Universal type couplings shall be used where required. Conduit joints shall be screwed up to butt. Empty conduits after installation shall have all open ends temporarily plugged to prevent the entrance of water or other foreign matter.
4. Conduits being installed in concrete or masonry shall be securely held in place by the Contractor installing them during pouring and construction operations. A group of conduits terminating together shall be held in place by a template.
5. **UNDERGROUND STEEL CONDUITS** - Unless otherwise specified, all underground steel conduits in contact with earth shall 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 shall be one (1) part cement to four and one-half (4 ½) parts of fine and coarse aggregate.
6. **EXCAVATION RESTORATION PERMITS** - The Contractor installing underground conduits, duct banks or manholes shall perform, as part of its Contract, 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 shall 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 shall secure and pay for all necessary permits and inspection fees and pay the cost of repaving.
7. **EXPOSED CONDUIT SUPPORTS** - Exposed conduit shall be supported by zinc coated hangers with necessary inserts, beam clamps of approved design or attached to walls or ceilings by expansion bolts. Exposed conduits shall be supported or fastened at intervals not more than five (5) feet.
8. Exposed conduit shall be installed parallel or at right angles to ceiling, walls and partitions. Where direction changes of exposed conduit cannot be made with neat bends, such as required around beams or columns, conduit type fitting shall be used.
9. The conduit shall be installed with an approved expansion joint:
 - a. Wherever the conduit crosses a building expansion joint (each 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. Conduit may only enter and leave a floating slab in the vertical direction, and then only in an approved manner. Horizontal entries into floating slabs are not permitted.
11. Conduit installed in pipe shafts shall 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 shall be provided to assure stability of the raceway system.
12. **BUSHINGS AND LOCKNUTS** - Approved bushings and locknuts shall be used wherever conduits enter outlet boxes, switch boxes, pull boxes, panel board cabinets, etc. For conduits one (1) inch in diameter or larger, insulating bushings to be O.Z. or approved equal.
13. **CONDUIT BENDS** - shall be made without kinking conduit or appreciably reducing the internal diameter. All bends in conduit of two (2) inch in diameter or larger shall be made with an hydraulic or power pipe bender. The radius of the inner edge of any bend shall 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 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 shall be tested for clear bore and correct installation by the Contractor who installed them using a ball mandrel and a brush and snake before the installation will be accepted. The ball shall be of lignum vitae turned to approximately 85% of the internal diameter of the raceway to be tested. Two (2) short wire brushes shall be included in the mandrel assembly. Snaking of conduits, ducts, etc., shall be performed by the Contractor in the presence of the Electrical Inspector. Any conduits or ducts which reject the mandrel shall 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 shall be assigned to the various conduit runs, and as they test clear they shall 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 shall be tagged.
- c. TEST RECORDS - As the conduit runs clear, a record shall 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 shall be signed by the Electrical Inspector and submitted in triplicate for approval. This record shall be entered on the Record drawings, which are required under "General Conditions Governing All Contracts."
- d. CAPPING - All empty conduit and duct openings, after test, shall be capped or plugged by the Contractor as directed.
- e. DRAG LINES - A drag line shall be left in all empty conduit.

C. BOXES

1. The Contractor shall furnish and erect all pull boxes indicated on the plans or where required. Sides, top and bottom of pull boxes shall be zinc coated and shall 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 shall be removable and held in place by corrosion resistant machine screws. Pull boxes in damp locations shall have threaded hubs and gaskets. All pull boxes shall be suspended from ceiling or walls in the most substantial manner.
2. For large boxes, sufficient suitable porcelain clamp insulators or other approved devices shall be provided in the pull boxes for supporting the cables passing through the box so that the cables will not be unsupported for a distance greater than three (3) feet and so as to permit a neat and orderly arrangement of the cables.
3. For pull boxes having the largest side more than nine (9) square feet in area, special rectangular and diagonal angle-iron bracing will be required as approved.
4. Pull boxes of special or odd shapes are required to be installed by the Contractor, even though not shown on plans, where necessary to overcome interference or to facilitate the pulling of conductors in conduits.
5. 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. Precautions should be exercised regarding the location of window and door trims,

paneling, etc. Mistakes resulting from failure to observe these precautions, must be corrected by the Contractor without cost to the City. Outlets in hung ceilings shall be supported from the black iron or structure.

6. The exact location of all outlets in finished rooms shall be as directed. When the interior finish has been applied, the Contractor shall make any necessary adjustment of its work to properly center the outlets. All outlet boxes for local switches near doors shall be located at the strike side of doors as finally hung, whether so indicated on the drawings or not.
7. Exposed wall outlet boxes shall be erected neatly and tight against the walls and securely anchored to same.
8. All wall outlets of each type shall be set accurately at the same level on each floor, except where otherwise specified or directed. Where special conditions occur, outlets shall be located as directed.
9. 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
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
10. Outlet boxes shall be of approved design and construction; of form and dimensions suited and adapted to its specific location; the kind of fixture to be used and the number and arrangements of conduits, etc., connecting therewith. All ferrous outlet boxes shall meet the requirements for zinc coating as specified under Electrical Conduit Systems.
11. There shall be knockouts opened only for the insertion of conduit. Any outlet boxes with more openings than are necessary for conduit insertion, shall be sealed by the Contractor without additional charge.
12. All outlet boxes and junction boxes for exposed work shall be galvanized cast iron or cast aluminum with threaded openings. Outlet boxes for exposed inside work in damp locations shall be galvanized cast iron or cast aluminum with threaded hubs and neoprene gaskets.
13. Junction boxes shall not be less than 4 11/16" square and shall be equipped with zinc coated plates. Where plates are exposed they shall be finished to match the room decor.
14. FIXTURE SUPPORTS - Outlet boxes supporting lighting fixtures shall be equipped with fixture studs held by approved galvanized stove bolts or integral with the box. Cast iron or malleable boxes shall have four (4) tapped holes for mounting required cover or fixtures.
15. Outlet boxes exposed to the weather or indicated W.P., shall be cast iron or cast aluminum and the covers made watertight with neoprene gaskets. The boxes shall have external lugs for mounting. Drilling of the body of the fitting for mounting will not be permitted. The cover screws shall be appropriate in size, noncorrodible and not less than four (4) in number for each box opening.

PART E - ELECTRICAL WIRING DEVICES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. WALL SWITCHES shall be of the best specification grade, quiet type, and shall have a rating of 20 Amperes at 277 volts, as manufactured by Bryant, Hubbell or approved equal. The mechanism shall be equipped with arc snuffers. They shall be of the tumbler type, single pole. Switches of the 3-way type shall have a similar rating.
- B. RECEPTACLES
 - 1. CONVENIENCE OUTLETS - shall be of the best specification grade, duplex, two-pole, 3-wire, 15 Amperes at 125 volts. It shall have a grounding pole that shall be grounded to the conduit system. Receptacles shall be capable of both back and side wiring and shall have only one (1) grounding screw. Receptacles shall be Hubbell Cat. #5262 or approved equal.
 - 2. HEAVY DUTY RECEPTACLE OUTLETS - shall have the Ampere rating and the number of poles specified on the Contract Drawings and shall be Hubbell, Russell-Stoll, Bryant, AH & H or approved equal. Each outlet shall have a grounding pole, which shall be grounded to the conduit system.
 - 3. FLOOR RECEPTACLES - shall 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 shall 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 shall be in a gasketed, cast iron enclosure.
- E. PLATES
 - 1. Every convenience outlet and switch outlet shall 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 shall be used. Where more than three (3) switches are located at one (1) point, the faceplates may be made up in multiple units.

PART F - ELECTRICAL CONDUCTORS AND TERMINATIONS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. CONDUCTORS FOR LIGHT AND POWER - All wire and cable shall be of annealed copper of 98% conductivity. Aluminum wire or cable will not be permitted. The insulation shall be flame retardant, moisture and heat resistant, thermoplastic, type THW or THWN rated for 600 volts at 75 degrees C. for both wet and dry locations. Wires No. 8 or larger shall be stranded. Wires and cables shall also be subject to the requirements of the NYCEC. Cables for incoming service or wire in conduits contiguous with the earth or in concrete or other damp or wet locations shall be synthetic rubber insulated with neoprene jacket, heat and moisture resistant and shall 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 shall 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 detailed

Specifications of applicable Contracts.

- D. MINIMUM SIZE - Conductors smaller than No. 12 AWG shall not be used for light or power.
- E. COLOR CODE - Wires shall have a phase color code, and multiple conductor cables shall be color coded.
- F. CABLE DATA - The Contractor shall 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 shall be delivered to the site of the work on original sealed factory reels.
- H. TESTS
 - 1. NOTIFICATION OF TEST - No cable shall be released for shipment from the mill unless authorized by the Commissioner. The Contractor shall give the Commissioner at least 10 days notice when the cable will be available for testing at the mill. The Contractor's representative or inspector shall have access during working hours to all parts of the plant where the cable is being manufactured, and all reasonable inspection and testing facilities shall be afforded to the Contractor without increase in price to the City. The Inspector shall witness the complete test of cable and receive a copy of all test data.
 - 2. TEST DATA - The Contractor shall forward to the Commissioner six (6) copies of all test data for approval before accepting shipment of the cable.
 - 3. INSPECTION DURING MANUFACTURE - The Commissioner reserves the right to dispatch a representative to the factory at any time during the period of manufacture of the cable for the purpose of expediting or checking progress. The living and traveling expenses of the City Engineers making these inspections and witness tests will be borne by the City of New York.
 - 4. TEST IN CITY LABORATORY - Sufficient additional length of conductor shall be provided on each reel, so that a six (6) foot sample may be removed for testing in the City's Laboratories. This sample shall be cut from the reel in the presence of the Inspector of the Department of Design and Construction and cut in two (2) three-foot lengths, each piece to be tagged showing reel number, size and type, manufacture, date, name or project & Contract number. Samples shall be handed to the Inspector for transmittal. If it is found as the result of test that the cable does not comply with the approved factory test the Contractor will be ordered to remove all cable which came off the reel and has been installed, and to replace the defective cable not used, without cost to the City. The Contractor will be held responsible for any delays in the construction program caused by the defective cable.
 - 5. FINAL FIELD TEST - After conductors are installed and connected, the City will test the work for overall insulation resistance. The Contractor shall furnish all test equipment necessary. To be acceptable, the test shall meet the requirements set forth in the NYCEC.
- I. WIRE INSTALLATION
 - 1. INSTALL WIRES AFTER PLASTERING - Feeder and branch circuits wiring shall not be installed in conduit before the rough plastering work is completed. No conductors shall be pulled into floor conduits before floor is poured.

2. CONDUIT SECURED IN PLACE - No conductor shall 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 shall be left with sufficiently long ends for proper connection and stowing.
4. PULLING COMPOUNDS - When required to ease the pulling-in of wires into conduit, only approved compounds as recommended by cable manufacturers shall be used.
5. PRESSURE CONNECTORS - for wires shall be of the cast copper or forged copper pressure plate type. Connectors shall be O.Z., Burndy, National Electric Products or approved equal.
6. Splices and feeder taps in the gutters of panel boxes shall 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, shall 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 shall be as approved by the connector manufacturer.
 - b. For wire and cable No. 6 AWG and larger for branch circuit wiring the seamless tubular connector will only be accepted. Application of this connector shall be with a tool recommended by the connector manufacturer.
9. TAGS - All feeders and risers shall be tagged at both ends, and in all pull and junction boxes and gutter spaces through which they pass. Such tags shall be of fiber and have the feeder designation and size stamped thereon.
10. BRANCH CIRCUIT WIRING
 - a. The Contractor installing branch circuit wiring shall test the work for correct connections and leave all loop splices in the fixture outlet boxes properly spliced and taped. The Contractor shall provide wire ends long enough for convenient connection to device.
 - b. NEUTRALS - No common neutrals shall be used except for lighting branch circuits. Each neutral wire shall be terminated separately on a neutral busbar in the panelboard. No common neutrals will be permitted for convenience receptacle branch circuits.

J. TERMINATIONS

1. LUGS - All lugs for all devices and all cable terminations shall 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 manufacture. Lugs for No. 6 AWG cable and larger shall be cast copper or forged copper pressure plate type. Lugs for 1/0 and larger shall be fastened with two (2) bolts.
2. All lugs shall be of the proper size to accept the cable connected to them. Any Contractor furnishing a device containing lugs is to coordinate with the Electrical Work Contract Documents to insure 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. This requirement

applies to both the Contractor for Electrical Work whose branch circuit protector must have lugs of the proper size, as well as to the Contractor who furnishes the device who may have to increase the size of that particular device.

PART G - CIRCUIT PROTECTIVE DEVICES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the circuit protective devices such as circuit breakers and safety switches, used in connection with Motor Control Equipment, Distribution Centers, Panelboards and Service Entrance.

A. CIRCUIT BREAKERS

1. CIRCUIT BREAKERS shall be operable in any position and shall be of the quick-make, quick-break type on manual operation. The handle shall 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 shall be provided, in addition to the "On" and "Off" indication. All circuit breakers shall be of the bolted type.
2. TRIP RATING - Circuit breakers shall 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 BARRIERS - Multipole pole breakers shall be designed to break all poles simultaneously. They shall be provided with barriers between poles and arc suppressing devices.
4. ELEMENTS - Multipole circuit breakers shall have frames of not less than a 100 Ampere rating. Multipole circuit breakers for 480 volts AC operation shall have an NEMA interrupting rating of 18,000 Amperes, unless a higher rating is specified in the Specific Requirements 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 shall be provided with interchangeable trip elements, which can be replaced readily.
6. The trip rating of all circuit breakers shall not exceed 70% of frame rating.
7. Single pole circuit breakers for branch circuits shall have a frame size of no less than 100 Amperes, and shall be rated at 125 volt A.C. with a NEMA interrupting rating of 10,000 Amperes, unless a higher rating is specified in the Specific Requirements or indicated on the Contract Drawings.
8. INVERSE TIME ACTION - The circuit breakers shall 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, the other with instantaneous trip action. Inverse time delay action shall 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.
9. CONSTANCY OF CALIBRATION - The tripping elements shall insure constant calibration and be capable of withstanding excessive short circuit conditions without injury.
10. CONTACTS shall be non-welding under operating conditions and of the silver to silver type.
11. TEMPERATURE RISE - Current carrying parts, except thermal elements shall not rise in temperature in excess of 30 degrees C. while carrying rated current at rated frequency.
12. NUMBERING - Each circuit breaker shall be distinctly numbered when installed in a group with other breakers. The calibration of trip element shall 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 shall be of the type HD of a rating not less than 30 Amperes. Enclosures shall be provided with means for locking. For ratings above 60 Amperes terminals shall have double studs.

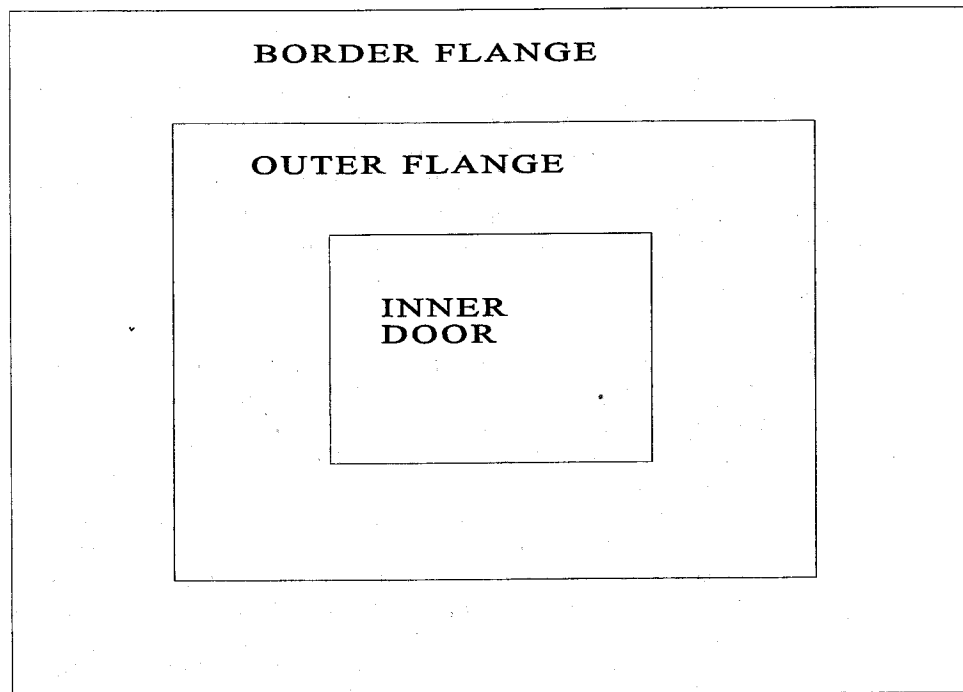
PART H - DISTRIBUTION CENTERS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the construction and installation procedure for Switchboards, Panelboards and Cabinets.

- A. **PANELBOARDS--GENERAL TYPE** - The panelboards shall be of the automatic circuit breaker type with individual breakers for each circuit, removable without disturbing the other units. Circuit breakers shall be in accordance with the requirements outlined under "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 shall be distinctly numbered.
- C. **BUS-BAR CONSTRUCTION AND SUPPORT** - Panel Boards shall be of the deadfront type and shall have bus bars and branch circuits designed to suit the system and voltage. Current carrying parts, exclusive of circuit breakers shall be copper and based on a maximum density of 1,000 Amperes per square inch. Bus bars for the main switchboard shall be designed for the frame rating of the Service Breaker. Bus bars shall run up the center of the panel, unless otherwise indicated, and shall have connected thereto the various branch circuits. Unless otherwise specified, bus bars for each panelboard shall be equipped with main lugs only and capacity as required on Contract Drawings. Where main protection is required, automatic circuit breakers shall be used. A neutral bus of at least the same capacity as a live bus bar shall be provided for the connection of all neutral conductors. Each terminal shall be identified. All current carrying parts, exclusive of circuit breakers, shall be of copper with a minimum number of joints. The bus bar structure shall be a self supporting unit, firmly fastened to a ½ inch plastic board, extending the full length and width of assembly which shall 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 shall separate neutral bus from other parts of panel.
- D. **CIRCUIT BREAKER ASSEMBLY** - The entire circuit breaker and bus bar assembly shall be mounted on an adjustable metal base or pan and secured to the back of panel box. The panel shall have edges flanged for rigidity.
- E. **PANEL MOUNTING** - The panel shall be centered in the panel box to line up with door openings and set level and plumb so that no live parts are exposed with the door open.
- F. **PANEL CABINET CONSTRUCTION AND SUPPORT**
1. Panel boxes shall be fabricated from No. 12 USSG sheet steel of no more than three-piece construction, reinforced at the corners and with continuous welds. Boxes having a back whose area is larger than 16 square feet, shall be of No. 10 USSG sheet steel and reinforced to provide ample stiffness and to prevent buckling. Boxes shall be of sufficient size to afford a clear gutter space on all sides, of not less than six (6) inches.
 2. **PANEL CABINET INSTALLATION** - When installed surface, or in panel closets, they shall be mounted on Kindorf channel, supported from floor slab to ceiling slab.
 3. Where cabinets cannot be set entirely flush due to shallow walls or partitions or where cabinet is extra deep, the protruding sides of cabinet shall 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. **CABINET TRIM** - Trim for both lighting and power panelboards shall be door-in-door type installation as depicted in **DETAIL A TRIM FOR LIGHTING AND POWER PANELBOARDS**. Construction details are to be as described in the following paragraphs.



DETAIL A TRIM FOR LIGHTING AND POWER PANELBOARD

1. **CABINET TRIM** - The trim and doors for lighting and power panels shall be made of No. 12 USSG full finish sheet steel in one (1) piece. Cabinet trim larger than 16 square feet shall be made of No. 10 USSG. The inner door shall cover the circuit breaker section only and be provided with appropriate brass hinges. The outer door shall cover the entire gutter space and shall be attached to the border type flange with appropriate hinges. Both doors for power panels shall be provided with a New York City Lock No. 511S, with key change to No. 47 and two (2) keys. For lighting panels, the inner door shall be provided with a substantial catch. All hinges shall be of the concealed type. Locks shall be flush with trim. In addition, for panels requiring doors over 48 inches in height, furnish a vault handle and a 3-point catch arranged to fasten door at top, bottom and center.
 2. The door shall close against a flange or rabbet to afford a dust tight fit. All space between the panel and the cabinet trim shall be closed by means of a sectional plate secured to the trim.
 3. The border flange of the trim shall be fastened to the box with oval head screws finished to prevent corrosion or with approved trim clamps.
 4. To facilitate installation of trim, a suitable angle iron shall be spot welded across the bottom of each trim to carry the weight of the trim while the holding screws are being put in place.
- H. **MOTOR CONTROL CENTERS** - Motor centers shall be furnished by the Contractor as indicated in the Specifications or Contract Drawings, but shall be installed by the Contractor for Electrical Work.
- I. **NAMEPLATES** - Nameplates where required, shall be made of engraved Lamicoid sheet, or approved

equal. Letters and numbers shall be engraved white on a black background (except for Firehouse projects which shall have white letters on a red background) the Contractor shall submit an engraved sample for approval as to design and style of lettering before proceeding with the manufacture of the nameplate. Nameplates shall be of suitable size and shall 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 shall also be provided for each distribution circuit breaker giving the breaker number, the number of the feeder, and the name of the equipment fed.

- J. SHOP DRAWINGS - showing all details of boxes, panels, etc., shall be submitted for approval.
- K. DIRECTORIES - A directory shall 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 Plasticite, Plexiglass, Lucite or approved equal that is not less than 1/16 inch thick over cardboard or heavy paper. The directory shall be typewritten and show the number of each circuit, the name of circuit and lighting or equipment supplied. The size of riser feeder shall be as indicated on directory. The dimensions of directory shall be submitted for approval for each size of panel.
- L. CONSTRUCTION
 - 1. FINISH - Panel boxes, doors and trim for installation in dry locations, shall be zinc coated after fabrication by the hot-dip galvanizing or electroplate process on inside and outside surfaces. In damp locations, panelboards shall be enclosed and gasketed NEMA 3R type. Panelboards located outdoors or exposed to the weather shall be cast iron.
 - 2. PAINTING - Panel boxes, doors and trim shall receive a coat of approved priming paint and a second coat of approved paint in the field after installation. Paint shall be applied to the inside and outside of boxes and on both sides of trim. Panel trims and doors shall 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. All of the aforementioned painting is to be done by the Contractor who furnishes the boxes and trim. Where panel trims or boxes are installed on walls which are to be painted, the previously mentioned third or finishing coat of paint shall be included in the work of the Contractor who has the Contract for general interior painting.

PART I - MOTORS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the general design, construction and performance requirements, which shall apply to all motors furnished in any of the Contracts.

- A. MOTOR DESIGN - All motors shall be designed to comply with the New York State Energy Code currently in effect. Motors shall have standard NEMA frames and shall have nameplate ratings adequate to meet the specified conditions of operation. Motor performance under variable conditions of voltage and frequency shall be within the limits set in NEMA standards, unless modified in present Specifications. Motors shall be expressly designed for the hazard duty load, voltage and frequency as specified in the Contract. All motor windings shall be copper. All motors intended to operate on a 208 volt system shall be designed and rated for 200 volts.
- B. MOTORS OF SAME MANUFACTURER - Unless expressly permitted otherwise by the Commissioner, all motors under the same Contract shall be manufactured by the same company. Exceptions may be granted in the case of motors of 1/4 horsepower rating and smaller, or for a motor that is an integral part of the equipment, with its housing especially built for this purpose.
- C. STANDARDS OF COMPARISON - In general, the best standard products of the leading motor manufacturers shall be considered as a standard for comparison. The requirements of the NEMA standards for motors and generators shall be deemed to contain the minimum requirements of performance and design.
- D. 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 Building Code of the City of New York may be performed as directed by the Commissioner. Such motors shall bear a nameplate lettered "Quiet Motor." Springs and slip rings shall be of approved non-ferrous material.

E. BEARINGS

1. Bearings, unless specified otherwise, shall be of the ball or roller type. Motors one (1) horsepower and larger that are equipped with ball roller bearings shall also have lubrication of the pressure-relief greasing type. Each Contractor who furnishes four (4) or more such motors shall also furnish, as part of its Contract, a pressure grease gun of rugged design, of approximately 10 ounce capacity, complete with necessary adapters. The Contractor shall also provide 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 shall in addition to having protected accessible fittings for oiling be provided with visible means for determining normal oil level. Lubrication shall be positive, automatic and continuous.

F. MOTOR TERMINALS AND BOXES - Each motor shall 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 shall be furnished of ample size to make and house motor connections. These requirements shall be met irrespective of any other standards or practices. Size of cable terminals and conduit terminal box holes shall be subject to approval. For motors five (5) horsepower or larger, each terminal shall 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 shall be of cast iron with threaded hubs and gasketed covers. Cover screws shall be of non-corrosive material.

G. MOTOR TEMPERATURE RISES - The motor nameplate temperature rises for the various types of motor enclosures shall 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 shall meet the requirements of NEMA standards for the size and type of the motors. Tests for heating shall 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.

H. SPECIAL CODE INSTALLATIONS - Electrical installations covered by special publications of NBFU and by special City rulings and regulations shall comply in design and safety features with such applicable codes, regulations and rulings, and shall be furnished and installed complete with all accessories and safety devices as therein specified.

I. MOTORS ON LIGHTING PANELS - The largest A.C. motor permitted on branch circuits of lighting panels shall not exceed 1/4 horsepower.

J. MOTORS RATED 1/2 horsepower and larger shall be polyphase.

K. TESTS

1. FACTORY INSPECTION - Electrical equipment and devices (except portable) not covered by standard Specifications or tests herein prescribed shall be inspected and witnessed on test at the factory with the tested equipment being completely assembled and connected under conditions approved by the Commissioner as equivalent to the actual working conditions. Suitability and

ruggedness of the design for the specified purpose will be a condition for acceptance.

2. **SHOP TESTS** - to determine the load performance of motors shall be made in accordance with Standard C-50, of the ASA. Motors shall meet the requirements of C-50 for insulation resistance, dielectric strength, efficiency and temperature rise. Efficiency (and power factor for A.C. motors) shall be established for 50, 75 and 100 percent of rated horsepower but for motors of 100 horsepower or larger, the 125 percent loading shall be included.
 3. **TEST REPORTS** - The result of shop tests shall be submitted to the Commissioner for approval and shall be on forms approved by the City. The evaluated test data shall include a signed statement confirming the fact that the equipment meets the requirements of the standards of performance.
 4. **MANNER OF TEST** - For motors of 100 horsepower or smaller, check tests against complete tests of similar motors will be accepted. For motors larger than 100 horsepower, complete tests for each motor furnished shall be made, and certified test data sheets shall be submitted for approval, unless shop tests are required by the Detailed Specifications.
 5. **PREFERRED METHODS** - The efficiency of fractional horsepower motors shall be determined by the input-output method; for larger motors up to and including 100 horsepower, the separate loss method as specified in ASA Standards C-50 will be accepted unless otherwise required in the Specifications.
- L. **SPARE PARTS** - The Contractor who furnishes motors, including fractional horsepower, shall provide the following spare parts and accessories in connection therewith:
1. **BRUSHES** - One (1) additional set of brushes for each motor equipped with them.
 2. **BEARINGS** - For each group of three (3) and fraction thereof, of each type and size of motor, the Contractor shall furnish one (1) set of extra bearing linings or ball or roller bearings. Where less than three (3) of any type of motor is involved, one (1) set of extra bearings shall be furnished.
 3. **SPRINGS** - One (1) set of brush springs used in slip ring motor or universal type motors.
 4. **WRAPPER MARKING** - All parts shall be delivered neatly and securely wrapped and boxed, plainly tagged and marked for identification and reordering.

PART J - MOTOR CONTROL EQUIPMENT (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

SCOPE - This Section sets forth the requirements for motor controllers and associated devices, which are applicable to all Contracts under which motor control equipment is furnished or installed.

- A. **MANUFACTURER** - All control equipment furnished under one (1) Contract shall 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 who furnishes a motor shall 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 breaker, magnetic starter 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 shall furnish as many of these items as are 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 who furnishes the motor shall 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 30 horsepower shall have magnetic across the line starters; motors rated above 30 horsepower shall be furnished with reduced voltage (autotransformer type) starter or part winding start with time delay to reduce inrush current. Size of starters shall be based on 200V. operation.
2. SLIP RING - A.C. Motors of the slip-ring type shall be furnished with primary across the line starters interlocked with secondary starting and regulating equipment. The interlocking feature shall 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 $\frac{1}{2}$ horsepower or more, magnetic starters and circuit breakers shall be used. Single phase A.C. motors smaller than $\frac{1}{2}$ 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 $\frac{1}{2}$ horsepower. Means for manual operation shall be provided.

D. DISCONNECTING BREAKER - All motor starters, unless otherwise specified shall be provided with a disconnecting means in the form of a circuit breaker of the type specified under "CIRCUIT PROTECTIVE DEVICES" of the General Conditions. This disconnecting means shall be contained in the same housing with the starter and shall be operable from outside. Means shall 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 shall 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 shall be provided.

G. 1. PANELS - Motor control devices and appliances shall be mounted on approved insulating slabs with all wiring and connections made on the back of the slabs.

2. WIRING AND TERMINALS - Wiring connections for currents of 100 Amperes or less may be made with copper wire or cable with special flameproof insulating coverings. Such wires shall be installed in a neat workmanlike manner, flat against the slab, and held in place by clips. Connections shall 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 shall 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.

3. COPPER BUS - For currents exceeding 100 Amperes, copper bus shall be used in place of wires. The bus shall 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 shall provide sufficient areas to keep current density at not more than 1,000 Amperes per square inch.

H. COOPERATION - The Contractors who furnish electrically operated equipment shall give to the Contractor for Electrical Work full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

Equipment being installed by the Contractor for Electrical Work shall be delivered to the Contractor for Electrical Work by other Contractors in proper time and sequence so that the Contractor for Electrical Work shall be able to meet the Contractor for Electrical Work working schedule.

I. SPARE PARTS

1. FURNISH - Each Contractor shall furnish the following spare parts pertaining to equipment furnished by each Contractor.

One (1) set of contact fingers and springs and thermal elements for each three (3) (or fraction) of each size of magnetic contactor starter.

One (1) holding coil for each three (3) (or fraction) of each size of magnetic contactor starter.

2. WRAPPER MARKING - All parts shall be delivered to the Resident Engineer neatly wrapped and boxed and plainly tagged and marked for identification and reordering.

PART K - SCHEDULE OF ELECTRICAL EQUIPMENT

Schedule D requirements for electrical motor equipment may be included in one or more of the Specifications for the separate contracts for the Project. SCHEDULE D delineates the responsibilities of each separate contractor for electrical motor control equipment. SCHEDULE D is included in the Addendum to the General Conditions. In the event of any conflict between the Specifications and 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.

1.38 Safety

- A. Each Contractor shall provide and maintain all necessary temporary closures, guard rails, and barricades to adequately protect all workers and the public from possible injury. Any Contractor requiring removal of these items shall be responsible for the replacement of same.

1.39 Interruption of Services and of Project Facilities

- A. EVENING AND WEEKEND WORK - Where the work makes temporary shutdowns of the services unavoidable, they shall be made at night or on weekends or at such times that will cause no interferences with the established routines and operations of the projects in question.

1. Where weekend or evening work is required due to unavoidable service shutdowns, such work shall be performed at no extra cost to the City.

B. INTERRUPTION OF PROJECT FACILITIES

1. The Contractor shall not interrupt any of the services of the project nor interfere with these in any way without the permission of the Commissioner. Such interruption, or interferences, shall be made as brief as possible, and only at such time stated.
2. Under no circumstances will the Contractor, or its workers, be permitted to use any part of the project as a shop, without the permission of the Commissioner.
3. Unnecessary noise shall be avoided at all times and necessary noise shall be reduced to a minimum.
4. The facility operates 24 hours per day seven (7) days a week. Toilet facilities, water and electricity

must be operational at all times. No services of the project 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.

5. Contractors shall schedule their work to avoid noise interference that will affect the normal functions of the project. In particular, construction operations producing noises that are objectionable to the project functions will be scheduled at times of day or night, day of the week, or weekend, which will not interfere with the project personnel. Any additional cost resulting from this scheduling shall be borne by the specific Contractor.
6. The Contractor shall arrange to work continuously, including overtime, if required, to assure that services will be shut down only during the time actually required to make the necessary connections to the existing work.
7. The Contractor shall give ample written notice in advance to the Commissioner and project personnel of any required shutdown.

1.40 Separation of Work Between Trades (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. SCHEDULE E – Requirements for various items of work are included in the Specifications for the separate contracts for the Project and in the General Conditions. Schedule E delineates the responsibilities of each separate contractor for various items of work, as well as the extent to which certain items involve coordination between trades. Schedule E is included in the Addendum to the General Conditions. The delineation set forth in Schedule E shall be taken as specific instruction to the Contractor that it is responsible for the listed items of work. Schedule E is not intended to limit the Contractor's responsibility for supervision and coordination as set forth in Paragraph B below. In the event of any conflict between the Specifications, the General Conditions and Schedule E, Schedule E shall take precedence; provided, however, in the event of an omission from Schedule E (i.e., Schedule E omits either a reference to or information concerning an item of work which is set forth in the Specifications or the General Conditions), such omission from Schedule E shall have no effect and the Contractor's obligation to perform the work, as set forth in the Specifications or the General Conditions, shall remain in full force and effect.
- B. SUPERVISION AND COORDINATION - Each Contractor is required to supply all necessary supervision and coordination information to any other trades who are to supply work to accommodate their installations.

1.41 Shop Drawing and Material Samples Schedule

- A. SCHEDULE F – Schedule F sets forth all submittal requirements for shop drawings and material samples. Schedule F is included in the Addendum to the General Conditions. At the kick-off meeting, each Contractor must review this Schedule with the Commissioner's Representative and the Consultant. Within 10 days after the kick-off meeting, the Contractor must complete information on Schedule F concerning the submission date, the required delivery date and the fabrication time. For all required submittals of shop drawings and material samples, the Schedule F provided by the Contractor must indicate a submission date which is at least 20 days prior to the date of the manufacture of the item or materials to be installed. In addition, if so directed by the Commissioner, the Schedule F provided by the Contractor must indicate a submission date for shop drawings and/or material samples of specified items or materials which is within 60 days after the kick-off meeting. In the event of any conflict between the Specifications and Schedule F, Schedule F shall take precedence; provided, however, in the event of an omission from Schedule F (i.e., Schedule F omits either a reference to or information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Contractor's submittal obligation, as set forth in the Specifications, shall remain in full force and effect.
- B. COORDINATION - The Resident Engineer for this project will coordinate and review the data submitted by various Contractors. Upon acceptance by the Resident Engineer, the Resident Engineer

will date and sign the schedule as approved and transmit it to the Consultant, Contractors and Project Manager within the Department of Design and Construction.

- C. ARTICLE 11 - Thereafter, this schedule will be subject to the provisions of Article 11 of the agreement and must be strictly adhered to by the Contractor.

1.42 Specific Requirements

- A. The work of this article shall be the responsibility of the Contractor for General Construction Work, unless otherwise indicated.

B. FIELD MEASUREMENTS

1. Each Contractor shall verify all dimensions and conditions on the job so that all work will properly join the existing work.
2. Each Contractor, before commencing work, shall examine all adjoining work on which each Contractor's work is in any way dependent on good workmanship in accordance to the intent of the Specification and Contract Drawings. The Contractor shall report to the Commissioner any condition that will prevent any Contractor from performing work that is below the required standard.

C. BORINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. 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:
2. 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 forces of the Department of Design and Construction at the site.
3. SOIL 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.
4. CERTIFICATION OF SAMPLES - The City certifies that the work was carried out as stated, and that the soil samples and rock cores, if any were referred to, were actually taken from the site at the times, places and in the manner indicated. The samples are available for inspection in the Department of Design and Construction Subsurface Exploration Section.
5. 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.
6. 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 and the bidder is required to estimate the influence of such features from its own inspection of the site.

D. DEFERRED CONSTRUCTION

1. Where necessity for deferred construction is certified by the Commissioner, in order to permit the installation of any item or items of equipment required to be furnished and installed under any other Contract in effect concurrent with the time allowed for doing and completing the work of the Contract, the Contractor shall defer construction work limited to adequate areas as approved by

the Commissioner.

2. The Contractor shall confer with the affected Contractors and ascertain arrangements, time and facilities necessary to be made by the Contractor in order to execute the provisions specified herein.

E. WORK FENCE ENCLOSURE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor shall furnish and erect a wood fence to the extent shown on the drawings enclosing the entire project on all sides. All materials used shall be new. Any permit required for the installation and use of said fence shall be borne by the Contractor.
2. THE FENCE shall be 7'-0" high with framing construction of yellow pine, using 4" x 4" posts on not more than 6'-0" centers, with three (3) rails of at least 2" x 4" size to which shall be secured boards, 3/4" x 6" tongue and groove, laid solid and surface and double nailed to each bearing. Posts shall be firmly fixed in the ground at least 30" and thoroughly braced. Top edge of fence shall be trimmed with a rabbeted edge mould. Provide on the street traffic sides of fence, observation openings as directed. The Contractor has the option of using 1/2" exterior grade plywood in lieu of the 3/4" x 6" tongue and groove boards.
3. GATES - Provide an adequate number of double gates, complete with hardware, located as approved by the Resident Engineer. Double gates shall have a total clear opening of 14'-0" with two (2) 7'-0" hinged swinging sections. Hanging posts shall be 6" x 6" and shall extend high enough to receive and be provide with tension or sag rods for the swinging sections.
4. PAINTING - The fence and gates shall be entirely painted on the street and public sides with two (2) coats of approved lead and oil paint. The below-grade section of the posts shall be first creosoted or given a coat of tar base paint. Black stenciled signs reading "POST NO BILLS" shall be painted on fence with three (3) inch high letters on 25 foot spacings for the entire length of fence on street traffic sides. Signs shall be stenciled five (5) feet above the sidewalk.
5. It shall be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
6. Where sidewalks are used for "drive over" purposes for Contractor vehicles, a suitable wood mat or pad shall be provided for protection of sidewalks.
7. Where required, make provision for fire hydrants, lampposts, etc.
8. REMOVAL - When directed by the Resident Engineer, the fence shall be removed.

F. PUMPING

1. 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.
2. All pumps shall be maintained at all times in proper working order.

G. RESIDENT ENGINEER'S OFFICE

1. OFFICE SPACE IN EXISTING BUILDING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)
 - a. The Resident Engineer will arrange for office space for sole use in the building where work is in progress. The Contractor for General Construction Work shall provide and install a lockset

for the door to secure the equipment in the room. The Contractor for General Construction Work shall provide two (2) keys to the Resident Engineer. After completion of the project the Contractor for General Construction Work shall replace the original lockset on the door and ensure its proper operation.

- b. The Contractor for General Construction Work shall provide one (1) telephone, where directed, for the exclusive use of the Resident Engineer. The Contractor for General Construction Work shall pay all costs for telephone service for calls within New York City limits for the duration of the project. The telephone service shall continue for a period of 90 days following substantial completion.
- c. The Contractor for General Construction Work shall provide the following equipment:
 - (1) 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) lockers, metal olive green or gray, 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 1/2"D x 18"W in a grey finish by Art Steel No. 2904L or approved equal.
 - (2) One (1) 9000 B.T.U. air conditioner or as directed by Commissioner. Wiring for the air conditioner shall be minimum No. 12 AWG fed from individual circuits in the fuse box.
 - (3) Two (2) metal wastebaskets, 13 inches square 15 inches high with rubber feet and corners by Art Metal Company No. 168 or approved equal.
 - (4) One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 - (5) 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.

2. TRAILER OFFICE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- a. The Contractor for General Construction Work shall provide at its own cost and expense a trailer and install and connect all utility services to trailer within twenty (20) days of start of work. The trailer shall have equipment having the minimum requirements hereinafter specified. Any permit required for the installation and use of said trailer shall be borne by the Contractor.
- b. The trailer shall remain the property of the Contractor for General Construction Work except that the file cabinets herein specified, shall become the property of the City of New York.
- c. Trailer shall be office type trailer of the following general minimum dimensions:
 - 1. Length, overall: 35 feet.
 - 2. Length, inside: 32 feet.
 - 3. Width, overall: 8 feet.
 - 4. Width, inside: 7 feet, 5 inches.
- d. Trailer shall be manufactured by International Trailer Company, Model No. 1 MU-35-D or Atlantic Trailer Corporation, Model No. F-36 or approved equal.
- e. The exterior of the trailer and the wheels shall be given an approved coat of exterior enamel. The enamel finish coat shall be DUPONT orange lacquer or approved equal. The trailer shall 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 STRUCTURES	3-1/2"
RESIDENT ENGINEER'S OFFICE	2-1/2"

NOTE: In lieu of painting letters on trailer the Contractor for General Construction Work may substitute a sign constructed of a good quality lumber with the same type and size of lettering above.

- f. All windows and doors shall have insect aluminum screens and wire mesh protective screening.
- g. The interior shall be finished in 1/4 inch plywood. Plywood shall be finished in natural color, with two (2) coats of varnish or lacquer.
- h. The interior shall be divided by partitions into one (1) large room in front of trailer, and a private office approximately 6' x 7' at rear of trailer and a washroom located adjacent to the private office.
- i. The washroom shall be equipped with a flush toilet, wash basin with two (2) faucets, medicine cabinet, complete with supplies by Hospital Supply and Watters Labs., Inc., Model No. 1 or approved equal and a toilet roll tissue holder. Plumbing and fixtures shall 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 shall be furnished.
- j. The heating system shall consist of thermostatically controlled electric baseboard heaters capable of delivering not less than 30,000 BTU per hour and heaters shall be as manufactured by Chromalox or approved equal, sized per area with individual approved thermostats.
- k. The trailer shall be equipped with an approved two-circuit, 110-120 volt armored cable wiring system of adequate capacity complete with entrance connector with provision for grounding, enclosed fused service switch and branch circuit fuse box. The circuits for lighting, water heater, heater and convenience outlets, etc. shall be two-conductor, No. 12. The circuits for the space heaters shall be sized minimum No. 12 wire led from individual circuits in the branch circuit fuse box. Metal boxes shall be provided at all outlet points. All wiring shall conform to the requirements of the Electrical Code of the City of New York for armored cable wiring systems.
- l. Lighting to be furnished by a minimum of four (4) 48 inch, single tube, fluorescent fixtures for the large rooms and an incandescent fixture for the washroom. Lighting fixtures shall be provided with built-in pull-chain switches. A minimum of six (6) duplex convenience outlets shall be installed; four (4) in the larger room and two (2) in the smaller room. These outlets shall be in addition to connections for electric space heaters and heaters for domestic hot water.
- m. In addition to the washroom and private office, the following shall be built-in to the trailer:
 - 1. The drafting or reference table at least 60 inches long by 36 inches wide with cabinet below, head shelf at each end of the trailer, wall type plan rack at least 42 inches wide and wardrobe opposite washroom.
- n. The following movable equipment shall be furnished:
 - 1. Four (4) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Four (4) lockers, metal olive green or gray, 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 1/2" D x 18"W in a grey finish by Art Steel No. 2904L or approved equal.
 - 2. One (1) 6000 B.T.U. and one (1) 9000 B.T.U. air conditioner. Wiring for the air conditioners shall be minimum No. 12 AWG fed from individual circuits in the fuse box.

3. Two (2) metal wastebaskets, olive green or grey finish, 13 inches square 15 inches high with rubber feet and corners by Art Metal Company No. 168 or approved equal.
 4. One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
 5. 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.
- o. TRAILER TEMPORARY SERVICE - Plumbing and electrical work required for the trailer will be furnished and maintained as below.
1. PLUMBING WORK - shall include all water supply and drainage piping required for a complete installation. Contractor to provide a temporary water service from the City's water main and extend in the trailer and properly connect up all fixtures requiring water supply. Provide all necessary soil, waste, vent and drainage piping.
 - a. Plumbing Contractor to frost-proof all water pipes to prevent freezing.
 - b. REPAIRS, MAINTENANCE - The Plumbing Contractor provide repairs when and as required for a period of thirty (30) days after the date of substantial completion acceptance.
 - c. DISPOSITION OF PLUMBING WORK - At the expiration of the time limit set forth in Subparagraph 3, the water drainage connections and piping to the office trailer shall be removed and shall be plugged at the mains. All piping shall become the property of the Contractor for Plumbing Work and shall be removed from the site, all as directed. All repair work due to these removals shall be the responsibility of the Contractor for General Construction Work.
 2. ELECTRICAL WORK - The Contractor for Electrical Work shall furnish, install and maintain a temporary electric feeder to the trailer to be used by the Resident Engineer immediately after it is placed at the job site.
 - a. The temporary electric feeder shall be at least three (3) No. 6RH wire and shall be protected by a 60 Ampere fused safety switch, complying with codes and utility requirements having jurisdiction.
 - b. Make all arrangements and pay all costs to provide electric service.
 - c. 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 a period of thirty (30) days after the date of substantial completion acceptance.
 - d. Disposition of Electric Work: At the expiration of the time limit set forth, the temporary feeder, safety switch, etc., shall be removed and disposed of as directed.
 - e. All repair work due to these removals shall be the responsibility of the Contractor.
- p. MAINTENANCE
1. The Contractor for General Construction Work shall provide and pay all costs for hot and cold water, heat and fuel and regular daily janitor service. Furnish toilet paper, cloth towels and soap and maintain the field office in first-class condition, including all repairs, until 30 days after the date of substantial completion acceptance.
 2. Provide fire, extended coverage and vandalism, malicious mischief and burglary and theft

insurance coverage for the Resident Engineer's field office equipment in the amount of \$10,000. All insurance coverage shall be provided by a company licensed and authorized to do business in the State of New York. Such coverage must, under the loss payable clause or by endorsement thereon, state the following: "loss, if any, payable to the City of New York."

3. At 30 days after the date of substantial completion acceptance, or sooner as directed by the Commissioner, the Contractor for General Construction Work shall have all services disconnected and capped to the satisfaction of the Resident Engineer.
- q. The Contractor for General Construction Work shall provide and pay all costs for the following telephone services for the Resident Engineer's trailer:
 1. Two (2) desk phones
 2. One (1) wall phone (with six (6) foot extension cord) at plan table.
 3. A remote bell located on outside of trailer
 4. The telephone service shall continue for a period of 90 days following substantial completion.
- r. Should it become necessary to relocate the trailer or move the field office from one (1) location to another, Contractor for General Construction Work shall be responsible for move or moves and of reconnecting all utilities described above at new location, and shall assume all costs incurred.
- s. PERMITS - The Contractor for General Construction Work shall make the necessary arrangements and obtain all permits required for this work.
- t. The Contractor for General Construction Work has the option of providing, at its cost and expense, rented office or store space in lieu of trailer. Said space shall be in the immediate area of the Project and have adequate plumbing, heating and electrical facilities. Space chosen by the Contractor for General Construction Work must be approved by the Commissioner before the area is rented. All insurance maintenance and equipment required for trailer field office shall also apply to rented spaces.

H. **ADDITIONAL EQUIPMENT FOR THE RESIDENT ENGINEER (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor for General Construction Work shall supply photo equipment not to exceed \$250. Said equipment to be specified by Resident Engineer. At the completion of the project, the equipment shall become the property of the City of New York.
2. The Contractor for General Construction Work shall provide a copy machine for paper sizes 8½ x 11 & 8½ x 14. Copier shall remain at job site 30 days beyond the Substantial Completion date.
3. The Contractor for General Construction Work shall furnish a fax machine and a telephone answering machine at commencement of the project. All materials shall be new, sealed in manufacturer's original packaging and shall have manufacturers' warranties. All items shall remain the property of the City of New York at the completion of the project.
4. Computer Workstation (Refer to the Addendum to the General Conditions for the number of Computer Workstations to be provided):

Computers shall be provided for all contracts that have a total duration of 180 Consecutive Calendar Days (CCDs) or more, as set forth in Schedule "A". Contracts that have a total duration of less than 180 CCDs shall not require computers. Computer workstations shall be provided for

the duration of the contract.

(1) Personal Computer(s) - Workstation Configuration.

- (a) Make and Model: Dell, Gateway, Toshiba, HP, IBM, or an approved equal. (Note: an approved equal requires written approval of the Assistant Commissioner of ITS.)
- (b) Processor: 3.0 GHz Pentium 4 or faster computer - Single Processor.
- (c) System RAM: Minimum of 1 GB (Gigabytes) of SDRAM or DDR.
- (d) Hard Disk Drive(s): 80 GB (Gigabytes) 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, 2 USB Ports. Serial Ports must consist of UART 16550 Chip or better.
- (h) Video Display Card: PCI Interface with a minimum of 64 MB of RAM.
- (i) Monitor: 17" TFT LCD monitor.
- (j) Available Exp. Slots: System as configured above shall have at least two (2) full size PCI Slots available.
- (k) Fax/Modem: Internal Fax/Modem 56 Kbps speed, featuring 3COM or US Robotics Chipset and supporting a minimum of V.92 and MNP5 compliant. Integrated 10/100/1000 Ethernet.
- (l) Other Peripherals: Optical scroll Mouse, 101 Key Keyboard, Mouse Pad and all necessary cables.
- (m) Software Requirements: Microsoft Windows XP Professional, Microsoft Office 2003 Professional, Microsoft Project 2002 Professional, Adobe Acrobat reader, Anti-Virus software package with one year updates subscription, Win Zip and Auto Cad 2008 LT.

(2) All field offices requiring computers shall be provided with the following:

- (a) One (1) broad-band internet service account. This account will be active for the life of the project.
- (b) One (1) 600 DPI HP Laser Jet Printer (twelve (12) pages per minute or faster) with one (1) Extra Paper Tray (Legal Size)
- (c) All necessary Cabling
- (d) Storage Boxes for and Blank CDs/DVDs
- (e) Printer Table
- (f) UPS/Surge Suppressor combo

(3) All Computer Hardware shall 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.

(4) An adequate supply of blank CD's/DVD's, and paper and toner cartridges for the printer shall be provided by the Contractor, and shall be replenished by the Contractor as required by the Engineer.

(5) 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.

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 Raul Canabal, Assistant Commissioner of Information Technology Services at 718-391-1668.

I. PUBLIC TELEPHONE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. The Contractor shall provide a public telephone located on the site, where directed, for the duration of the Contract.

J. HEAD PROTECTION (HARD HATS)

1. The Contractor shall provide a minimum of 10 standard protective helmets for the exclusive use of Department of Design and Construction personnel and their visitors. Helmets shall be turned over to the Resident Engineer and kept in the office of the Resident Engineer.

2. Upon completion of the project, the helmets shall become the property of the Contractor.

K. RODENT AND INSECT CONTROL

1. **DESCRIPTION** - The General Contractor shall 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:

a. Wet areas within the project area, including all temporary structures.

b. All exterior and interior temporary toilet structures within the project area.

c. All Field Offices and shanties within the project area of all Contractors and the Department of Design and Construction (DDC).

d. 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.

e. Any other portion of the premises requiring such special attention.

2. **MATERIALS:** All materials shall be approved by the New York State Department of Environmental Conservation 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

3. **PERSONNEL:** All pest control personnel must be supervised by an exterminator licensed in categories 7A & 8.

4. **METHODS**

- a. Application and dosage of all materials shall be done in strict compliance with the manufacturer's recommendations.
- b. Under the Maintenance of Site item (section 1.42.L), any unsanitary conditions, such as uncollected garbage or debris, resulting from the General Contractor's activities which will provide food and shelter to the resident rodent population shall be corrected by the General Contractor immediately after notification of such condition by the Commissioner

5. RODENT CONTROL WORK

- a. 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 shall be used in areas within seventy-five (75) feet of all streambanks. Live traps must be used in these seventy-five (75) foot buffer zone areas and within wetland and woodland areas.
- b. 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 shall be placed during the period of construction and any consumed or decomposed bait shall be replenished as directed.
- c. At least one 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, shall be placed at locations that are inaccessible to pets, human beings, children and other non-target species, particularly wildlife (for example-birds) in the project area.
- d. The General Contractor shall be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper proof bait stations. The General Contractor shall also be responsible for posting and maintaining signs announcing the baiting of each particular location.

The General Contractor, under his/her Maintenance of Site operations, shall be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalks within the project area.

- e. It is anticipated that public complaints will be addressed to the Commissioner. The General Contractor, where directed by the Commissioner, shall 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.
- f. Emergency service during the regular workday hours (Monday through Friday) shall be rendered within 24 hours, if requested by the Commissioner, at no additional cost to the City.

6. EDUCATION & TRAINING

- a. The General Contractor shall post notices on all Construction Bulletin Boards advising workers, employees, and residents to call the Engineer's Field Office to report any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the project area. The General Contractor shall provide and distribute literature pertaining to 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.
- b. Prior to application of any chemicals, the General Contractor shall furnish to the Commissioner copies or sample labels for each pesticide, antidote information, and Material Data Safety Sheets (MSDS) for each chemical used.

7. RECORDS AND REPORTS

- a. The General Contractor shall keep a record of all rodent and waterbug infestation surveys conducted by him/her and make available, upon request, to the Commissioner. The findings of each survey shall include, but not be limited to, recommended Integrated Pest Management (IPM) techniques, like baiting, trapping, proofing, etc., proposed for rodent and waterbug pest control.
- b. The General Contractor shall maintain records of all locations baited along with the type and quantity of rodenticide and insecticide bait used.

L. SITE SECURITY/PERIMETER SIGNAGE

1. In order to properly convey notice to persons entering upon a City construction site, the Contractor shall furnish and install a sign at the entrance (gates) as follows:

NO TRESPASSING
AUTHORIZED PERSONNEL ONLY

2. If no construction fence exists at the site, this notice shall be conveyed by incorporating the above language into safety materials (barriers, tape, and signs).

M. MAINTENANCE OF SITE AND ADJOINING PROPERTY

1. Take over and maintain the site, after order to start work.
2. Until the work of the Contract is completed and accepted, the Contractor shall be responsible for the safety of the adjoining property, including sidewalks, paving, fences, sewers, water, gas, electric and other mains, pipes and conduits etc. The Contractor shall, at its own expense, except as otherwise specified, protect same and maintain them in least as good a condition as that in which the Contractor finds them.
3. All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, maintained and repaired to serviceable condition with materials to match existing.
4. Provide and keep in good repair all bridging and decking necessary to maintain vehicular and pedestrian traffic.
5. The Contractor shall also remove all snow and ice as it accumulates on the sidewalks within the Contract Limits Lines.

N. SAFETY PRECAUTIONS FOR CONTROL CIRCUITS

1. Control circuits, the failure of which will cause a hazard to life and property, shall comply with the New York City Dept. of Buildings, Bureau of Electrical Control requirements.

O. OBSTRUCTIONS IN DRAINAGE LINES

1. The Contractor shall 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 shall be kept clear of any and all debris. Any stoppage shall be repaired immediately at the expense of the Contractor for General Construction Work.

P. MAINTENANCE OF PROJECT SITE

1. Take over and maintain all project areas, after order to start work.
2. Until the work of the Contract is completed and accepted, the Contractor shall be responsible for the safety of all project areas, including water, gas, electric and other mains and pipes and conduits and shall 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.
3. All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, maintained, and if damaged, repaired to serviceable conditions with materials to match existing.
4. The Contractor shall keep the space for the Resident Engineer in a clean condition.

Q. PROJECT SIGN AND RENDERING
PART A – PROJECT SIGN

1. Responsibility: The Contractor shall produce and install one (1) project sign which shall be posted and maintained upon the site of the project at a point and in a position where directed by the Commissioner. The Contractor shall protect the sign from damage during the continuance of work under the Contract and shall do all patching of lettering, painting and bracing thereof necessary to maintain same in first class condition and in proper position. Prior to fabrication, contractor shall submit an 8-1/2" x 11" color match print proof from the sign manufacturer of completed sign for approval by the Commissioner.
2. Sign Quality: The Contractor shall provide all materials required for the production of the sign as specified herein. Workmanship shall be of the best quality, free from defects and shall be produced in a timely manner.
3. Schedule: Upon project mobilization, the Contractor shall commence production and installation of the sign.
4. Removal: At the completion of all work under the Contract, the Contractor shall remove and dispose of the project sign away from the site.
5. Sign construction:
 - a. Frame: The frame shall be from quality dressed 2"x2" pine, fire retardant, pressure treated lumber, that surrounds the inside back edge of the sign. The sign shall have one (1) intermediate vertical and two (2) diagonal supports, glued and screwed for rigidity. Frame shall be painted white with two (2) coats of exterior enamel paint, prior to mounting of sign panel.
 - b. Edging: U-shaped, 22 gauge aluminum edging, with a white enameled finish to match sign background, shall run around entire edging of sign panel and frame. Corners shall be mitered for a tight fit. Channel dimensions shall 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 shall be constructed in one (1) piece of 14 gauge (.0785") 6061-T6 aluminum. This panel shall be prefinished 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 1/2" below edge of panel and 8" on center. The U-shaped aluminum channel shall 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. All visual components of the sign are in an Adobe *.pdf file, which is provided by the

Commissioner's representative. The file is to be opened in Acrobat Professional or Acrobat Approval in order to be saved with project information. The Commissioner's representative shall insert the project name and names and titles of personnel (3 or more) and any other required information associated with the project. At no point in the update, saving or renaming of the file should it be locked by any user. The digital file shall be provided by DDC to the Contractor (on a CD or via E-mail) for printing.

- b. The DDC *.pdf file with names provided by the commissioner shall be reproduced at the Sign Panel size of 4' x 8' on 3M High Performance Vinyl or approved equal. The sign manufacturer is required to print from the Acrobat *.pdf provided, and must match the following colors specified by Pantone: 3025 C, 119 C, 131 C, 1805 C, 1817 C in their exact locations as indicated in the *.pdf file, and on the DDC website: www.nyc.gov/buildnyc.
- c. Color shall be created in a four-color process to reproduce Pantone Colors (per Pantone formula).
 1. Pantone color 3025 C (C-100, M-17, Y-0, K-51).
 2. Pantone color 119 C (C-0, M-12, Y-100, K-49).
 3. Pantone color 131 C (C-0, M-32, Y-100, K-23).
 4. Pantone color 1805 C (C-0, M-91, Y-100, K-23).
 5. Pantone color 1817 C (C-0, M-90, Y-100, K-66).

The typeface, Helvetica shall be used in all text-fields as is specified in the settings of the Acrobat *.pdf.

Note: 3M High Performance Vinyl or equivalent shall be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking.

PART B – PROJECT RENDERING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

1. **Responsibility:** In addition to the Project Sign, the Contractor shall furnish and install one (1) sign showing a rendering of the project. From an approved image file provided by the DDC, the Project Rendering is to be sized, printed, and mounted in an identical manner as described in Part A above for the Project Sign. Any area of the 4' X 8' panel area not filled by the rendering shall be printed in Pantone color 3025 (c-100, M-17, y-0, K-51). 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 shall 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 shall remove and dispose of the project rendering away from the site.

R. PLANT PEST CONTROL REQUIREMENTS and TREE PROTECTION REQUIREMENTS

1. **Plant Pest Control Requirements:** The Contractor for General Construction Work (the "Contractor") and its subcontractors, including the Certified Arborist described below, shall 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.

- a. All tree work performed within the quarantine areas must be performed by New York State Department of Agriculture and Markets (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 sub contractor performing tree work has entered into a compliance agreement with NYSDAM. The terms of said compliance agreement shall be strictly complied with. Any host material so removed shall be delivered to a facility approved by NYSDAM. For the purpose of this contract host material shall be ALL species of trees.
 - b. Any host material that is infested with the Asian Longhorned Beetle must be immediately reported to NYSDAM for inspection and subsequent removal by either State or City contracts, at no cost to the Contractor.
 - c. Prior to commencement of tree work, the Contractor shall submit to the Commissioner a copy of a valid Asian Longhorned Beetle compliance agreement entered into with NYSDAM and the Contractor or its sub contractor performing tree work. If any host material is transported from the quarantine area the Contractor shall 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.
 - d. Quarantine areas, for the purpose of this contract shall be defined as all five boroughs of the City of New York. In addition, prior to the start of any tree work, the Contractor shall contact the NYC Department of Parks & Recreation's 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.
2. **Tree Protection Requirements:** The Contractor shall retain a Certified Arborist, as defined by New York City Department of Parks and Recreation (NYCDPR) regulations, to provide the services described below.
- a. **Surveys and Reports:** The Certified Arborist shall, 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 above; (3) evaluation of the general health and condition of any infected plant material.
 - b. **Frequency of Reports:** The Certified Arborist shall 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 24 months in duration, the Certified Arborist shall conduct a survey and prepare a report at the midpoint of construction. Copies of each plant material assessment report shall be submitted to the Resident Engineer within two (2) weeks of the survey.
 - c. **Proximity to Project Site:** Off-site trees, significant shrubs and/or planting masses shall be considered to be located in proximity to the project site under the circumstances described below.
 1. The tree trunk, significant shrub, or primary cluster of stems in a planting mass is within 50 (fifty) feet of the project's Contract Limit Lines (CLLs) or Property Lines (PLs).
 2. Any part of the tree or shrub stands within 50 (fifty) 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.

3. 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 50-foot inclusionary perimeter as outlined above.
- d. Tree Protection Plan: The Certified Arborist shall prepare, and the Contractor shall 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 NYCDPR jurisdiction as determined by the Department of Transportation, and (4) all trees that are located in proximity to the project site, as defined above. The Tree Protection Plan shall comply with the NYC 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 shall be submitted to the Resident Engineer prior to the commencement of construction. Implementation of the Tree Protection Plan for street trees and trees under NYCDPR jurisdiction shall 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 50 feet of the intersection of the project's site's property line with the street frontage property line.
3. No Separate Payment. No separate payment shall 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 shall be deemed included in the Contractor's bid for the Project.

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FMS ID: P1CROT16A



**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

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

New Construction of the Bronx River House

LOCATION: 1041 East 172nd Street
BOROUGH: Bronx 10460
CITY OF NEW YORK

BEYS SPECIALTY, INC.

Contractor

Dated NOVEMBER 14, 20 13

Approved as to Form
Certified as to Legal Authority

[Signature]
Acting Corporation Counsel

Dated January 22, 20 13

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated _____, 20 _____

[Signature]
1-22-2013





PROJECT ID: P1CROT16A

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

30-30 THOMSON AVENUE
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LAW

VOLUME 3 OF 3

**ADDENDUM TO THE GENERAL
CONDITIONS**

SPECIFICATIONS

FOR FURNISHING ALL LABOR AND MATERIALS
NECESSARY AND REQUIRED FOR:

**New Construction of the Bronx River
House**

LOCATION: 1041 East 172nd Street
BOROUGH: Bronx 10460
CITY OF NEW YORK

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

Department of Parks and Recreation

Kiss + Cathcart, Architects

Date: October 1, 2012



52-129





THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

March 15, 2013

ADDENDUM No. # 1

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

P1CROT16A

New Construction of the Bronx River House

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 March 20, 2013, at 2:00 pm is rescheduled April 3, 2013, at 2:00 pm.**

Contract #1 – General Construction Work

2. **Questions from Bidders and Responses to Questions:**

See Attachment A.

3. **Revisions to the Bid Booklet:**

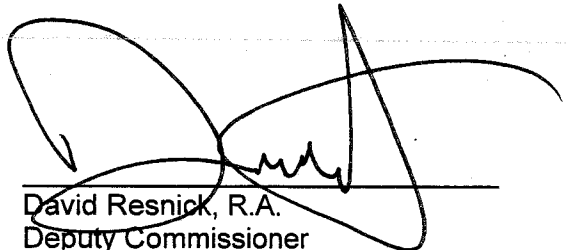
See Attachment B.

4. **Revisions to the Drawings:**

See Attachment C.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: _____



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	<p>Schedule A included in the Addendum to the General Conditions specifies that no more than 60% of the project can be subcontracted. On a project of this type, the percentage of work to be subcontracted is typically 10% to 20%. Can you please advise if the subcontracting limit requirement can be either eliminated or reduced to a more practical percentage?</p>	<p>The subcontracting limit cannot be eliminated or adjusted. Schedule A of the Addendum to the General Conditions limits subcontracts to <i>no more than 60%</i> of total project on a cost basis. Since 10%-20% is less than 60%, this percentage will conform to the requirements, providing all MWBE requirements are also met.</p>
2	<p>In order to price the cleaning and video of existing storm/sewer lines (as per Drawing Sheet C-251.01), we need to know the size of the pipes.</p>	<p>Refer to Survey Drawing Sheets X-001.01 and X-002.01 for sizes of all existing storm and sewer lines.</p>
3	<p>We have been advised by SmartBoard Building Products, Inc., one of the manufacturers listed in Specification Section 07540 "Cement Board Rain Screen," that they do not make a rainscreen system, only cement board. Please advise.</p>	<p>Rainscreen is a generic description of a stand-off type exterior wall assembly that incorporates exterior sheathing, a ventilated cavity and a moisture-resistant surface on the actual structural wall.</p> <p>The specified cement board product (by SmartBoard or approved equal) is the exterior sheathing component of the rainscreen assembly. In this case, there is no "system" that can be purchased from a single source manufacturer. The rainscreen at the Bronx River House is essentially field-built of various components.</p> <p>Other components include the vertical and horizontal wood furring and the exterior wall waterproofing over the structural AAC substrate. Refer to Drawing Sheet A-500 for rainscreen assembly details.</p>
4	<p>Drawing Sheet S-200 includes truss loading diagrams with 300lb point loads, and a 53 PSF uniform load. On the same drawing, the Design Load Schedule indicates a different loading. Please advise which loading should be followed. Please provide the division between live and dead loads.</p>	<p>The Design Load Schedule on Drawing Sheet S-200 is accurate. The truss loading diagrams have been updated accordingly, and separated into live and dead load components to assist the fabricator. Refer to Sketch SSK-01, in Attachment C Revisions to the Drawings.</p>



5	<p>The typical sections depict a double top chord truss that bears on a single plate. To make the parallel walls sections equal in height, the sections show three plates parallel to the trusses. The Red-W shown on Drawing Sheet S-101 is a 1-1/2" top chord on the flat. When installed on a single plate, the Red-W will be 1 1/2" lower than the parallel plates. For proper installation, there needs to be a plate removed from the parallel wall, or one added to the perpendicular wall. Please advise.</p>	<p>The truss section details on the drawings have been shown diagrammatically. Adjustments of plate thickness will be necessary to account for the 1 1/2" thick top chord of the Red-W by Redbuilt (or approved equal) trusses, so all trusses level out.</p>
6	<p>When this project was originally bid in 2011, the project specified the use of FSC Red-M (double 2x6 top and bottom chord truss). The Bid Drawings now call for Red-W (single 2x5 top and bottom chord) and omits the FSC requirement. Is this correct?</p>	<p>The basis of bid is for Red-W truss. There are no FSC (certified wood) requirements for this project. Contractors may purchase FSC or certified wood products, but it is not a contract requirement.</p>
7	<p>Drawing Sheet M-015.00, Note #1, indicates a submittal for refrigerant safety. This is very vague and we are not sure what your requirements are to fulfill this requirement. Please clarify.</p>	<p>Refer to Attachment C, Revisions to the Drawings for further information.</p>
8	<p>Please confirm the approximate start date for this project.</p>	<p>The Start date of the project will be immediately after awarding the contract.</p>
9	<p>The Contract Drawings indicate both an Aqua Swirl AS-2 (per Drawing Sheet C-702.01) and Stormceptor STC 450i (per Drawing Sheet R-200.00) stormwater treatment system. Please confirm if both systems are required, and if so, where is the STC 450i system located?</p>	<p>Both devices are required. Aqua Swirl AS-2, or approved equal, treats the storm discharge downstream from the tank prior to discharge into the Bronx River, per SPDES requirements. STC 450i, or approved equal, pre-treats (through gross particulate filtration / debris separation) the storm water upstream of the rainwater harvest tank, to protect filters and pumps. The STC 450i is located below the "River Plaza" East of the building. Refer to Drawing Sheet R-100.00 for location.</p>
10	<p>Drawing Sheet C-501.01 indicates 2" & 4" water lines leading up to the building. Plumbing Drawing Sheet P-003.01 indicates only one 2" line coming into the building. Please clarify.</p>	<p>There is only one municipal water service line to building, the 2" size as shown on P-003.01. Refer to Attachment C, Revisions to the Drawings, for further information.</p>
11	<p>Drawing Sheet C-501.01 indicates a new "UW" water line. Please confirm size.</p>	<p>The "UW" water line is a 2" line. This is clarified in the note attached to the "UW" line on C-501.01. The other "UW" (just west of the 2" line) is a 4" line which is deemed deleted. Refer to Attachment C, Revisions to the Drawings, for further information.</p>



2	Please confirm if a Fire Suppression system is required for this building.	There is no fire suppression system (sprinklers or standpipe) required for this building. The project is a Type IIB combustible structure, under 1968 code and is unsprinklered, as allowed under height and area limitations of Table 4-1. Refer to Drawing Sheet G-003.01 for additional information.
13	The Bid Form is over 30 pages long, and the breakdown is difficult to fill out in a timely fashion, especially when subcontractors do not provide pricing in the same breakdown categories. Can the bid form be completed after the winning bid is selected? Is there an excel file available for the bid form?	No, the bid form must be filled out as best possible and submitted at the time of bid. Bidders are permitted to "roll-up" or aggregate sub-costs if breakdown is not available or not feasible (i.e. "cost included above"). There is no excel file available to bidders. Please note that the Bid is a Lump Sum, and the Bid Form will be used for comparison purposes only.
14	Given the inherent problems of Standing Column Wells (namely higher-than-expected maintenance and operation costs and future contamination risks as groundwater is withdrawn from the aquifer), may the bidders substitute a Closed Loop Well field as an alternate? There is sufficient site area for a closed loop well field. This may be less expensive to install and maintain, and still satisfy the low-energy goals of the project.	The basis of the design is a Standing Column Well (SCW) system, two wells total. No alternates are allowed; bidders must bid on the project documents. After the bid is awarded, SCW vs. Closed Loop systems may be discussed again with the selected contractor.
15	There are several existing material piles on the site: one large pile containing dirt, one small pile containing mulch, and one mixed pile containing concrete rubble and boulders. The existing dirt pile is shown on Drawing Sheet X-002.01, but the other two are not. The note on Drawing Sheet C-201.01 indicates to "relocate existing topsoil pile as required by the Commissioner." Please clarify to where the existing dirt pile will be relocated. What happens with the mulch and the boulders?	The existing dirt pile and mulch pile must be removed off site and properly disposed of by the Contractor. This material cannot be reused on site, due to lack of test results and chain-of-custody provenance. The third pile, containing boulders and concrete chunks, must be sorted and the boulders salvaged for reuse on site. Refer to Attachment C, Revisions to the Drawings, for further information.



6	<p>The cement board appears to be unfinished. We are aware that the façade irrigation system is intended to support moss growth on the cement board. Can you confirm?</p>	<p>The cement board will remain unfinished, which is why the installation must be neat, with screws and joints aligned, etc. The cement board specified in Section 07540 "Cement Board Rain Screen" is impervious to water when properly installed (i.e. cut edges treated, etc). It can remain exposed to weather and water without deterioration. The façade irrigation tubing is intended to support future moss growth on the surface of the cement board panels. The moss is not in the contract, and may be done later, by others.</p>
17	<p>What is the Construction Cost Estimate for the project?</p>	<p>The Design Team's Construction Cost Estimate is not public information, and will not be shared with bidders until the Bid Opening.</p>
18	<p>The Bronx River House was bid before, in 2011 by NYC Department of Parks and Recreation, as project X147-107M. What has changed?</p>	<p>Since it was originally bid, the site has been enlarged substantially, by approximately 30,000 sf. The site now includes the parking lot and paths to the west, and a long strip north, between the new soccer field and the Sheridan Expressway. The scope of this new site includes new utilities connections, including a double-check valve vault, a sewage ejection pumping station, and associated landscaping features.</p> <p>The building itself has not changed significantly. Major building changes from the previous bid include (but are not limited to): additional fire-rated partitions around the lobby, new smoke purge, and the elimination of the sprinkler system. Bidders are responsible to review and bid the current Contract Drawings, and not rely on any previously bid scope.</p>



<p>9</p>	<p>There is a chain link fence currently around the site.</p> <ul style="list-style-type: none"> - Is this the Construction Limit Line (CLL)? - Will the fence be there at start of construction? - Can we reuse the fence? 	<ul style="list-style-type: none"> - No, the current location of the chain link fence does not represent the actual CLL, which is roughly 15'-0" further out (providing a large CLL), typically on the far side of the asphalt walkway along the river. - Yes, the existing chain link fence (and gate) will be in place when the site is turned over, for the Contractor's immediate use. - Yes, the contractor can re-use the existing fence, by relocating it totally or partially to the new location, depending on the Contractor's means and methods and site logistics. All construction fencing must be removed at the Contractor's expense at the conclusion of project. <p>Refer to Drawing Sheet C-301.01 for both the existing and the proposed fence locations.</p>
<p>20</p>	<p>I am having difficulty with the MWBE requirements. Can DDC help?</p>	<p>Please contact DDC at the number listed on page 6 of the Bid Booklet, "Schedule B: Subcontractor Utilization Plan – Part I: Agency's Target," for a list of registered MWBE subcontractors, including MEP.</p>
<p>21</p>	<p>Drawing Sheet A-100.01, Note #1, as well as the Specification Sections 08330 "Roll Up Doors" and 08340 "Roll Up Grilles," state that Roll Up Doors and Grilles are to be Stainless Steel. On Drawing Sheet A700.01, however, the Door Schedule indicates the materials for Roll Up Grilles to be Aluminum. Drawing Sheet A-521.00, Detail #6 also indicates Aluminum Roll Up Grilles. What is the material of the Roll Up Grilles?</p>	<p>Roll Up Grilles (in the East curved Green Screen) are Aluminum, per Section 08340 "Roll Up Grilles," Article 2.2, and Door Schedule on Drawing Sheet A-700.01. Roll Up Doors (in Boat House #12) are Stainless Steel, per Section 08330 "Roll Up Doors," Article 1.2A, and Door Schedule on Drawing Sheet A-700.01.</p>
<p>22</p>	<p>Drawing Sheet A-520.00, Detail #3 indicates 2" x 4" rectangular tube bracing to building, typ, and refers to a blowup of this location on Drawing Sheet A-522.00, Detail #1. This Detail, however, indicates a 3" x 6" steel tube bracing. Please confirm that all horizontal screen panel bracing is 2" x 4" x 1/4" steel tube, or clarify locations.</p>	<p>All horizontal screen bracing is 2" x 4" x 1/4" steel tube.</p>



23	<p>Drawing Sheet A-120.00 indicates ceramic wall tile to be a wainscot of 40" AFF. The elevations on Drawing Sheet A-400.00, however, indicate full height tile. Please clarify.</p>	<p>The extent of wall tiles is shown correctly on Drawing Sheet A-400.00. Bathrooms WC1, WC2, WC3, and WC4 have full-height tiles on all four walls. The only 40" high wainscot is the East wall of Crew Room #21, as shown on the Finish Schedule on Drawing Sheet A-120.00, and room elevation on Drawing Sheet A-400.00, Detail #3.</p>
24	<p>Specification Section 05500, "Miscellaneous Metals," indicates window security bars and grilles at roof monitors (Article 1.2A). The Details on Drawing Sheet A-710.00, however, do not clearly describe these grilles. Please provide a separate specification for the security grilles.</p>	<p>The security grille material shall be galvanized solid steel, of sizes shown on the details on Drawing Sheet A-710.00 (1/2" x 1/2" vertical bar pickets fastened to 1/2" x 1/2" horizontal bar stock). The security grille shall be fastened to window jambs with four (4) galvanized angles, 2 per side (inside mount). Size the security grilles to fit within each clerestory window opening. All clerestory windows are identical in size, but must be verified in field prior to fabrication. Refer to the performance and installation requirements listed in Specification Section 05500, "Miscellaneous Metals" for further information.</p>
25	<p>Please refer to the Drawing Sheet A-720.00, Detail X. The note states "Allow \$1,500 for complete fabrication and installation of Sign X". Does this include concrete footings as well as the sign material and installation? In addition, next to Sign "D" there is a note that states "NOTE: ALLOW \$1,500." Where does this \$1,500 allowance belong? Is it for Sign D as well? Please clarify.</p>	<p>There is no allowance for signage. Refer to Attachment C, Revisions to the Drawings, for further information.</p>
26	<p>Drawing Sheet S-300, Detail #1 indicates an S-clip by Truss Joist. Please note that Truss Joist is not in business anymore.</p>	<p>All truss accessories must be submitted for approval. An S-clip or fabricators' equivalent is acceptable for truss end connections.</p>
27	<p>Drawing Sheet R-100.00 indicates pre-cast concrete deadmen on either side of the cistern, and refers to the section on R-200.00. Drawing Sheet R-200.00 has no details for these vertical deadmen. Please provide.</p>	<p>The size and type of concrete deadmen anchors are per the tank manufacturer's recommendations. Tank and all accessories (hold-downs, fasteners, deadmen, etc.) must be submitted for review and approval. Refer to Specification Section 02120 "Harvesting System," Article 2.1C.</p>



28	<p>Please refer to Drawing Sheets C-201.01 and L-201.00. The asphalt paving area at the east side of the job site to be milled on Drawing Sheet C-201.01 and resurfaced on Drawing Sheet L-201.00 with asphalt top course, do not match. Which is correct?</p>	<p>Refer to Drawing Sheet C-201.01 for the extent of all milling and asphalt pavement replacements.</p>
29	<p>Please refer to Drawing Sheets L-400.00, L-401.00 and L-402.00. Please review the following discrepancies between the quantities of plantings obtained from the drawings and the quantity from the schedule, and advise on how we are to proceed:</p> <p><i>Description / Quantity on Plans / Quantity in Drawing Schedule:</i></p> <p>Shrubs: CS/ 21/ 22 IG 'N'/ 173/ 112 MP/ 107/ 112 RV/ 185/ 182 SC/ 11/ 13</p> <p>Perennials: RH/ 290/ ED EX/ 24/ 27</p> <p>Grasses: PV/ 756/ 567</p>	<p>Refer to Attachment D, Revisions to the Drawings, for revised Plant Schedule and section of Planting Plan.</p>
30	<p>Please provide detail drawings and specifications for the Area Drains shown on Drawing Sheet L-300.00.</p>	<p>Refer to Detail 5 on Drawing Sheet C-702.01.</p>
31	<p>Drawing Sheet S-200.00 directs us to use the 1968 NYC Building Code. Please confirm if this is your intention, as it conflicts with requirements in the specifications.</p>	<p>Yes, the project was designed and approved under 1968 code. It complies with the most recent NYC Codes (a.k.a the "2008 code" or "new code"), which includes provisions for use of the 1968 code in certain circumstances such as this.</p>
32	<p>Refer to Drawing Sheet C-501.01, Note #7. Some of the sanitary sewer pipe runs do not indicate concrete encasement. Please confirm that the only sanitary sewer pipe runs to have concrete encasement are the ones that are clearly indicated on the drawings.</p>	<p>Yes, the sanitary sewer pipe segments are to be concrete encased only where indicated on the Drawings.</p>



33	<p>Please refer to Drawing Sheet L-100.00 which shows that North of the future comfort station are six existing trees. The Drawing indicates that the hatched area around these trees is an "Absolute Critical Root Zone." Per this drawing, no excavation is to take place in this area. Drawing Sheet C-703, however, indicates that the proposed pump station will be located between existing trees 004 and 005. This pump station is more than 22 feet deep in depth and will require sheeting and a large excavated hole. As located, the excavation for the pump station and the utility lines associated with it will encroach on this restricted area. Please advise.</p>	<p>The location of utilities was determined by previously obtained approvals and permits, and cannot be relocated. Refer to Specification Section 02316, "Pneumatic Excavation," as well as Attachment C, Revisions to the Specifications, which includes additional methods for installing utility lines within the Absolute Critical Root Zone (ACRZ).</p>
34	<p>In the Contract Drawings, insulated sandwich panels shown to be used in Wall Type B, specified as InsuLam or Nailboard, are not available with 3/4" CDX Plywood as a standard product. Can the manufacturers' standard 7/16" or 5/8" Oriented Strand Board (OSB) be used in lieu of 3/4" CDX Plywood?</p>	<p>Yes, 5/8" OSB is acceptable.</p>
35	<p>The insulated panels are 4" nominal thickness inclusive of the Oriented Strand Board (OSB) facing. Therefore, the overall wall thickness of 9-5/8" will actually be approximately 8-7/8". Please update wall types and roof monitor dimensions affected by this change.</p>	<p>In regards to wall types, the Contractor is to provide the insulated panels of 4-1/2" nominal thickness, inclusive of sheathing (see response #34 above, too). This is a standard nailboard size by John Mansville (or approved equal). The overall wall thickness shown on Drawing Sheet A600.01, Detail #1 remains the same. As for the roof monitors, these are constructed from clear roof structural wood deck openings, as shown on Drawing Sheet S-101.00 and on Drawing Sheet A-530.00, Detail #1. The overall exterior dimensions of monitors, and the dimension between monitors, is not critical.</p>
36	<p>Detail #4A on Drawing Sheet A-521.00 calls out "stucco finish" on the parapet wall. Is there a specification for stucco in this project?</p>	<p>No, there is no stucco in the project: references to stucco are deemed deleted. Refer to Drawing Sheet 600.01, Detail #5 "Waterproofing System for Walls" and Drawing Sheet A-310.00, Detail #9 "Roof Waterproofing System."</p>
37	<p>Refer to on Drawing Sheet A-710.00, Detail #6. The sill and head shown here conflict with Sections #1 and #3 on Drawing Sheet A-530.00. Detail #6 shows the stainless steel flashing as independent of window construction, whereas Sections #1 and #3 show the sill as integral to window unit. Please advise.</p>	<p>Roof monitor windows are to receive independent (separate) stainless steel sill flashing, as shown on Drawing Sheet A-710.00, Detail #6.</p>



88

Does the window/stainless steel diagram on Drawing Sheet A-710.00 apply only to the masonry openings that show the stainless steel jamb flashing, as in Detail #1 1? No stainless steel jamb flashing is shown for W3 and W4 types.

Yes, the stainless steel surround shown on the axonometric diagram on A-530.00 applies only to windows in AAC masonry walls, window types W1 and W2.



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT B – REVISIONS TO THE BID BOOKLET

Delete page 22 of the Bid Booklet in Volume 1 and replace with revised page 22, included with this Addendum.



**ATTACHMENT 1 - BID INFORMATION
PROJECT ID: PICROT16A**

DESCRIPTION AND LOCATION OF WORK:

**Bronx River House
1041 East 172nd Street
Bronx, NY 10460
E-PIN: 85013B0023 / DDC PIN: 8502013PV0004C**

DOCUMENTS AVAILABLE AT:

Department of Design and Construction, Contract Section
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

SUBMISSION OF BIDS BEFORE BID OPENING:

TIME TO SUBMIT:

On or Before: **WEDNESDAY, MARCH 20, 2013**

BIDS MUST BE CLOCKED IN PRIOR TO BID OPENING

PLACE TO SUBMIT:

Department of Design and Construction, Contract Section (located behind Security Desk)
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

BID OPENING:

PLACE OF BID OPENING:	Department of Design and Construction Contract Section 30-30 Thomson Avenue – First Floor Long Island City, NY 11101
DATE AND HOUR:	WEDNESDAY, MARCH 20, 2013 @ 2:00 PM
	LATE BIDS WILL NOT BE ACCEPTED

PRE-BID CONFERENCE

PLACE	Bronx River House 1041 East 172nd Street Bronx, NY 10460
DATE AND HOUR	WEDNESDAY, MARCH 6th, 2013 AT 10:00AM
MANDATORY OR OPTIONAL	OPTIONAL

BID SECURITY:

Bid Security is required in the amount set forth below; provided, however, bid security is not required if the TOTAL BID PRICE set forth on the Bid Form is less than \$1,000,000.

- (1) Bond in an amount not less than 10% of the TOTAL BID PRICE set forth on the Bid Form, OR
- (2) Certified Check in an amount not less than 2% of the TOTAL BID PRICE set forth on the Bid Form

PERFORMANCE AND PAYMENT SECURITY:

Required for Contracts in excess of \$1,000,000.00. Performance and Payment Security shall each be in an amount equal to 100% of the Contract Price

AGENCY CONTACT PERSON:

Lorraine Holley, 30-30 Thomson Avenue - First Floor, Long Island City, Queens, NY 11101
Telephone (718) 391-2200 or (718) 391-2601 Fax: (718) 391-2615



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT C – REVISIONS TO THE DRAWINGS

Drawing Sheet SE-100.00:

Delete reference to "150w HPS cobrahead luminaries (two per pole, four total)" and replace with the following text:

110w LED cobrahead NYC DOT 670.01100039 L.E.D ROADWAY LUMINAIRE (two per pole, four total).

Drawing Sheet C-201.01:

Include Note #18:

Boulders to be salvaged and stored on site. Pile to be sorted, boulders by size, and concrete rubble discarded. A portion (approximately 30-40), as determined by the Commissioner, to be removed or crushed for subsurface use on site.

Drawing Sheet C-501.01:

Delete all references to 4" supply lines.

Drawing Sheet A-400.00:

Revise all lavatory mirrors M-1 to ASI #0600 or equal (without shelf).

Drawing Sheet A-720.00:

The following text is deemed deleted:

2.) Allow \$1,500 for complete fabrication and installation of Sign X.

Note: Allow \$1,500.

Drawing Sheet S-200.00:

Refer to supplementary Sketch SSK-1, included with this Addendum.

Drawing Sheet M-015.00:

Delete Note #1 in its entirety and replace with the following text:

All work performed on the refrigerant equipment shall meet all requirements of EPA Section 608 of the "Federal Clean Air Act." All workers performing work on the refrigeration equipment shall be EPA certified or have obtained approved technician certifications as "universal technicians" in accordance with Section 608 of the "Federal Clean Air Act" and "U.S. CFR Part 82, Sub Part F."

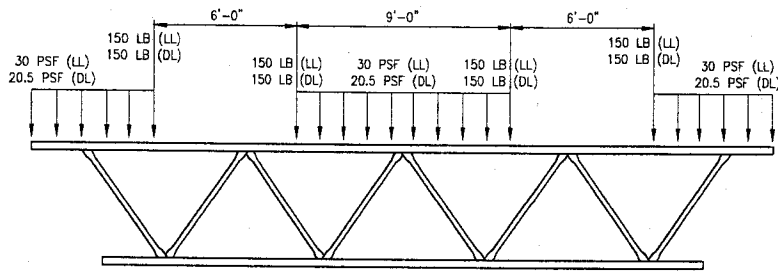
Drawing Sheet P-003.01:

Refer to Sketch B-SKP-01, included with this Addendum.

Drawing Sheet P-008.01:

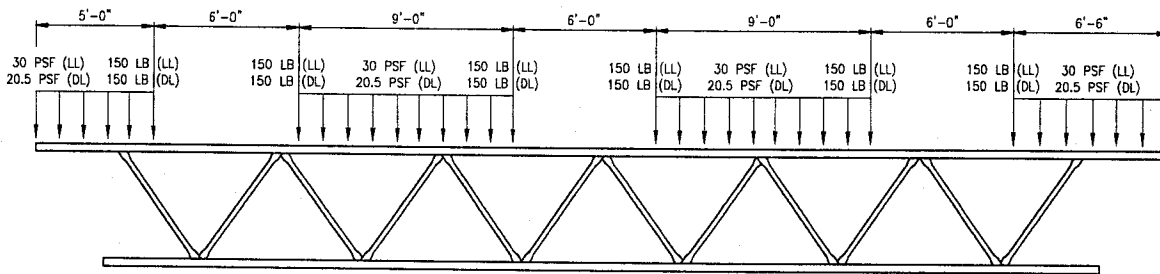
Refer to Sketch B-SKP-02, included with this Addendum.





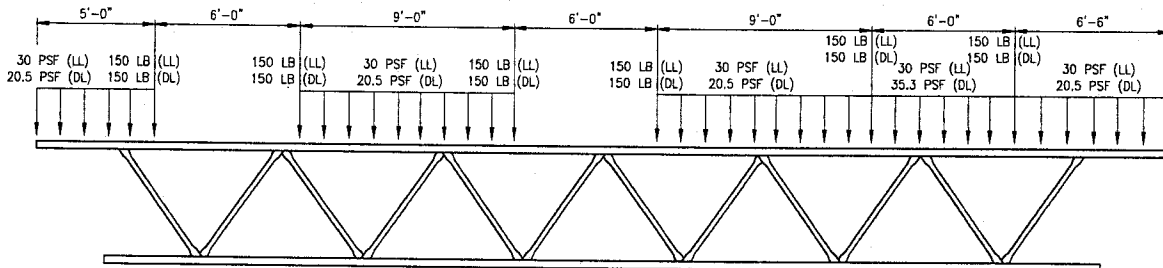
TRUSS LOADING DIAGRAM
NOT TO SCALE

1
S-200



TRUSS LOADING DIAGRAM
NOT TO SCALE

2
S-200



TRUSS LOADING DIAGRAM
NOT TO SCALE

3
S-200

Title: **REVISED TRUSS LOADING**

Date: 02/28/2013

Scale: N.T.S.

ROBERT SILMAN ASSOCIATES
STRUCTURAL ENGINEERS
88 University Place
New York, NY 10003
P 212.620.7970 F 212.620.8157

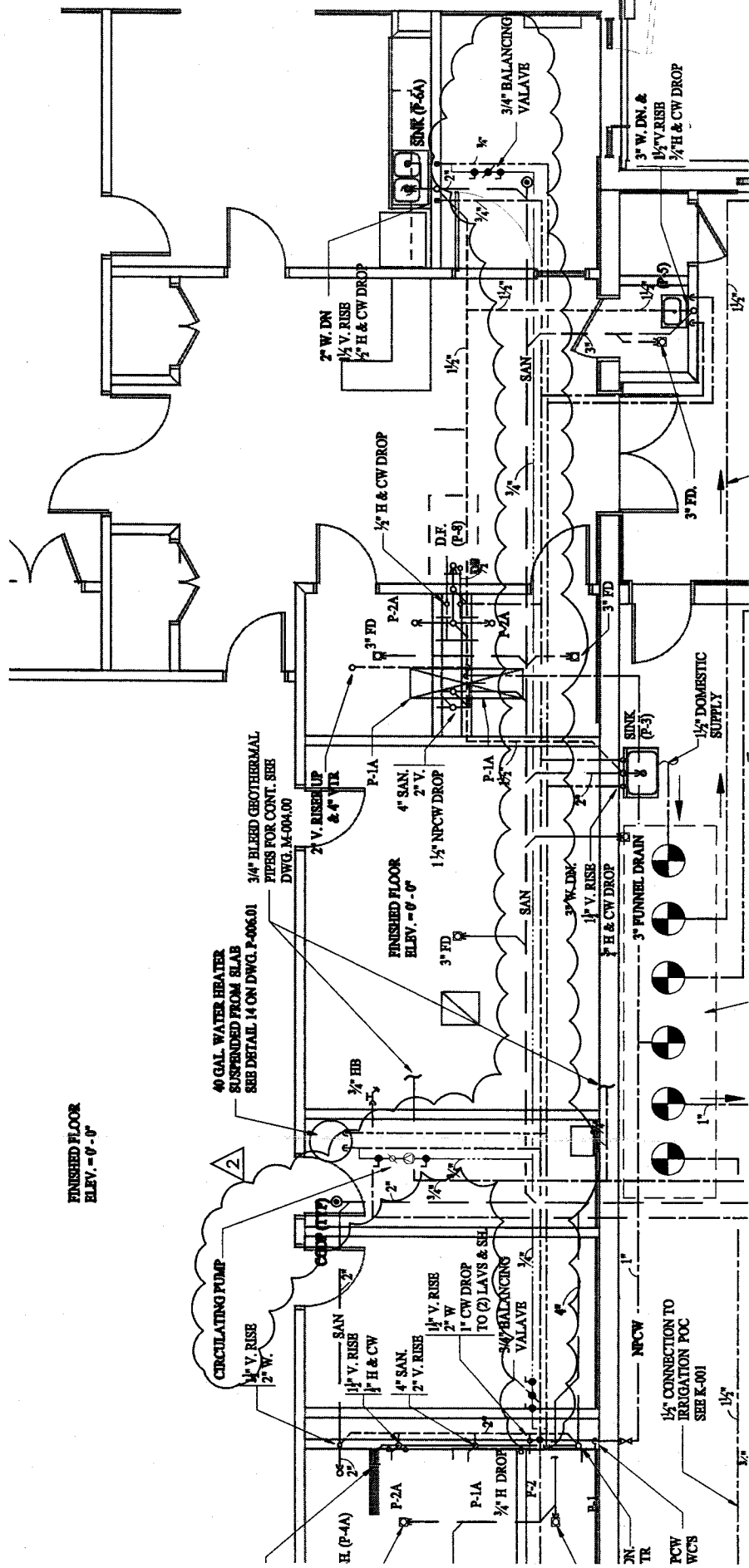
Job Title: **BRONX RIVER
GREENWAY**

Job Number: 12377

Reference number: RFI-1

SSK-1





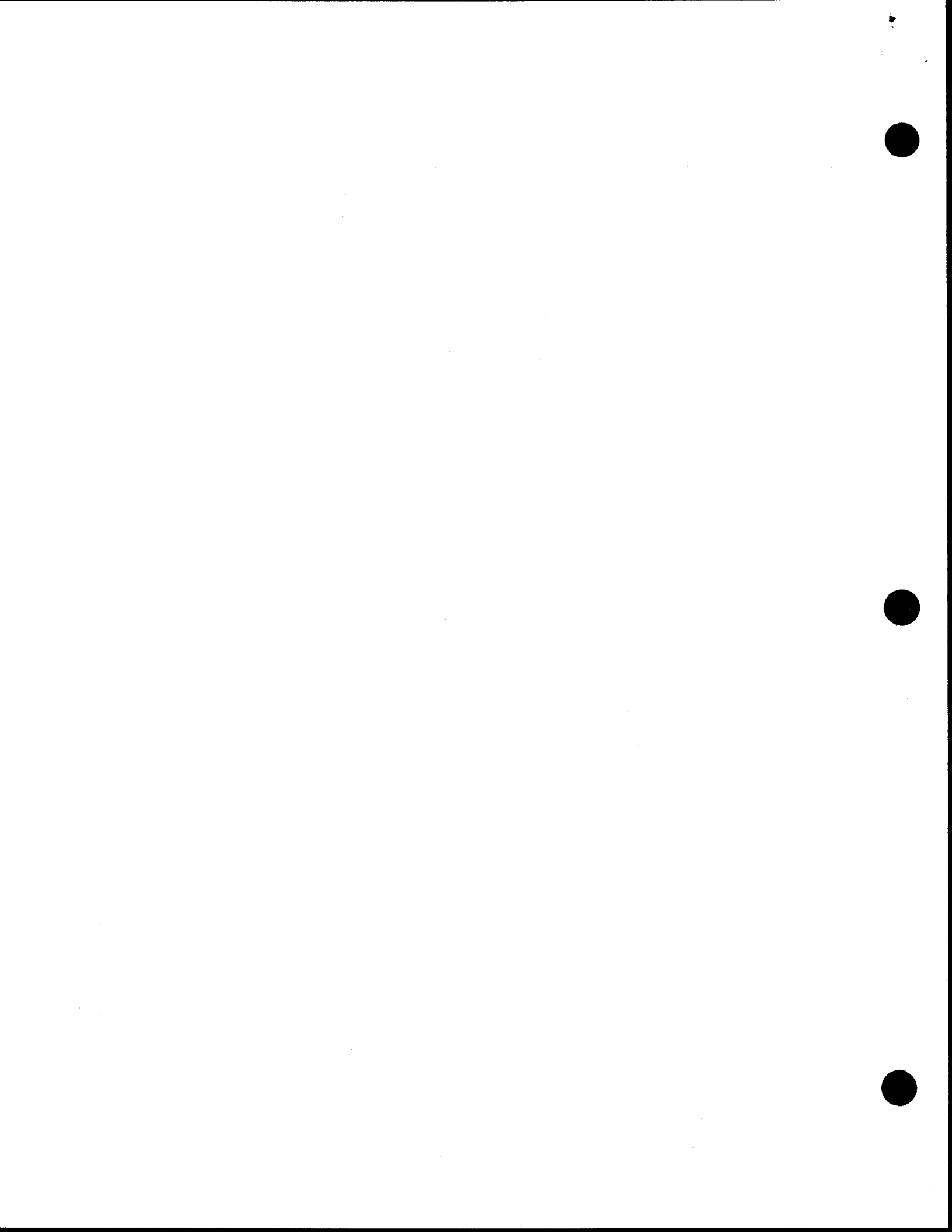
ADDENDA #1

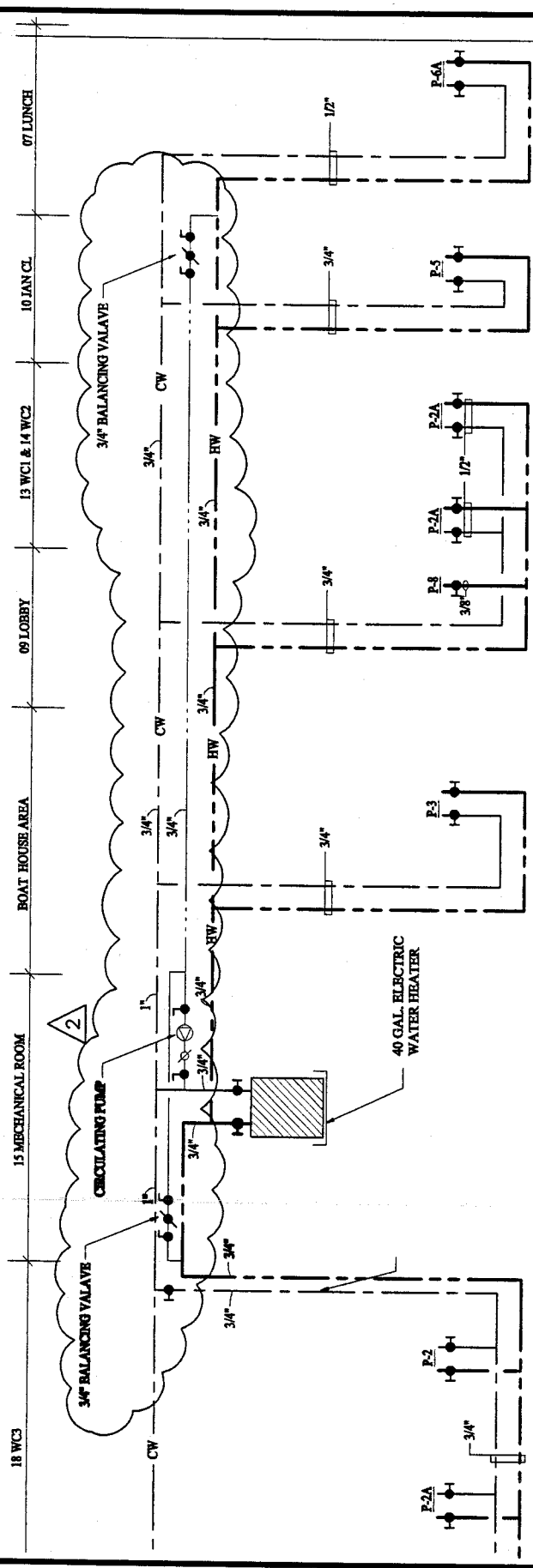
Title: **HOT WATER RECIRCULATING PIPING**
 Project: **BRONX RIVER HOUSE FMS P1CROT16A**

A.G. Consulting Engineering, P.C.
 MECHANICAL / ELECTRICAL ENGINEERS
 131 WEST 33RD STREET, UNIT 128
 NEW YORK, NY 10001
 Tel: (212) 268 0660 Fax: (212) 268 7497
 E-mail: agceng@aol.com

Job No.: **J7011**
 Date: **03-04-2013**
 Scale: **1/8" = 1'-0"**
 Drawn By: **E.B.**
 Designed By: **E.B.**

Reference Dwg.: **P-003.01**
 Sketch No.: **B-SKP-01**
 Sheet **1** of **2**





ADDENDA #1

Title: **HOT WATER RECIRCULATING PIPING**
 Project: **BRONX RIVER HOUSE FMS P1CROT16A**

A.G. Consulting Engineering, P.C.
 MECHANICAL / ELECTRICAL ENGINEERS
 151 WEST 35th STREET, UNIT 12B
 NEW YORK, NY 10001
 Tel: (212) 265 0960 Fax: (212) 265 7497
 E-mail: agcong@sdi.com

Job No.: J7011	Reference Dwg.: P-008.01
Date: 03-04-2013	Sketch No.: B-SKP-02
Scale: N.T.S.	Sheet 2 of 2
Drawn By: E.B.	
Designed By: E.B.	





THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

March 22, 2013

ADDENDUM No. # 2

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

P1CROT16A

New Construction of the Bronx River House


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. **Questions from Bidders and Responses to Questions:**
See Attachment A.
2. **Revisions to the Bid Booklet:**
See Attachment B.
3. **Revisions to the Specifications:**
See Attachment C.
4. **Revisions to the Drawings:**
See Attachment D.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.

DR 

David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: _____



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	<p>Please refer to Drawing Sheets L-400.00, L-401.00 and L-402.00. Please review the following discrepancies between the quantities of plantings obtained from the drawings and the quantity from the schedule, and advise on how we are to proceed: <i>Description / Quantity on Plans / Quantity in Drawing Schedule:</i> Shrubs: CS/ 21/ 22 IG 'N'/ 173/ 112 MP/ 107/ 112 RV/ 185/ 182 SC/ 11/ 13 Perennials: RH/ 290/ ED EX/ 24/ 27 Grasses: PVI 756/ 567</p>	<p>Refer to Attachment D, Revisions to the Drawings, for revised Plant Schedule and section of Planting Plan.</p>
2	<p>Please refer to Drawing Sheet L-100.00 which shows that North of the future comfort station are six existing trees. The Drawing indicates that the hatched area around these trees is an "Absolute Critical Root Zone." Per this drawing, no excavation is to take place in this area. Drawing Sheet C-703, however, indicates that the proposed pump station will be located between existing trees 004 and 005. This pump station is more than 22 feet deep in depth and will require sheeting and a large excavated hole. As located, the excavation for the pump station and the utility lines associated with it will encroach on this restricted area. Please advise.</p>	<p>The location of utilities was determined by previously obtained approvals and permits, and cannot be relocated. Refer to Specification Section 02316, "Pneumatic Excavation," as well as Attachment C, Revisions to the Specifications, which includes additional methods for installing utility lines within the Absolute Critical Root Zone (ACRZ).</p>
3	<p>Please refer to Details #1 and #2 on Drawing Sheet L-500.00. The Details make reference to foundation material for asphalt. Please confirm if Recycled Concrete Aggregate (RCA) is an acceptable foundation material for asphalt in accordance with Specification Section 02300, "Earthworks," paragraph 2.1E.</p>	<p>Per DPR standards, RCA is not allowed under asphalt or permeable or open jointed pavements (including boathouse plaza). See Attachment C, Revisions to the Specifications, for further information.</p>
4	<p>The Contract Drawings indicate "galvanized steel mesh, typ." at Green Screen panels. Specification Section 05500, "Miscellaneous Metals," indicates "steel mesh as indicated." Please provide a specification for the steel mesh.</p>	<p>See Attachment C, Revisions to the Specifications, for further information.</p>



5	<p>Please refer to Drawing Sheet C-201.01. The drawing states "Sheet Pile removal: assume 400SF. Provide unit price." There is no place on the bid form or any specification for unit prices in the bid documents. If any unit prices are required, please revise the bid form and provide a specification for unit prices. Please advise on how we are to proceed.</p>	<p>See Attachment B, revisions to the Bid Booklet, for revised Bid Form.</p>
6	<p>The sheet piling denoted on Drawing Sheet C-201.01 was not visible at the time of Pre-Bid Walk Through due to locked gates. This Drawing has notes requiring contractors to cut existing sheet piling below grade and to 'remove' approximately 400SF of sheet piling. It is impossible to provide unit pricing for either of these activities without knowing the existing elevation, length, and type of sheet piling. Please provide this missing information.</p>	<p>All known information is provided on Contract Documents. We assume that sheeting was cut 4'-0" below grade – though this is not confirmed and sheeting is not visible. The Contractor to price 400SF of sheet pile removal. See Attachment B, Revisions to the Bid Booklet, for revised Bid Form.</p>
7	<p>Drawing Sheet FO-100.00 requests a unit price for the installation of timber piles. The bid form does not seem to allow for this. Please direct us on how to proceed.</p>	<p>See Attachment B, Revisions to the Bid Booklet, for revised Bid Form.</p>
8	<p>Drawing Sheet L-201.00 has a section cut line through the stone wall referring to Detail #7 on Drawing Sheet L-505.00. There is no Drawing Sheet L-505.00 listed in the drawing index. Where can a section of this wall condition be found?</p>	<p>Refer to Detail #3 on Drawing Sheet L-504.00. See Attachment D, Revisions to the Drawings, for further information.</p>
	<p>Inaccessibility to the site for the March 6th Pre-Bid Walk Through presents a serious impediment to subcontractors needing to view existing conditions. We are requesting a new site walk-through date and an extension to the bid due date of at least two weeks in order to schedule trade contractors.</p>	<p>There will be no rescheduled Pre Bid Walk Through. The Bid Opening Date will take place on April 3, 2013 at 2:00pm.</p>
10	<p>Specification Section 02300, "Earthwork," refers to an "Operable Unit 1 Site Management Plan" in Article 1.4E2. This document is not included in the Bid Package. Please provide the Operable Unit 1 Site Management Plan referenced above for our use and review.</p>	<p>See Attachment C, Revisions to the Specifications, for this information.</p>



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT B – REVISIONS TO THE BID BOOKLET

Insert page 13-0 into the Bid Booklet, included with this Addendum.

Delete page 13 of the Bid Booklet in Volume 1 and replace with revised page 13-R, included with this Addendum.

Delete page 21-3 of the Bid Booklet in Volume 1 and replace with revised page 21-3R, included with this Addendum.



Unit Price Schedule

Unit Price items: The items of work set forth in the Schedule below shall be performed by the contractor on a unit price basis for additional work. Such items of work shall be performed by the contractor only as directed in writing by the Commissioner.

The unit price for the items of work in the Schedule below are for EXTRA WORK ONLY i.e., work which is above and beyond that described in the Drawings and Specifications.

The bidder shall submit prices for all the items of work in the Schedule below. The bidder shall insert the total sum for all unit price items on the Bid Form, Item C - Allowance for Unit Prices. The unit price bid for each item shall include all costs and expense for the item, i.e., labor, material, overhead and profit. Quantities shown are approximate and for bid comparison purposes only. Actual amounts to be determined when the work is performed.

CSI #	Item #	Item Description	Quant.	Units	Unit Price	Total
02300	1	SHEET METAL PILING REMOVALS: Remove underground sheet pilings, where removal is necessary to install new work, as directed by the Commissioner.	40	SF		
04500	2	TIMBER PILES: Provide additional timber pile length, over and above the 25' per pile provisional quantity in the Bid Breakdown. Include all associated pre-drilling.	3	LF		

Total Amount of Unit Price Work

* Insert Total amount of Unit Price Work on line C of Bid Form

*

Note: All quantities are approximate



BID FORM

PROJECT ID: P1CROT16A

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. **LUMP SUM PRICE** - Total price for all labor and material for all required work, excluding items (B), (C) and (D) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For
Labor

Total Price for Material
Sold and Delivered

\$ _____ + \$ _____ Total Price for Item A \$ _____

B. ALLOWANCE for Part A-1 of Standing Column Well System Const. Seq. \$17,000.00
(Article 1.45 of the Addendum to General Conditions)

C. ALLOWANCE for Part A-2 of Standing Column Well System Const. Seq. \$135,000.00
(Article 1.45 of the Addendum to General Conditions)

D. AMOUNT for Unit Prices (from page 13-0) for extra work items \$ _____

TOTAL BID PRICE (Add A + B + C + D) \$ _____
(a/k/a BID PROPOSAL)

BIDDER'S SIGNATURE AND AFFIDAVIT

WARNING!! Failure to comply with items below will result in the rejection of your bid.

SUBCONTRACTORS: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (See Page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". _____ Yes _____ No

MWBE GOALS: You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.

Bidder: _____

By: _____
(Signature of Partner or corporate officer)

Attest:
(Corporate Seal)

Secretary of Corporate Bidder

Affidavit on the following page should be subscribed
and sworn to before a Notary Public





NEW YORK CITY DEPARTMENT OF
DESIGN + CONSTRUCTION

Project: Bronx River Boathouse

Location: 1041 East 172nd Street, Bronx, NY 10460

Bidder:

CONTRACT 1 - General Construction

DDC ID: P1CROT16A

Sponsor Agency: Dept of Parks and Recreation

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
	Site Grading/ Leveling (Earthmoving)		CY					
	Borrowed Fill (Truck Measured)		CY					
	Borrowed Fill (Measured In Place)		CY					
	Excavation and Backfill (Unclassified excavation) for Storm Lines and Sheridan Outfall		CY					
	Fine Grade at Sod or Groundcover (Earthmoving)		SF					
	6" Gravel Base for Paving (Broken Stone)		CY					
	Geotextile - Drainage		SY					
	Geotextile - Separation		SY					
	Broken Stone - Loose Measure		CY					
	Sand		CY					
	Foundation Material for Asphalt (Truck Measured)		CY					
	Sheeting and Shoring		SF					
	Sheeting and Shoring (Trenching Utilities to CS and Spray Controls)		SF					
	Sheet Pile Removal (assume 400 SF)		LS					
	Dewatering		LS					
	Subtotal							
02 316	PNEUMATIC EXCAVATION							
	Hand and/or Pneumatic Excavation		CY					
	Subtotal							
02 370	EROSION CONTROLS							
	Catch Basin Silt Sack		EA					
	Temporary Silt Fence		LF					
	Stabilized Construction Entrance		SY					
	Subtotal							
02 371	GABION RETAINING WALLS							
	Stone Gabions 18"X18"X3'0" H. including Stake Supports		LF					
	Recycled Plastic Lumber (RPL) Edging		LF					
	Subtotal							



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT C – REVISIONS TO THE SPECIFICATIONS

Section 02300 Earthwork, page 8:

Delete Article 2.1E and replace with the following text:

E. Pavement Subbase Fill: Subbase materials below asphalt and concrete pavements shall consist of clean granular soils or crushed stone conforming to the requirements of NYSDOT Item No. 304.14, Subbase Course, Type 4. Recycled concrete aggregate RCA is not allowed.

Section 02316 Pneumatic Excavation:

Page 1: include the following text to Article 1.2:

B. The Contractor shall utilize tunneling or horizontal directional drilling for the installation of utilities within the absolute critical root zones (ACRZ) of existing trees as shown on the drawings.

Page 2: include the following text to Part 2 Products:

2.2 Tunneling or boring beneath the roots located within the ACRZ shall be accomplished with a horizontal directional drilling rig, compaction boring, augers or other appropriate machinery.

Page 4: include the following text to Part 3 Execution:

*Tunneling or boring shall be a minimum of 3' deep.
B. Excavate / trench at either end of the tunnel run.
Use extreme care to ensure that all air pockets are backfilled.*

Section 05500 Miscellaneous Metals, page 10:

Include the following text to Article 2.6C1:

a. Green screen mesh to be pre-galvanized lock-crimp woven wire (WW) mesh in two sizes, 1" x 1" square and 2" x 2" square, in locations shown on drawings. These dimensions are wire center-to-center. All mesh to meet ASTM E 2016-06 standards.

b. 1" x 1" square mesh: provide industrial grade WW mesh by Banker Wire or equal, 0.135" wire diameter.

c. 2" x 2" square mesh: industrial WW mesh by Banker Wire or equal, 0.192" wire diameter.

d. For structural calculations required elsewhere in this Section, assume fully vegetated mesh panels with approximately 8 PSF of plant material weight. Structural calculations must include mesh.

Appendix

Include the following Appendix item to the Bid Package, included with this Addendum:

Operable Unit 1 Site Management Plan, East 173rd Street Works Former MPG Site, March 2010



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT D – REVISIONS TO THE DRAWINGS

Drawing Sheet L-201.00:

Section Cut Line reference to Detail #7 on Drawing Sheet L-505.00 is revised to Detail #3 on Drawing Sheet L-504.00.

Drawing Sheet L-400.00:

Refer to Sketch LSK-002, included with this Addendum.

Drawing Sheet L-402.00:

Refer to Sketch LSK-001, included with this Addendum.

Drawing Sheet A-100.01:

Refer to Sketch ASK-001, included with this Addendum:

A new recessed electrical panel 4A to the West wall of Classroom #11, between classroom and janitor closet #10. Wall type revised to accommodate depth of recessed panels.

Drawing Sheet E-002.00:

Refer to Sketch SKE-1, included with this Addendum:

The following are included: circuitry for HW recirculating pump, two (2) additional dedicated outlet in #12 Boat Storage for irrigation equipment, one (1) additional 50-amp dedicated outlet in #12 Boat Storage for owner-provided power-washer equipment. Modified location of operable clerestory window motor switches as shown on attached sketches. Quantity of motor switches remains the same. Quantity of operable windows changed on E-002.00 to reflect actual quantity of window type W3 shown on A-103.00.

Refer to Sketch SKE-4, included with this Addendum:

Notes have been revised to clarify extent of concealed vs. surface-mounted electrical work, color of electrical devices and recessed panels.

Drawing Sheet E-007.00:

Refer to Sketch SKE-2, included with this Addendum:

A new recessed electrical panel 4A to the West wall of Classroom #11, between classroom and janitor closet #10. Wall type revised to accommodate depth of recessed panels.

Drawing Sheet E-011.00:

Refer to Sketch SKE-3, included with this Addendum:

A new recessed electrical panel 4A to the West wall of Classroom #11, between classroom and janitor closet #10. Wall type revised to accommodate depth of recessed panels.



PLANT SCHEDULE

SYMBOL	QTY	BOTANICAL NAME	COMMON NAME	SPACING	SIZE	HEIGHTS
TREES						
AR	2	ACER RUBRUM 'RED SUNSET'	RED MAPLE	AS SHOWN	B&B, 2.5"-3" CALIPER	12'-0" - 14'-0"
GT	5	GLEDITSIA TRIACANTHOS 'INERMIS 'HALKA'	HALKA HONEYLOCUST	AS SHOWN	B&B, 2.5"-3" CALIPER	12'-0" - 14'-0"
NS	6	NYSSA SYLVATICA	BLACK GUM	AS SHOWN	B&B, 2.5"-3" CALIPER	12'-0" - 14'-0"
SF	1	SASSAFRAS ALBIDIUM	SASSAFRAS	AS SHOWN	B&B, 1.5"-2.5" CALIPER	12'-0" - 14'-0"
MULTISTEMMED						
ACA	1	AMELANCHIER CANADENSIS	SHADBUSH SERVICE BERRY	AS SHOWN	B&B, MULTI-STEMMED	7'-0" - 8'-0"
MV	7	MAGNOLIA VIRGINIANA 'HENRY HICKS'	HENRY HICKS SWEETBAY MAGNOLIA	AS SHOWN	B&B, MULTI-STEMMED	8'-0" - 10'-0"
SHRUBS						
AA	11	ARONIA ARBUTIFOLIA 'BRILLIANTISSIMA'	RED CHOKEBERRY	36" O.C.	5 GALLON	2'-0" - 3'-0"
CA	3	CLETHRA ALNIFOLIA	CLETHRA	48" O.C.	10 GALLON	4'-0"
CAR	22	CLETHRA ALNIFOLIA 'RUBY SPICE'	SUMMERSWEET	36" O.C.	5 GALLON	2'-0" - 3'-0"
CS	22	CORNUS SERICEA 'ISANTI'	ISANTI REDOSIER DOGWOOD	48" O.C.	7 GALLON	3'-0" - 4'-0"
IG 'N'	173	ILEX GLABRA 'NORDIC'	NORDIC COMPACT INKBERRY	24" O.C.	5 GALLON	1'-6" - 2'-0"
JGC	191	ILEX GLABRA 'COMPACTA'	COMPACT INKBERRY	36" O.C.	5 GALLON	2'-0" - 3'-0"
IV	10	ITEA VIRGINICA	SWEETSPIRE	36" O.C.	3 GALLON	18"-24"
MP	106	MYRICA PENNSYLVANICA	NORTHERN BAYBERRY	48" O.C.	B&B	3'-0" - 4'-0"
RG	64	RHUS GLABRA	SMOOTH SUMAC	48" O.C.	B&B	3'-0" - 4'-0"
RV	185	ROSA VIRGINIANA	VIRGINIA ROSE	36" O.C.	5 GALLON	2'-0" - 3'-0"
SA	6	SYMPHORICARPOS ALBUS	SNOWBERRY	36" O.C.	3 GALLON	18"-24"
SC	11	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	48" O.C.	B&B	3'-0" - 4'-0"
VA	315	VACCINIUM ANGUSTIFOLIUM	LOWBUSH BLUEBERRY	18" O.C.	3 GALLON	12"-18"
VINES						
CR	10	CAMPISIS X TAGLIABUANA 'MME GALEN'	MME GALEN TRUMPETCREEPER	AS SHOWN	6'-0" - 8'-0" TENDRILS	
CVA	7	CLEMATIS MONTANA 'ALEXANDER'	ALEXANDER CLEMATIS	AS SHOWN	6'-0" - 8'-0" TENDRILS	
PQ	47	PARTHENOCISSUS QUINQUEFOLIA	VIRGINIA CREEPER	AS SHOWN	6'-0" - 8'-0" TENDRILS	
PT	32	LONICERA SEMPERVIRENS 'HENRY'	TRUMPET HONEYSUCKLE	AS SHOWN	6'-0" - 8'-0" TENDRILS	
PERENNIALS						
CV	147	COREOPSIS VERTICILLATA 'GOLDEN GAIN'	TICKSEED	18" O.C.	2 GALLON	
AS	63	ASTILBE CHINENSIS 'MAGGIE DALEY'	MAGGIE DALEY ASTILBE	12" O.C.	2 GALLON	
CL	19	COREOPSIS LANCEOLATA	TICKSEED	12" O.C.	2 GALLON	
CLT	57	CAMPANULA LATIFOLIA 'SARASTRO'	SARASTRO BELL FLOWER	18" O.C.	2 GALLON	
EP	262	ECHINACEA PURPUREA 'MAGNUS'	MAGNUS PURPLE CONEFLOWER	18" O.C.	2 GALLON	
EX	27	ECHINACEA PARADOXA	YELLOW CONEFLOWER	18" O.C.	2 GALLON	
GM	277	GERANIUM MACULATUM 'ESPRESSO'	ESPRESSO GERANIUM	12" O.C.	2 GALLON	SEE NOTE 2
RH	290	RUDBECKIA HIRTA 'INDIAN SUMMER'	INDIAN SUMMER BLACK-EYED SUSAN	12" O.C.	2 GALLON	
SS	57	SALVIA X SUPERBA	SAGE	18" O.C.	2 GALLON	
GRASSES						
CG	155	CAREX FRASERI	FRASER'S SEDGE	12" O.C.	1 GALLON	
DC	76	DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	18" O.C.	3 GALLON	
ES	64	ERAGROSTIS SPECTABILIS	ED	18" O.C.	2 GALLON	
PV	756	PANICUM VIRGATUM 'HANSE HERMS'	RED SWITCH GRASS	18" O.C.	3 GALLON	
SH	259	SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED	18" O.C.	3 GALLON	
FERNS						
MS	34	MATTEUCCIA STRUTHIOPTERIS	OSTRICH FERN	AS SHOWN	2 GALLON	
PA	38	POLYSTICHUM ACROSTICHOIDES	CHRISTMAS FERN	AS SHOWN	2 GALLON	
GROUND COVER						
AU	347	ARCTOSTAPHYLOS UVA-URSI	BEARBERRY	10" O.C.	1 QT	
BULBS						
AC	207	CAMASSIA LEICHTLINII 'BLUE DANUBE'	BLUE DANUBE CAMAS LILY	6" O.C.	BULBS 12-14 CM	SEE NOTE 1
LL	235	LILLIUM LANCIFOLIUM	TIGER LILY	6" O.C.	BULB - 12-14 CM	
MOSS						
	60 SF	HYPNUM	SHEET MOSS			SEE NOTE 3
	20 SF	LEUCOBRYUM	CUSHION MOSS			SEE NOTE 3
NOTE 1: PLANT IN CLUMPS OF 6-12						
NOTE 2: INTERPLANT WITH CAMAS LILY						
NOTE 3: SHEET AND CUSHION MOSS TO BE PLANTED IN THE GAPS BETWEEN RIVER COBBLE PAVEMENT						



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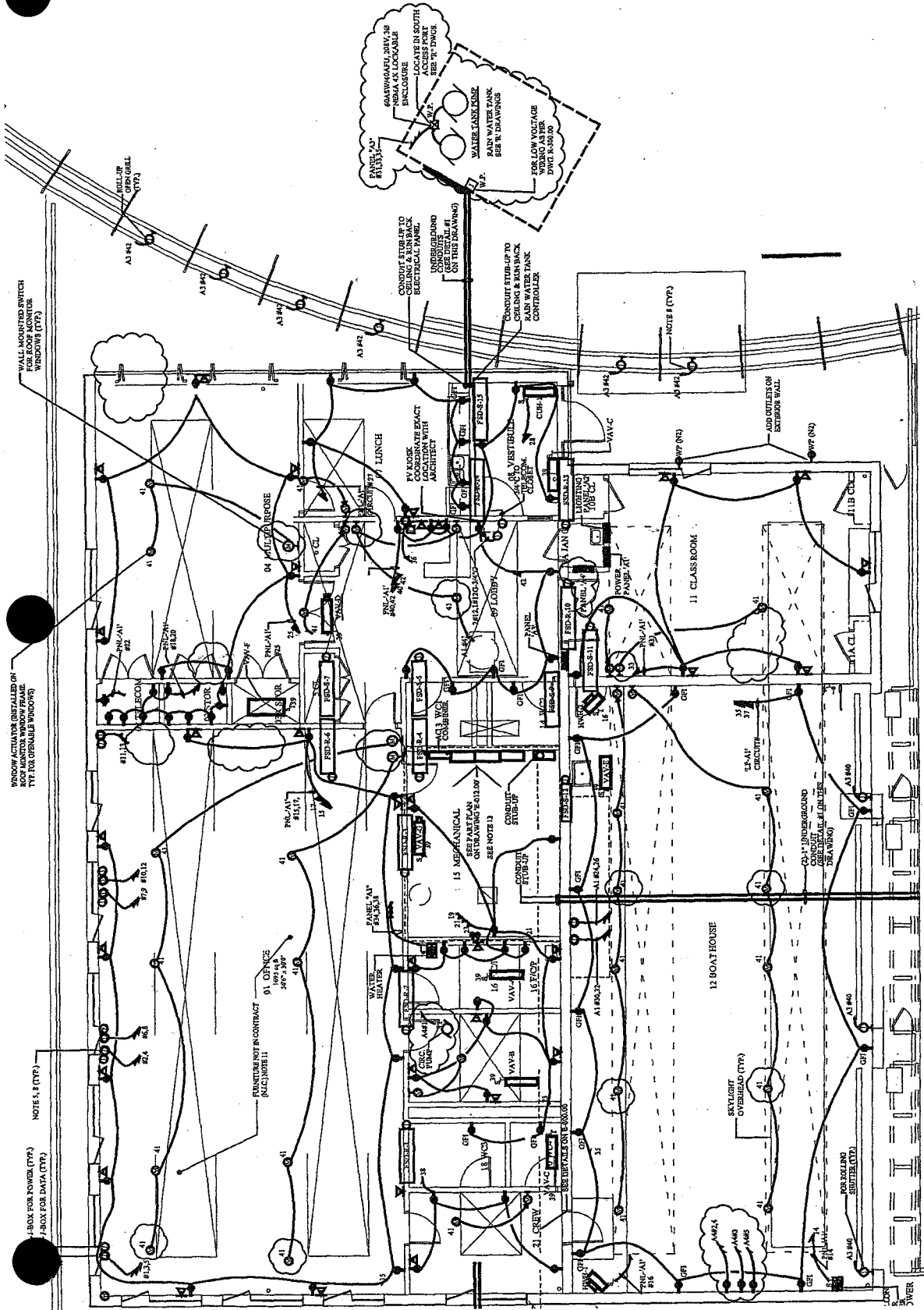
PROJECT BRH / STARLIGHT
TITLE REF: L-402.00 PLANTING SCHEDULE

DRAWN BY BS
CHECK BY JP

PROJECT NO. 11010.10
DATE 03/12/2013
SCALE NTS
SHEET NO. 1 OF 1

LSK-001



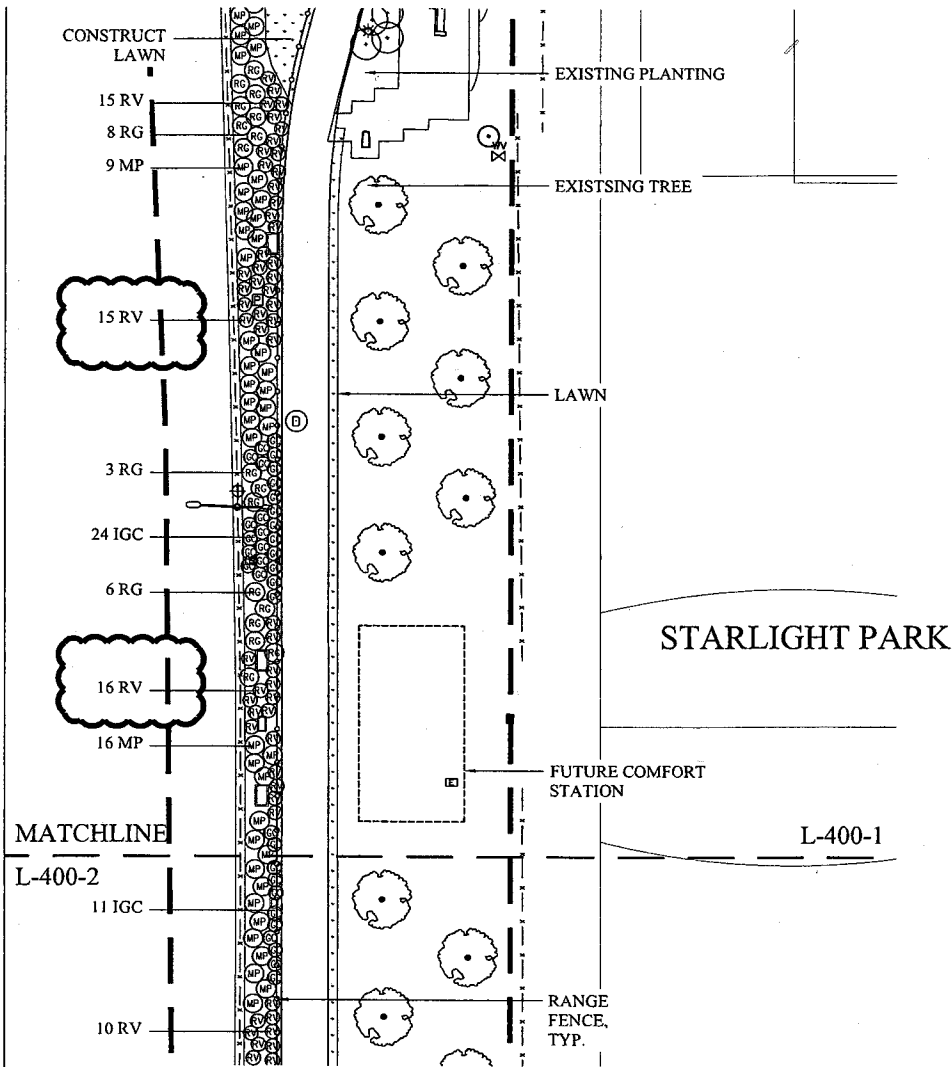


A.G. Consulting Engineering, PC
 THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN
 THE BOROUGH OF BRONX, NEW YORK
 DDC PROJECT #P1CROT16A

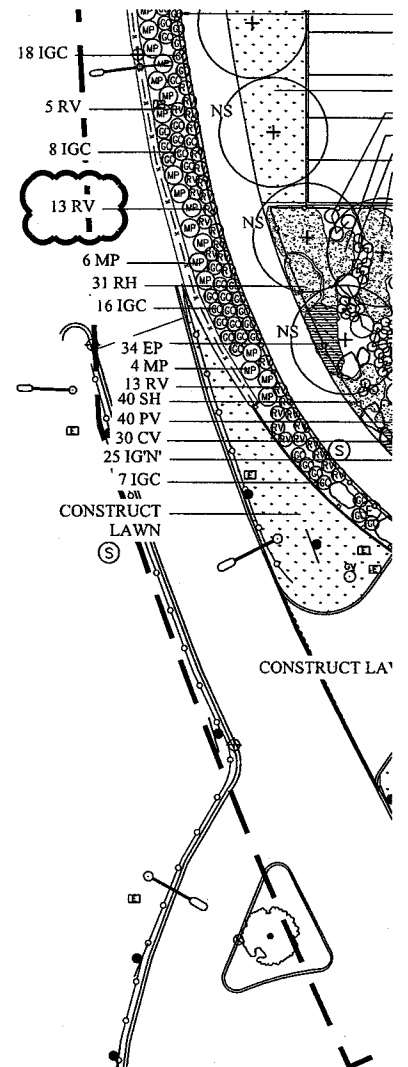
Electrical Revisions
 SCALE: E-002
 DATE: 9/19/2013

SKE: 001
 REF.: E-002
 DRAWN BY: HM





1 SITE PLAN - NORTH



2 SITE PLAN - SOUTH



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PROJECT
TITLE

DRAWN BY
CHECK BY

PROJECT NO.
DATE
SCALE
SHEET NO.

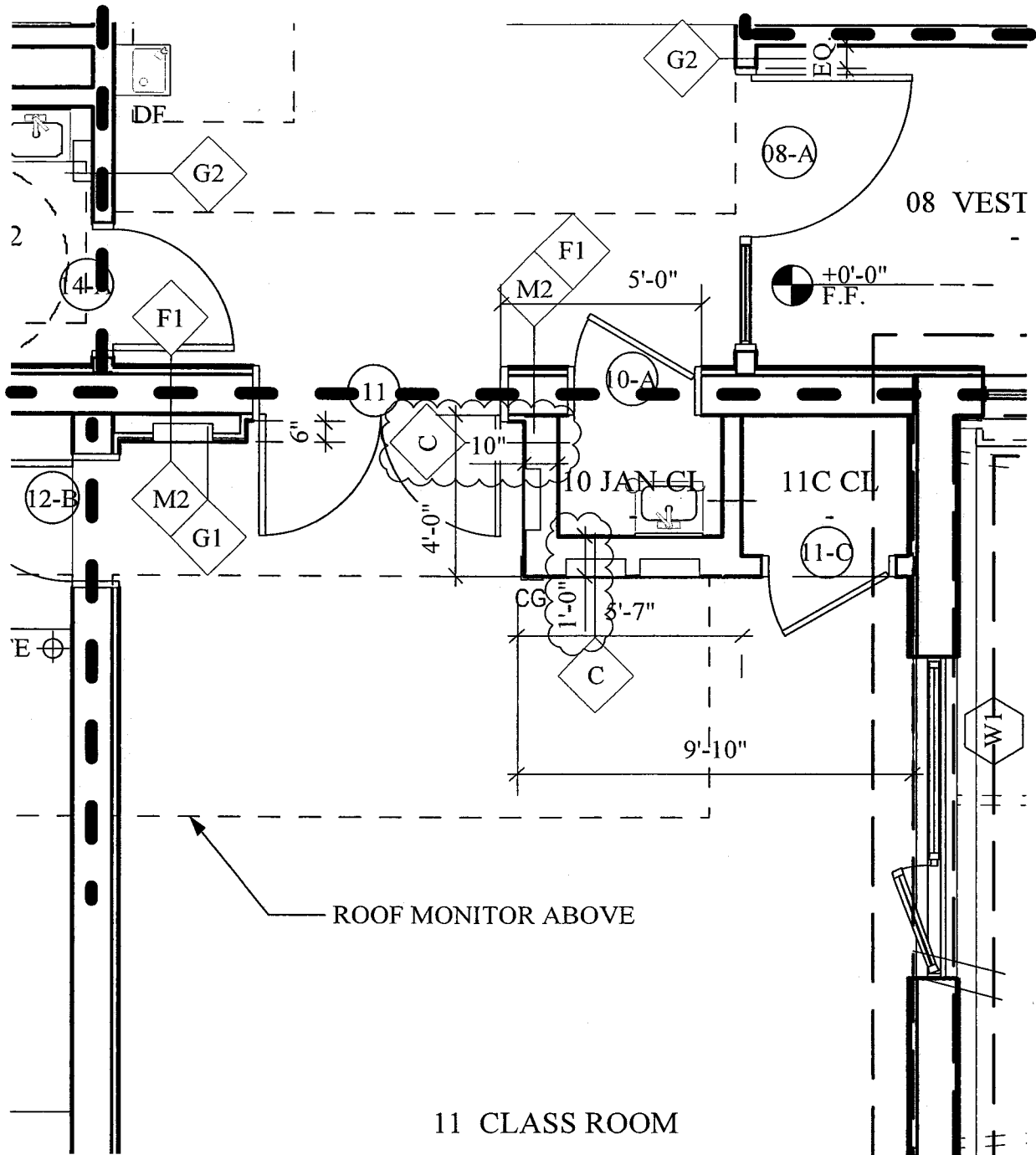
BRH / STARLIGHT
REF: L-400.00 PLANTING PLANS

BS
JP

11010.10
03/12/2013
NTS
1 OF 1

LSK-002





11 CLASS ROOM

Kiss - Cathcart, Architects

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BRONX RIVER HOUSE

THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN
 THE BOROUGH OF BRONX, NEW YORK
 DDC PROJECT #PICROT16A

Walls @ Electrical Panels

ASK: 001

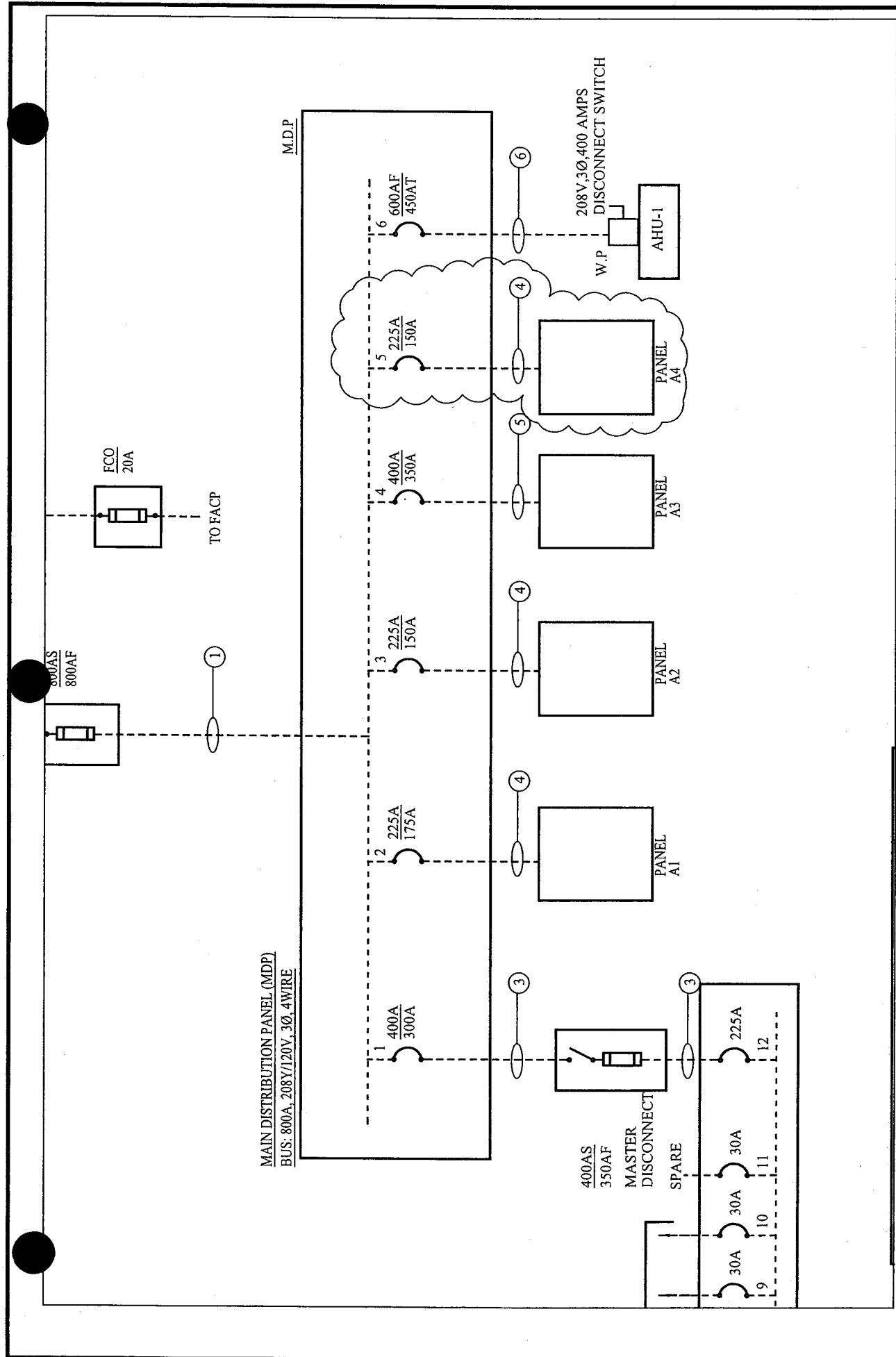
SCALE: 1/4" = 1'-0"

REF.: A-100

DATE: 3/13/2013

DRAWN BY: HM





Title:	Job No.:	-	Reference Dwg.:	E-007.00
	Date:	-	Sketch No.:	SKE-2
Project:	Scale:	-	Drawn By:	-
	Bronx River House			
A.G. Consulting Engineering, P.C. MECHANICAL / ELECTRICAL ENGINEERS 131 WEST 33RD STREET, Suite 12B NEW YORK, NY 10001 Tel: (212) 268 0950 Fax: (212) 268 7497 E-mail: agceng@aol.com	Designed By:	-	Sheet 1 of -	



2#12, 1#12G-3/4" C	RECEPTACLE	1	100	20	1080				31			32	20	HARVESTING CONTROLLER	2#12, 1#12G-3/4" C
2#12, 1#12G-3/4" C	RECEPTACLE	1	100	20	1080				33			34	20	FIRE SMOKE DAMPERS	2#12, 1#12G-3/4" C
2#12, 1#12G-3/4" C	RECEPTACLE	1	100	20	1080		1080		35			36	20	DOOR PANEL	2#12, 1#12G-3/4" C
2#12, 1#12G-3/4" C	RECEPTACLE	1	100	20	1080				37			38	20	GFI RECEPTACLES	2#12, 1#12G-3/4" C
2#12, 1#12G-3/4" C	VAV BOXES	1	100	20	1080				39		1620	40	20	RECEPTACLE	2#12, 1#12G-3/4" C
2#12, 1#12G-3/4" C	WINDOW ACTUATORS	1	100	20	1080				41			42	20	RECEPTACLE & KIOSK POWER	2#12, 1#12G-3/4" C
TOTALS IN VA															
			7560	6480	6480				A	B	C	6240	6240		
TOTAL LOAD (VA)			CONNECTED			DEMAND			TOTAL=39240						

PANEL DESIGNATION: A4
 SERVICE VOLTAGE: 3PHASE, 4WIRE, 208Y/120, 60Hz WITH GROUND & NEUTRAL BUS
 BUS RATING: 225A

150A MCB
 42KAIC

LOCATION: LOBBY
 MOUNTING: FLUSH

FEEDER SIZE	LOAD DESCRIPTION	PROTECTIVE DEVICE		LOAD (VA)			PHASE			CKT.	LOAD (VA)			LOAD DESCRIPTION	FEEDER SIZE
		POLE	TRIP AMP.	A	B	C	A	B	C		A	B	C		
2#12, 1#12G-3/4" C	CIRCULATING PUMP	1	100	15	568				1			2	5750	PRESSURE WASHER MACHINE	2#12, 1#12G-3/4" C
2#12, 1#12G-3/4" C	IRRIGATION SYSTEM	1	100	20	1900				3			4			
2#12, 1#12G-3/4" C	IRRIGATION SYSTEM	1	100	20	1900				5			6			
	SPARE	1	100	20					7			8			
	SPARE	1	100	20					9			10			
	SPARE	1	100	20					11			12			
	SPARE	1	100	20					13			14			
	SPARE	1	100	20					15			16			
	SPARE	1	100	20					17			18			
	SPARE	1	100	20					19			20			
	SPARE	1	100	20					21			22			
	SPARE	1	100	20					23			24			
	SPARE	1	100	20					25			26			
	SPARE	1	100	20					27			28			
	SPARE	1	100	20					29			30			
TOTALS IN VA															
			568	1900	1900				A	B	C	5750	5750		
TOTAL LOAD (VA)			CONNECTED			DEMAND			TOTAL=						
			6318	7650	1900				TOTAL=						
			DEMAND						15868						

PWR. = 15868/560 = 44A
 SPARE: 44 + 11 (25% SPARE) = 55A

Job No.: -
 Date: -
 Scale: -
 Drawn By: -
 Designed By: -

Reference Dwg.: E-011.00
 Sketch No.: SKE-3
 Sheet 1 of -

BRONX RIVER HOUSE

A.G. Consulting Engineering, P.C.
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NOTES:

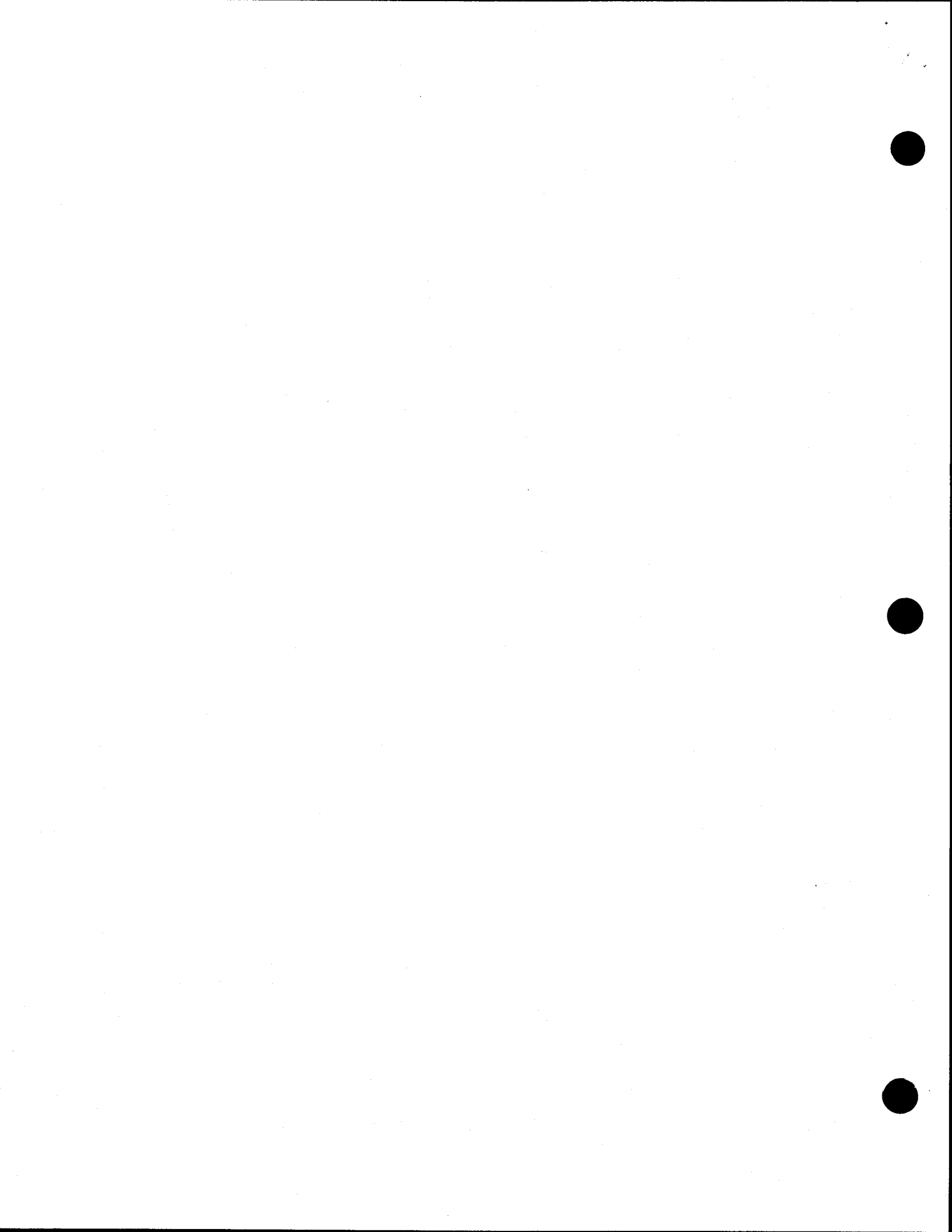
1. COORDINATE EXACT LOCATION OF ELECTRICAL EQUIPMENT WITH ARCHITECTURAL DRAWINGS.
2. ALL RECEPTACLE IN THIS AREA SHALL FEED FROM PANEL 'A1' U.O.N.
3. REFER TO SHEET E-011 FOR PANEL SCHEDULES.
4. ALL RECEPTACLE SHALL BE RECESSED MOUNTED EXCEPT BOAT STORAGE ROOM.
5. PROVIDE RECESSED MOUNTED POWER AND DATA JUNCTION BOXES AT THE APPROXIMATE LOCATION SHOWN ON THE DRAWING. PROVIDE JUNCTION BOX AT 24" A.F.F. TERMINATE AND TAPE WIRING PROPERLY INSIDE JUNCTION BOX FOR FUTURE USE. HOMERUN ASSOCIATED WITH JUNCTION BOX SHALL BE STUB-UP TO CEILING AND RUN BACK TO ELECTRICAL PANEL 'A1'. COORDINATE EXACT CONDUIT ROUTING PATH IN FIELD WITH COMMISSIONER.
6. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR LOCATION OF MECHANICAL EQUIPMENT.
7. ALL VAV AND CV-1 DEVICES SHALL FEED VIA ELECTRICAL PANEL 'A1' CIRCUIT#39.
8. PROVIDE LOACL KEY SWITCH AT ALL EXTERIOR ROLL-UP GRILLS.

9. CONCEAL ALL CONDUITS AND JUNCTION BOXES INSIDE OF INTERIOR PARTITIONS, WITH ONLY FACE PLATES, PLUGS AND SWITCH-PLATES VISIBLE. IF REQUIRED, CONTROL TO ROUTE OR REMOVE AAC MASONRY MATERIAL TO ACHIEVE A FLUSH APPEARANCE FOR ALL ELECTRICAL DEVICES. IN ROOMS WITH EXPOSED AAC MASONRY (SUCH AS 12-BOAT HOUSE AND 15 MECHANICAL ROOMS) THE OUTLETS, CONDUITS AND SWITCHES CAN BE INSTALLED EXPOSED, IN A NEAT AND VISUALLY ORGANIZED MANNER.
10. PROVIDE EMT CONDUIT FROM STUB UP TO ELECTRICAL ROOM. PROVIDE COUPLINGS TO SWITCH FROM PVC TO EMT CONDUIT.
11. FURNITURE IS NOT IN CONTRACT AND SHOWN FOR INFORMATION ONLY. ALL ELECTRICAL WORK RELATES TO FURNITURE IS ALSO NOT PART OF THIS CONTRACT.
12. ENERGIZE ALL FIRE SMOKE DAMPERS VIA THE ELECTRICAL PANEL 'A3' CIRCUIT #40.
13. KEEP EQUIPMENT AND PIPES CLEAR OF THE DEDICATED ELECTRICAL SPACE AS WELL AS WORKING SPACE.

14. COLOR OF ALL WALL SWITCHES, PLATES, PLUGS TO BE WHITE, UNLESS OTHERWISE NOTED.

15. ALL PANEL BOARDS SHALL BE FLUSH MOUNTED IN WALL U.O.N.





THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

April 2, 2013

ADDENDUM No. # 3

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

P1CROT16A

New Construction of the Bronx River House

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 April 3, 2013, at 2:00 pm is rescheduled to April 10, 2013, at 2:00 pm.**

Contract #1 – General Construction Work

2. **Questions from Bidders and Responses to Questions:**

See Attachment A.

3. **Revisions to the Specifications:**

See Attachment B.

4. **Revisions to the Drawings:**

See Attachment C.

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.
Deputy Commissioner

Name of Bidder

By: _____



DDC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES

No.	Bidders Questions	DDC Responses
1	<p>Details #1 and #3 on Drawing Sheet A-530 show "vapor barrier ice and water shield, or equal" over the stud wall framing. Is there a specification for the vapor barrier? Would a Tyvek or similar building wrap be considered an equal?</p>	<p>There is no specification for the vapor barrier. Yes- Tyvek, or similar, is acceptable for use below the composite roof panel, installed per manufacturer's instructions and with all fastener holes properly sealed. Roof Assembly B and Monitor Construction Details have been revised to clarify the extent of waterproofing, vapor barrier, nailboard blocking, etc. Refer to Sketches ASK-002 and ASK-003 in Attachment C, Revisions to the Drawings, for additional information.</p>
2	<p>Details #1 and 3 on Drawing Sheet A-530 show framing lumber in section within the insulated foam panels. How and where is this additional framing to be installed? What is its purpose?</p>	<p>This wood framing represents blocking (to set the composite roof panel securely to rough framing, and prevent the nail board from sliding), and/or provides a nailer for roof sheathing (at the outside top corners). Refer to Sketches ASK-002 and ASK-003 in Attachment C, Revisions to the Drawings, for additional information.</p>
3	<p>Please confirm the Horse Power (HP) and power requirement for the pump in the Rainwater Harvest Tank. The Electrical Drawings currently have it wired for three-phase service, but Specification Section 02120, "Harvesting System," Article 2.2, indicates one-phase or three-phase service.</p>	<p>The Rainwater Harvest Pump is performance-based, per Specification Section 02120 "Harvesting System," Article 2.2. Note the Electrical Drawings indicate a three-phase service. The Contractor shall coordinate the circuitry and pump selection accordingly.</p>
4	<p>We recommend that in the event the tank pump fails, to use domestic water to feed the non-potable water, so toilets can be flushed, etc. On Drawing Sheet R-300, both incoming potable and outgoing non-potable supply are located in proximity to one another; there is no interconnection, however, except indirectly via the potable fill line to the rainwater tank and pump. This seems like an opportunity to add resiliency to the system. Please advise.</p>	<p>There will be no interconnections between domestic and non-potable water.</p>



5	Please refer to the areas labeled "construct lawn" on Drawing Sheet L-400. Are we only to reseed these specific areas and is topsoil required?	Yes, only reseed those areas. Where the Contract Drawings indicate "construct lawn," the Contractor shall provide full build-up of topsoil and sod. Refer to the revised Specification Section 02920, "Lawns & Grasses," in Attachment B, Revisions to Specifications, for clarification of scope.
6	Please confirm that the Gabion Cages in Detail #5 on Drawing Sheet L-503 are to be constructed as shown, 3'-0" in total height (2 cages high) with an embedment of 6" below the infiltration swale. Also, please clarify the extent of the geotextile separation fabric at the stone base below the Gabion.	Yes, the Gabion wall is comprised of 1'-6" high x 1'-6" wide x 3'-0" long welded wire baskets filled with stone. They are set on a gravel base, 2 courses high (3'-0" total), and staggered, in a radial pattern, as shown on the Contract Drawings. Refer to Sketch LSK-004 in Attachment C, Revisions to the Drawings, for additional information on the extent of geotextile separation fabric below the Gabion.
7	On Drawing Sheet A-100, Room WC-1 indicates Fire Rated Plywood (FRP), but it is not mentioned in the FRP note. Please confirm if all WC rooms should receive FRP/furring.	The Fire Rated Plywood (FRP) symbol is intended to point at the East wall of Mechanical Room #15, not into WC-1 or any other toilet room. Refer to Sketch ASK-004 in Attachment C, Revisions to the Drawings, for additional information.
8	We were told that Nana Wall, one of the manufacturers listed in Specification Section 08480, "Aluminum Framed Folding Doors," will not provide a painted finish for the bi-parting doors. Please advise.	The thermal bridging material of Nana Wall and other folding door systems are not compatible with the high process temperatures of the Fluoropolymer Two-Coat system specified. Specification Section 08480 "Aluminum Framed Folding Doors," is revised to include a Powder Coated finish. Refer to in Attachment B, Revisions to the Specifications, for additional information.
9	Please confirm if the motors for the operable windows at the Roof Monitors are 120VAC or 24VDC.	All wiring from Group Controllers (the wall switch that operates the actuators) to Window Actuators is 24VDC. Refer to Drawing Sheets E-001 and E-002. Group Controllers are shown on E-002, and are identified on E-001 under the "Wall Mounted Roof Monitor Shade Opener" symbol.
10	On Drawing Sheet A-120, the Finish Color Chart Item XPTD-1 indicates painting at the "Driveway/ Garage." Please clarify if this is the Boathouse floor, Boat Plaza pavement, or another location.	All references to XPTD-1 are deemed deleted. All interior bollards are to be painted with PTD-2, as shown on Drawing Sheet A-120. All exterior bollards (fixed and removable) are to be galvanized with a Powder Coated finish. Refer to Attachment C, Revisions to the Drawings, for interior bollard PTD-2 color and finish. Also see Specification Section 05500, "Miscellaneous Metals," Articles 2.6, sections I and J, for additional information.



1	Please refer to Detail #6 on Drawing Sheet S-201, and clarify if the exterior bollard is the same design as the interior bollard.	No, the bollards are different. Interior bollard design is shown on Drawing Sheet S-201, Detail #6. Exterior bollards are referenced on Drawing Sheet L-201 as NYC DPR Park Standard Detail #7, sheet 37 (identified with rectangular callout symbol). Also see Specification Section 05500, "Miscellaneous Metals," Article 2.6, Sections I and J for additional information.
12	Please refer to Drawing Sheet A-530. How can the sloped roof panel dimension indicated on Detail #1 be 4'-1 3/4" if the minimum outside dimensions of the Roof Monitor Walls is 7'-7 1/4" horizontally?	Refer to Sketches ASK-002 and ASK-003 in Attachment C, Revisions to the Drawings, for additional information.
13	On Drawing Sheet A-600, Note #2 above the F1 Wall Type indicates that all wood decking and blocking be certified wood. Specification Section 06126, "Wood Trusses," Article 1.4.C states "there is no certified wood requirement for this project." Please confirm if there are any certified wood requirements.	There is no certified wood requirement in the project. Refer to Attachment C, Revisions to Drawings, for additional information.
14	Please clarify wall thicknesses for the following Green Screen components: a- steel tubing 4" x 4" b- steel tubing 12" x 4" c- steel tube bracing 3" x 6," as shown on Drawing Sheet A-521, Details 4A, 4B & 4C.	To clarify, please use the following thicknesses: a- HSS 4x4x5/16. b- HSS 12x4x5/16. c- All horizontal screen bracing is 2" x 4" x 1/4" steel tube. See also Attachment A, Questions from Bidders and Responses to Questions, #22, from Addenda #1.
15	The graphic scales shown on Drawing Sheets L-201, L-300 and L-401 indicate 1" = 20'-0", whereas the written scales indicate 1"= 10'-0". What is the correct scale?	The written scale, 1" = 10'-0" is correct. All Graphic Scales shown are deemed deleted. Refer to Attachment C, Revisions to the Drawings, for additional information.
16	The notes on Drawing Sheet C-401 refer to Drawing Sheet L-301 for the building perimeter trench drain; there is no sheet L-301 issued in the Bid Package.	Please replace all references to Drawing Sheet L-301 with Drawing Sheet L-300. Refer to Attachment C, Revisions to the Drawings, for additional information.
17	Drawing Sheet C-401 shows an un-sized drainage pipe that connects the trench drain terminus to the rainwater system, and refers to Drawing Sheet L-301, which is not included in the Bid Package. Please clarify the pipe size and materials to be used here.	The drainage pipe shall be a 4" connection to the trench drain, with an expansion to a 6" PVC. Please replace all references to Drawing Sheet L-301 with Drawing Sheet L-300. Refer to Attachment C, Revisions to the Drawings, for additional information.
18	Drawing Sheet L-201 refers to "Perimeter Trench Drains at Building," but there is no way to determine the extent of the trench drain. Where does it start and end?	Refer to Sketch LSK-010 in Attachment C, Revisions to the Drawings, for additional information.
19	Detail #8 on Drawing Sheet L-500 indicates a precast paver edge at the trench drain against the building, but does not indicate where to be cut. Detail #9 on that Sheet indicates a "colored concrete collar" at the building edge and trench drain intersection. Please clarify this condition.	Refer to Sketches LSK-007, LSK-008, and LSK-009 in Attachment C, Revisions to the Drawings, for clarification.



20	Refer to Section 02130, "Harvesting System Controls," Article 1.4C. Please confirm that the furnishing and installation of the Geosyntec-provided control module and all low-voltage final connections to the controller will be by Geosyntec Consultants, or approved equal.	Yes, the controller purchase (from Geosyntec Consultants, or approved equal) will include the final field connectivity.
21	In the Addendum to General Conditions, Additional Article 1.46, "Standing Column Well System Construction Sequence," the responsibility for water and soil testing is variously described as being the responsibility of either the Contractor or the Owner (City of NY). Please clarify which tests are performed by each.	Unless otherwise specified, the Contractor shall be responsible for performing all required tests.
22	With regards to the driving of Timber Piles, is it the intent to have any boulders removed prior to driving, or to drill through boulders and begin driving the piles when soils are reached? Should an allowance be included for this work?	The Contractor is responsible for his own means and methods. Boulders and other obstructions must be addressed prior to driving the piles, with removal (pre-excavation), spudding, or pre-auguring. Refer to Specification Section 02455, "Timber Piles," Article 3.1H for additional information.
23	Drawing Sheet M-004 indicates well water piping to be 3". Drawing Sheet M-012, however, indicates this piping to be 2-1/2", and Drawing M-013 indicates both 2-1/2" and 3" piping. Please clarify.	Well water piping from HX-1 and HX-2 to Wells 1 and 2 shall be 2-1/2", as shown on Drawing Sheets M-012 and M-013. Refer to Attachment C, Revisions to the Drawings, for additional information.
24	The Bid Breakdown makes reference to "Range Fencing." Please confirm the location of the new Range Fencing.	The Range Fence is located on the West side of the site, between the proposed new asphalt path and the Sheridan Expressway. Refer to Drawing Sheet L-400.
25	Drawing Sheet B-101 indicates borings RH-1 through RH-4 within the building footprint. These borings are not shown on the boring log. Please advise.	Refer to Drawing Sheet B-201 for profiles including RH-1 through RH-4. Refer to the Appendix item "Geotechnical Data Report" for all boring logs. The first sets of "LB-" borings (4 total, dated 2008) correspond to the "RH" series on Drawing Sheets B-101 and B-201. The second set of "LB-" borings (4 total, dated 2011) correspond to the "SP-" series on B-101 and B-201. Also see General Notes #3 and 4 on B-101.
26	Please provide the depth, diameter, details, etc. of the existing observation well that is to be decommissioned.	Two wells will be decommissioned: SP-1 (OW) and RH-1 (OW). Refer to General Note #6 on Drawing Sheet B-101, for well construction details that apply to both wells. Also see page 3 of the Appendix item "Geotechnical Data Report" for additional information.



27	Please provide deflection criteria for wood trusses.	Specification Section 06126, "Wood Trusses," has been revised to clarify deflection criteria. Refer to Attachment B, Revisions to the Specifications, for additional information.
28	There are several discrepancies in the quantities of lighting fixtures indicated in plan on Drawing Sheets A-120 and E-003, and on the Lighting Schedule on Drawing Sheet E-001. Please advise.	The Drawing Sheets and Lighting Schedule have been revised and coordinated. Refer to Attachment C, Revisions to the Drawings, for additional information.
29	For the "Operable Unit Site Management Plan," who will pay for testing? If the soil and /or water are found to be contaminated, how will payment be made to the Contractor for removal?	The payment for testing shall be made by the City of New York (DDC) and the payment for the removal of contaminated soil and/or water if found shall be included in the ALLOWANCE for Part A-2 of Standing Column Well System Construction Sequence.



DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT B – REVISIONS TO THE SPECIFICATIONS

Specification Section 02771 – STONE CURBS AND STEPS

Page 02771-3, delete Article 2.1A and replace with the following:

A. Granite shall be Corinthian Granite as supplied by Champlain Stone, Ltd., Warrensburg, NY, or approved equal. Step shall be a single piece of stone cut to the length, width and radius shown on the drawings.

Specification Section 02920 – LAWNS & GRASSES

Delete Section 02920 in its entirety and replace with new Section 02920, included with this Addendum.

Specification Section 06126 – WOOD TRUSSES

Page 06126-2, add the following to Article 1.3C:

2. Wood trusses shall be designed with maximum Live Load Deflection of L/360 and maximum Total Load Deflection of L/240.

Specification Section 08480 – ALUMIUM FRAMED FOLDING DOORS

Page 08480-3, delete Article 2.2A3 and replace with the following:

Finish-Provide powder coated finish, color and sheen to match Aluminum Windows.



SECTION 02920 – LAWNS & GRASSES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The Commissioner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below, are implemented to the fullest extent. Submissions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING Performance Criteria.

1.2 SUMMARY

- A. Construct Lawn. Provide all materials and equipment, and do all work required to complete the seeding and sodding including furnishing and placing topsoil, as indicated on the Drawings and as specified.
- B. Maintenance and Guarantee
- C. Aerate, Topdress, and Seed Lawn Areas. Within the Critical Root Zones and Absolute Critical Root Zones of existing trees, and within areas of existing lawn, contractor shall provide all materials and equipment to prepare existing soil, place and maintain top dress material, and furnish, plant and maintain grass seed, as indicated on the Drawings and as specified.

1.3 RELATED WORK

- A. Division 1 Specifications for Green Building Requirements
- B. Section 02930 Planting

1.4 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. American Society for Testing and Materials (ASTM):
 - a. C136 Sieve Analysis of Fine and Coarse Aggregates
 - b. D422 Particle-Size Analysis of Soils



c. E11 Wire-Cloth Sieves for Testing Purposes

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following materials:

1. Aluminum sulfate
2. Fertilizer

C. Certificates: Labels from the manufacturer's container certifying that the product meets the specified requirements shall be submitted for the following materials:

1. Commercial fertilizer
2. Ground limestone
3. Seed mix for sod



1.6 INSPECTION AND TESTING

- A. Work will be subject to inspection at all times by the Commissioner. The Contractor shall engage an independent testing laboratory to analyze and test materials used in the construction of the work. Where directed by the Commissioner the testing laboratory will make material analyses and will report to the Commissioner whether materials conform to the requirements of this specification.
1. Cost of tests and material analyses made by the testing laboratory will be borne by the Contractor.
 2. Testing equipment will be provided by and tests performed by the testing laboratory. Upon request by the Commissioner, the Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work and to repair damage caused thereby to the permanent work.
 3. Gradation of granular materials shall be determined in accordance with ASTM C 136. Sieves for determining material gradation shall be as described in ASTM E 11.
- B. Testing, analyses, and inspection required by the Contractor for his own information or guidance shall be at his own expense.
- C. The Contractor shall engage an independent testing agency to perform the following tests and analyses:
1. Material: Tests and Analysis Required
 2. Topsoil: Mechanical analysis of soil and determination of pH and organic matter content, and nutrient content. Recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring nutrient content and pH to satisfactory levels for seeding and sodding.
 3. Compost: Determination of moisture absorption capacity, organic matter content, and pH.
- D. Materials shall not be used in construction until test results have been reviewed by the Commissioner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Digging Sod:
1. Sod shall not be dug at the nursery or approved source until ready to



transport sod to the site of the work or acceptable storage location.

2. Before stripping, sod shall be mowed at a uniform height of 2 in.
3. Cut sod to specified thickness and to standard width and length desired.

B. Transportation of Sod:

1. Sod transported to the Project in open vehicles shall be covered with tarpaulins or other suitable covers securely fastened to the body of the vehicle to prevent injury. Closed vehicles shall be adequately ventilated to prevent overheating of the sod.
2. Evidence of inadequate protection following the digging, carelessness while in transit, or improper handling shall be cause for Commissioner's rejection.
3. Sod shall be kept moist, fresh, and protected at all times. Such protection shall encompass the entire period during which the sod is in transit, being handled, or are in temporary storage.
4. Upon arrival at the temporary storage location or the site of the work, sod material shall be inspected for proper shipping procedures. Should the sod be dried out, the Commissioner will reject the sod. When sod has been rejected, the Contractor shall at once remove it from the area of the work and replace it with acceptable material.
5. Unless otherwise authorized by the Commissioner, the Contractor shall notify the Commissioner at least two working days in advance of the anticipated delivery date of sod material. Certificate of Inspection when required shall accompany each shipment.

C. Handling and Storage of Sod:

1. Sod material shall be handled with extreme care to avoid breaking or tearing strips.
2. Sod shall not be stored for longer than 30 hours prior to installation. Sod shall be stored in a compact group and shall be kept moist. Sod shall be prevented from freezing.
3. Sod that has been damaged by poor handling or improper storage will be rejected by the Commissioner.



- D. Deliver seed in original sealed containers, labeled with analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, location of packaging, and name of seed grower. Damaged packages will not be accepted.
- E. Seed shall be stored under cool and dry conditions so that the endophytic seed in the mixture is capable of maintaining a high level of endophytes
- F. Deliver fertilizer in sealed waterproof bags, printed with manufacturer's name, weight, and guaranteed analysis.

1.8 PLANTING SEASON

- A. Planting season for sod shall be as follows:

<u>Item</u>	<u>Planting Period</u>	
	<u>Spring</u>	<u>Fall</u>
Sod	04/01 to 07/1	09/15 to 10/30
Seeding	03/15 to May 30	08/15 to 9/30

- B. Planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.
- C. Planting season may be extended with the written permission of the Commissioner.

1.9 ACCEPTANCE

- A. Acceptance:

- 1. The Commissioner will inspect all work for Substantial Completion upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.
- 2. Acceptance of material by the Commissioner will be for general conformance to specified requirements, and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents.
- 3. Upon completion and reinspection of all repairs or renewals necessary in the judgement of the Commissioner, the Commissioner will recommend to the Commissioner that the work of this Section be accepted.

- B. Sod and seed areas will be accepted when in compliance with all the following conditions:

- 1. Roots are thoroughly knit to the soil;
- 2. Absence of visible joints (sodded areas);
- 3. All areas show a uniform stand of specified grass in healthy condition;



4. At least 60 days have elapsed since the completion of work under this Section.

PART 2 PRODUCTS

2.1 SOD MAKEUP

- A. Sod shall be a superior sod grown from high quality seed of known origin. Seed is to be inspected by a Certification Agency to assure satisfactory genetic identity and purity, overall high quality, and freedom from noxious weeds at time of harvest.
- B. Grass Seed Blend: the blend/mix of grass in sod shall be one of those listed below and shall be harvested from one field to insure a uniform color and texture. Percentages of each grass type are to be within the given range for that type.

GRASS SEED MIXTURE				
PERCENT BY WEIGHT	GRASS SEED	PURITY	GERMINATION	MAXIMUM WEEDSEED
60%	TALL FESCUE	98%	85%	.25%

One or more of the following varieties: Apache II, Arid 3, Cochise III, Coronado Gold, Falcon IV, Justice, Jaguar III, Lancer (SH), Masterpiece, Rebel IV, Rebel Jr.(SH), Rebel Sentry, Rembrandt, Tomahawk E+, RTF or approved equal.

20%	BLUEGRASS	98%	80%	.10%
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One or more of the following varieties: Able 1 (SH), Blacksburg, Glade Moonlight, Midnight, America (SH) Brilliant, Ram (SH), Touchdown (SH) Warren's A-34 (SH), Bristol (SH), Lofts 1757 (SH), or approved equal.

20%	PERENNIAL RYEGRASS	98%	85%	.25%
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One or more of the following varieties: Brightstar II, Manhattan 4, Citation Fore, Elfin or approved equal

1. NOTE: The cultivars followed by "(SH)" exhibit better shade tolerance than other varieties, under moderate shade.



2. All seed shall be interagency certified under the auspices of a State Seed Improvement Cooperative and must bear their seals of certification on each fifty pound (50 lb.) bag. All Grass Seed shall be delivered in sealed standard size bags of the vendor, showing weight, analysis, and name of vendor. It shall be stored as directed by the Commissioner, in such a manner that its' effectiveness will not be impaired.
3. Sod shall be machine cut to uniform soil thickness of five-eighths inch (5/8"), plus or minus one-quarter inch (1/4") at the time of cutting. Measurement for thickness shall exclude top growth and thatch. Individual pieces of sod shall be cut eighteen inches (18") wide by sixty inches (60") long (7-1/2 sq. ft.) or rolls four feet (4') wide by fifty feet (50') long (200 sq. ft.). Standard sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically. Sod shall not be harvested or transplanted when the moisture content may adversely affect its survival.
4. Sod shall be harvested, delivered, and transplanted within a period of thirty six (36) hours. Before cutting, sod shall be mowed uniformly at a height of one and one-half inches (1 1/2"). The Engineer may inspect the sod before it is harvested but reserves the right to reject, on or after delivery, any sod which, in their opinion, does not meet with the specifications.
5. When sod is delivered with monofilament (plastic or similar) backing, the backing shall be removed after rolling out the sod and discarded in an approved manner.

2.2 SOD REQUIREMENTS

- A. Time Limitations: Sod shall be harvested, delivered, and transplanted within a 36 hour period unless a suitable preservation method is approved prior to delivery. Sod not transplanted within this period shall be inspected and approved by the Commissioner prior to its installation.
- B. Thatch: Sod shall be relatively free of thatch. A maximum of 1/2 in. (uncompressed) thatch will be permitted.
- C. Diseases, Nematodes, and Insects: Sod shall be free of diseases, nematodes, and soil-borne insects. State Nursery and Plant Materials Laws require that all sod be inspected and approved for sale. The inspection and approval must be made by the State Agricultural Department, Office of the State Entomologist.
- D. Weeds: Sod shall be free of objectionable grassy and broad leaf weeds. Turfgrass sod shall be considered free of such weeds if less than five such plants are found per 100 sq. ft. of area.
 1. Turfgrass sod shall not be acceptable if it contains any of the following weeds: common bermudagrass (wiregrass), quackgrass, johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel and brome grass.



- E. The Commissioner reserves the right to reject, on or after delivery, all material which does not, in their opinion, meet these specifications. The rate of seeding shall be ten pounds (10 lbs.) per one thousand (1,000) square feet.

2.3 SEEDING

- A. Topseeding with a seed mix matching the procured sod.

2.4 TOPSOIL

- A. Stockpiled topsoil shall be treated with weed killer in accordance with manufacture's printed instructions prior to mixing and spreading operations
- B. Topsoil shall conform to Section 02910 Topsoil
- C. Topsoil shall have a pH value range of 6.0 to 6.5.
 - 1. If planting soil mixture does not fall within the required pH range, limestone or aluminum sulfate shall be added to bring the pH within the specified limit.

2.5 COMPOST

- D. Compost shall contain organic matter, or material of generally humus nature capable of sustaining the growth of vegetation, with no admixture of refuse or material toxic to plant growth. The Compost shall be free of pathogens and stones, lumps, or similar objects larger than two inches (2") in greatest diameter, as well as roots, brush, and weeds.
- E. Composts that have been derived from organic wastes such as food and agriculture residues, animal manures, composted leaves that meet the above requirements, and are approved by the New York State DEC, are acceptable compost sources. Compost shall have an approximate N-P-K analysis of at least 1-1-0 as delivered, with a pH between 5.5 and 8.0 and a solids content of at least fifty percent (50%). Compost shall have a minimum of twenty five (25%) to a maximum of fifty percent (50%) organic material.
- F. Compost shall be from Long Island Compost, Islip, NY or "Nature's Choice Compost" by Nature's Choice Corp., Union, NJ, or Agresoil compost by Agresource, Inc. Amesbury, MA or approved equal.
- G. Compost available from NYC Department of Sanitation may be acceptable for purposes of this specification. See www.nyc.gov/sanitation or www.nyccompost.org for pick-up sites. Organic biosolids are not acceptable under this specification.



2.6 LIMESTONE

- A. Lime shall be an approved agricultural limestone containing no less than 50% of total carbonates, and 25% total magnesium with a neutralizing value of at least 100%. The material shall be ground to such a fineness that 40% will pass through a No. 100 U.S. Standard Sieve, and 98% will pass through a No. 20 U.S. Standard Sieve. The lime shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any lime which becomes caked or otherwise damaged making it unsuitable for use, will be rejected.

2.7 WATER

- A. Water shall be suitable for irrigation and free from ingredients harmful to seeded or sodded areas.

2.8 ALUMINUM SULFATE

- A. Aluminum sulfate shall be unadulterated and shall be delivered in containers with the name of the material and manufacturer, and net weight of contents.

2.9 COMMERCIAL FERTILIZER

- A. Fertilizer shall be a *pesticide free* (no weed-and-feed), low phosphorus, slow release product such as "Healthy Turf (8-1-9)" as manufactured by Plant Health Care, Inc, Pittsburgh, PA; or Safer Ringer Lawn Restore (10-2-6) as manufactured by Woodstream Corp., Lifitz, PA; or Nutrients Plus (7-2-12) as manufactured by Nutrients Plus, Virginia Beach VA, or approved equal.

- B. Fertilizer shall conform to the following:

1. When applied as a topsoil amendment, fertilizer shall have an analysis that will deliver appropriate amounts of nitrogen, phosphorus, and potassium as required to remedy deficiencies revealed by testing the topsoil.
2. When used as a top dressing for the maintenance of sod, fertilizer shall conform to the following:

<u>Constituent</u>	<u>% Present by Weight</u>
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Nitrogen (N)	7-10
Phosphorous (P)	1-2
Potassium (K)	4-12

- a. 50% of nitrogen shall be derived from natural organic source of ureaform.
- b. Available phosphorus shall be derived from superphosphate, bone meal, or tankage.



- c. Potassium shall be derived from muriate of potash containing 60% potash.
- C. Fertilizer shall be delivered in manufacturer's standard container printed with manufacturer's name, material weight, and guaranteed analysis.
- D. Fertilizers with N-P-K analysis other than that stated above may be used provided that the application rate per square foot of nitrogen, phosphorus, and potassium is equal to that specified.

2.10 SUPERPHOSPHATE

- A. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes, and containing not less than 20% available phosphoric acid. The superphosphate shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any superphosphate which becomes caked or otherwise damaged making it unsuitable for use, will be rejected.

2.11 CELLULOSE FIBER MULCH

- A. Cellulose fiber mulch shall be composed of virgin wood, contain a green color additive, be weed free, and non-polluting, containing no germination or growth - inhibiting factors, similar to Hydro Mulch, manufactured by Conwed Corporation, St. Paul, Minnesota 55113.

2.12 WEED CONTROL

- A. Weed control for stockpiled topsoil shall be a non-selective weed killer for control of grassy and broadleaf weeds; weed control shall have short residual, allowing seeding or sodding operations to occur within 7 days of application.

2.13 TOPDRESS MATERIAL:

- A. Topdress material shall consist of one-third (1/3) screened topsoil, one-third (1/3) compost, and one-third (1/3) clean construction sand.
 - 1. Topsoil for Turf Lawns - See Section 02910 Topsoil.
 - 2. Compost - See Paragraph 2.5.
 - 3. Construction Sand - shall consist of clean, hard, durable, uncoated stone particles, free from lumps of clay and all deleterious substances and shall be so graded when dry, one hundred percent (100%) shall pass a one-quarter inch (1/4") square opening sieve. Not more than thirty- five percent (35 %) by weight shall pass a No. 50 sieve. Sand may be



rejected if it contains more than ten percent (10%) by weight of loam or silt.

- B. Screened topsoil, sand, and compost quantities are to be measured by volume and thoroughly mixed prior to application.

PART 3 EXECUTION

3.1 PREPARATION OF SUBGRADE

- A. Subgrade shall be examined to ensure that rough grading and all other subsurface work in lawn areas and other areas to be seeded is done prior to start of seeding and sodding.
- B. Existing subgrade shall be loosened or scarified to a minimum depth of 3 in. prior to spreading topsoil. Subgrade shall be brought to true and uniform grade, and shall be cleared of stones greater than 3 in., sticks, and other extraneous material.

3.2 SPREADING OF TOPSOIL

- A. Topsoil shall not be spread until it is possible to follow immediately or within 24 hours with seeding or sodding operations. If topsoil is spread prior to this time it shall be cultivated to loosen soil prior to seeding or sodding.
- B. Topsoil shall not be placed when subgrade or topsoil material are frozen, excessively wet, or excessively dry.
- C. Topsoil shall be spread in a uniform layer, to a thickness which will compact to the depth required to bring final lawn and grass surfaces to required elevation. Unless otherwise indicated minimum depth of topsoil shall be **6 9** in.
- D. Surfaces shall be graded and smoothed, eliminating all sharp breaks by rounding, scraping off bumps and ridges, and filling in holes and cuts.

3.3 APPLICATION OF FERTILIZER AND CONDITIONERS

- A. Fertilizer and conditioners shall be applied at the following rates:
 - 1. Compost - as required by test results of topsoil.
 - 2. Limestone - as required by test results of topsoil.
 - 3. Fertilizer - as required by test results of topsoil.
- B. Mixing with topsoil:
 - 1. Fertilizer and conditioners shall be spread over the entire lawn areas at the application rates indicated above.
 - 2. Materials shall be uniformly and thoroughly mixed into the top 4 in. of topsoil by discing, rototilling, or other approved method.



- C. Two (2) applications of acceptable commercial fertilizer shall be applied by machine, each application at the rate of twenty (20) pounds per thousand (1,000) square feet or as recommended by the manufacturer. The first application shall be made at the time of installation of seed. The second application shall be made approximately six (6) months after the first application. This treatment shall take place during the next appropriate fertilizing season; that is, the following Spring or Fall, and shall be subject to the direction of the Commissioner. The second application shall be applied to the surface only. Incorporation shall be achieved by thoroughly watering the entire area after application. The Contractor shall provide all labor and materials including water if not available from NYC sources.

3.4 FINISH GRADING

- A. Final surface of topsoil immediately before seeding shall be within $\pm 1/2$ in. of required elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Stones, roots, and other debris greater than 1 in. in any dimension, which are visible at the surface, shall be removed and the resulting holes filled with topsoil, leaving a uniform planar surface.
- B. Finish grade surface with a drag or rake. Round out all breaks in grade, smooth down all lumps and ridges, fill in all holes and crevices. Rolling with a light roller is acceptable, if the surface is scarified afterward.
- C. In the event of settlement, the Contractor shall readjust the work to required finished grade.

3.5 SOIL STABILIZATION FABRIC

- A. Place soil stabilization fabric in all slopes of 3:1 or steeper grade.
- B. Pin in place in accordance with the manufacturer's directions.

3.7 SODDING

- A. Edges of the sodded areas shall be smooth, and all sodded areas shall conform to the design cross sections and grade. At edges adjacent to curbs, paved areas, etc., top surface of earth in sod shall be 1/2 in. below adjacent hard surface.
- B. Sod shall be placed and all sodding operations completed within 72 hours following stripping from sod source bed.
- C. On slopes steeper than 3 to 1, sod shall be fastened in place with suitable wood pins or other approved methods, spaced at not less than 1 pin per square foot.
- D. Surface of completed sodded area shall be smooth. Sod shall be laid edge-to-edge, with tight-butted, staggered joints. Sod shall be carefully placed to insure that it is neither stretched or overlapped. Immediately after laying sod shall be pressed firmly into contact with sod bed by tamping or rolling, to eliminate air



pockets. Following compaction, topsoil shall be used to fill all cracks, and excess soil shall be worked into grass with rakes or other suitable equipment. Sod shall not be smothered with excess fill soil.

- E. Immediately after sodding operations have been completed, entire surface shall be compacted with a cultipacker roller or other approved equipment weighing 100 to 160 lb./ft. of roller.
- F. Completed sod shall immediately be watered sufficiently to uniformly wet the soil to at least 1 in. below the bottom of sod bed.

3.8 MAINTENANCE

- A. Except as otherwise specified below, maintenance shall include all operations required to produce an established lawn, including but not limited to:
 - 1. Fertilizing
 - 2. Mowing
 - 3. Replanting
 - 4. Resodding
 - 5. Watering
 - 6. Weeding
- B. Provide & maintain plastic fencing and/or rope barricades at perimeters of seeded areas immediately after seeding of lawns.
- C. Maintenance of sodded areas shall begin upon completion of sodding and shall continue for 45 days thereafter, unless sodding is not completed until after September 15, in which case maintenance shall continue until the June 15 following.
 - 1. Watering
 - a. Week No. 1: Provide all watering necessary for rooting of sod. Soil on sod pads shall be kept moist at all times. Perform watering daily or as necessary to maintain moist soil to a depth of 4 in. Watering shall be done during the heat of the day to prevent wilting.
 - b. Week No. 2 and Subsequent Weeks: Water as necessary to maintain adequate moisture in the upper 4 in. of soil to promote deep root growth.
 - 2. Mowing



- a. Mowing shall not be attempted until the sod is firmly rooted and securely in place. Not more than 40% of the grass leaf shall be removed during the first or subsequent mowings.
 - b. Bluegrass and other cool season grasses shall be maintained between 1-1/2 in. and 2-1/2 in.
 - c. All clippings shall be removed.
 - d. After 2 mowings, the Contractor shall top dress the sod with an application of fertilizer at the rate of 1 pound of actual nitrogen per 1000 square feet.
3. Scattered bare spots, shall not exceed 15 sq. in. each.
- D. First mowing shall be done when average height of grass is 2-1/2 in., with mower set to cut at a height of 1-1/2 in. Subsequent mowings shall be made at not over two week intervals, with the height of cut set at 1-1/2 in. With prior permission of the Commissioner, mowings during periods of slow growth or dormancy may be spaced at greater intervals.
- E. Weeds and growth other than varieties of grass named in grass seed formula shall be removed. Removal may be accomplished by use of suitable herbicides or by physical removal, in which case top growth and roots shall both be removed, and bare spots exceeding specified limits shall be reseeded.
- F. Topseed bare patches per direction of Commissioner.
- G. If lawn or grass is established in the fall and maintenance is required to continue into spring months, lawn and grass shall receive an application of lime and fertilizer in the spring. Lime and fertilizer shall be spread in a uniform layer over the entire lawn surface, at the following rates.

<u>Material</u>	<u>Application Rate</u>
Lime	100 lb./1000 sq. ft.
Fertilizer	20 lb./1000 sq. ft.

- H. Remove any fencing and rope barricades only after second cutting of lawns.

3.9 GUARANTEE

- A. The Contractor hereby guarantees that all work specified in this Section will be free from defects of materials and workmanship for a period of:
 - 1. LAWN: two (2) years beginning at the date of acceptance of substantial completion, per Addenda to General Conditions
- B. The following types of failure will be adjudged as defective work:



1. LAWN

- a. Failure in planting.
- b. No bare spots larger than 3 square feet.
- c. Not more than 10% of total area with bare spots larger than one square foot.
- d. Not more than 15% of total area with bare spots larger than 6 inches square.

- C. Operations: The Contractor shall, during the entire guarantee period, cultivate, weed, and, if necessary, water all lawn and meadow grass areas under this contract to the satisfaction of the Commissioner. The Contractor shall replace, according to the original specifications, any lawn areas adjudged to be dead or in a dying condition at the request of the Commissioner. The Commissioner shall be the sole judge as to the condition of the lawn. The guarantee and maintenance applies to all lawn and meadow grass areas.

3.10 TOPDRESSING, AERATION AND SEEDING

- A. PREPARATION OF SEED BED: The Contractor shall cut grass or other existing vegetation to a three-quarter inch (3/4") height and rake clean. Screened topsoil shall be applied to depressed areas to provide a uniform gradient. The Aerator should be equipped with three-quarter inch (3/4") hollow tines 3 to 4 inches long and passed over the area four (4) to six (6) times in different directions, as directed by the Commissioner. If the full depth of penetration cannot be achieved, the Contractor must increase the soil moisture content by watering the area to a sufficient depth. Within the Tree Protection Zone or as directed by the Commissioner the Contractor may be directed to utilize a scarifying machine in place of an aerator in order to limit surface penetration to the top one or two inches of soil. The area should be raked smooth after aerating to break up all soil cores generated by the aerating operation.
- B. INSTALLATION: Topdressing material shall be spread over aerated areas to a depth of at least one-half inch (1/2") and raked into the soil. Limestone, as needed, and Commercial Fertilizer Low Phosphorus (Slow Release) shall be incorporated into the topdressing material at their respective rates. Grass seed shall be sown, covered to the proper depth and firmed in such a manner that a uniform stand of grass will result.

END OF SECTION



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DC PROJECT #: P1CROT16A

PROJECT NAME: NEW CONSTRUCTION OF THE BRONX RIVER HOUSE

ATTACHMENT C – REVISIONS TO THE DRAWINGS

Drawing Sheet C-401.01:

Refer to supplementary sketch CSK-001, included with this Addendum.

Delete note: *"Building Line Trench Drain Connection. Refer to L301"*.

Replace with: *"Building Line Trench Drain Connection. Refer to L-300. Line to be 6" PVC, with a 4" connection to trench drain."*

Drawing Sheet L-201.00:

Delete graphic scale.

Refer to supplementary sketch LSK-010, included with this Addendum.

Drawing Sheet L-300.00:

Delete graphic scale.

Refer to supplementary sketch LSK-011, included with this Addendum.

Drawing Sheet L-401.00:

Delete graphic scale.

Drawing Sheet L-500.00:

Refer to supplementary sketches LSK-007, LSK-008, and LSK-009, included with this Addendum.

Drawing Sheet L-503.00:

Refer to supplementary sketches LSK-004 and LSK-005, included with this Addendum.

Drawing Sheet L-504.00:

Refer to supplementary sketches LSK-006, included with this Addendum.

Drawing A-100.01:

Refer to supplementary sketch ASK-004, included with this Addendum.

Drawing A-110.00:

Refer to supplementary sketch ASK-005, included with this Addendum.

Drawing Sheet A-120.00

Delete all references to XPTD-1 on Finish Color Chart.

Add to Color Finish Chart the following:

Abbreviation: PTD-2

Description: Exterior paint

Manufacturer: Benjamin Moore (or equal)

Product: Eco Spec

Color: BM Bold Yellow 336

Size: N/A

Finish: N/A

Location: Interior bollards in Boat House Storage



Drawing Sheet A-530.00:

Refer to supplementary sketch ASK-002, included with this Addendum.

Drawing A-600.01:

Refer to supplementary sketch ASK-003, included with this Addendum.

Delete Note #2: *"All wood blocking and decking to be certified wood."*

Replace with: *"#2: Not used."*

Drawing M-004.00:

Delete note: *"3" GWS/R pipes (underground) typical"*

Replace with: *"2-1/2" GWS/R pipes (underground) typical"*

Drawing E-001.00

Refer to supplementary sketch ASK-006, included with this Addendum.

Delete chart "BRG River House Luminaire Schedule".

Drawing E-003.00:

Refer to supplementary sketch ASK-007, included with this Addendum.



UTILITY STRUCTURE SCHEDULE

TAG	TYPE	TG	INVERT
1	CO	9.40	6.95
2	CO	10.40	6.48
3	CO	10.97	9.47
4	CO	10.94	10.35
5	CO	11.61	8.98
6	CO	12.29	8.62
7	TANK	12.78	1.71 (TANK) 8.02 (11) 7.92 (12)
8	AD	11.83	8.51
9	AD	11.80	8.72
10	AD	11.88	9.38
11	MH	12.76	8.37 (IN) 8.12 (OUT)
12	MH	12.24	6.07
13	AD	10.92	9.09

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

LANGAN

21 Penn Plaza, 360 West 31st Street, 8th Floor
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Langan Engineering, Environmental, Surveying and
Landscape Architecture, D.P.C.
Langan Engineering and Environmental Services, Inc.
Langan International LLC

Collectively known as Langan

Project

STARLIGHT PARK

BLOCK No. 3019, LOT No. 100

BRONX

Drawing Title

C-401 SCHEDULE

NEW YORK

Project No.

005788403

Date

3/13/13

Scale

NTS

Drawn By

DL

Submission Date

3/13/13

Drawing No.

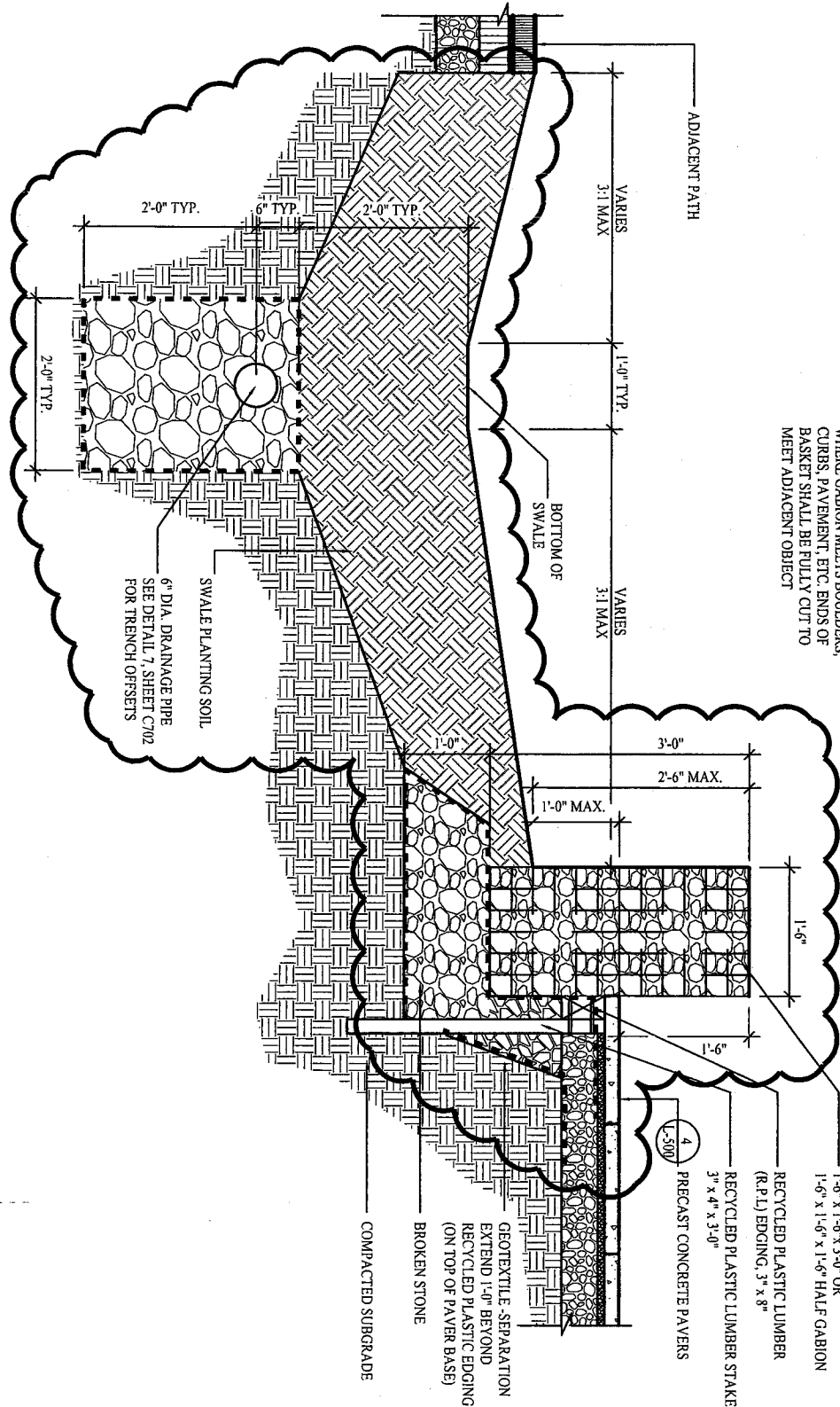
CSK-001

Sheet **III** of **III**



5

GABION WALL AT PLAZA -- SECTION



NOTE:
WHERE GABION MEETS BOULDERS,
CURBS, PAVEMENT, ETC. ENDS OF
BASKET SHALL BE FULLY CUT TO
MEET ADJACENT OBJECT

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www.starrwhitehouse.com

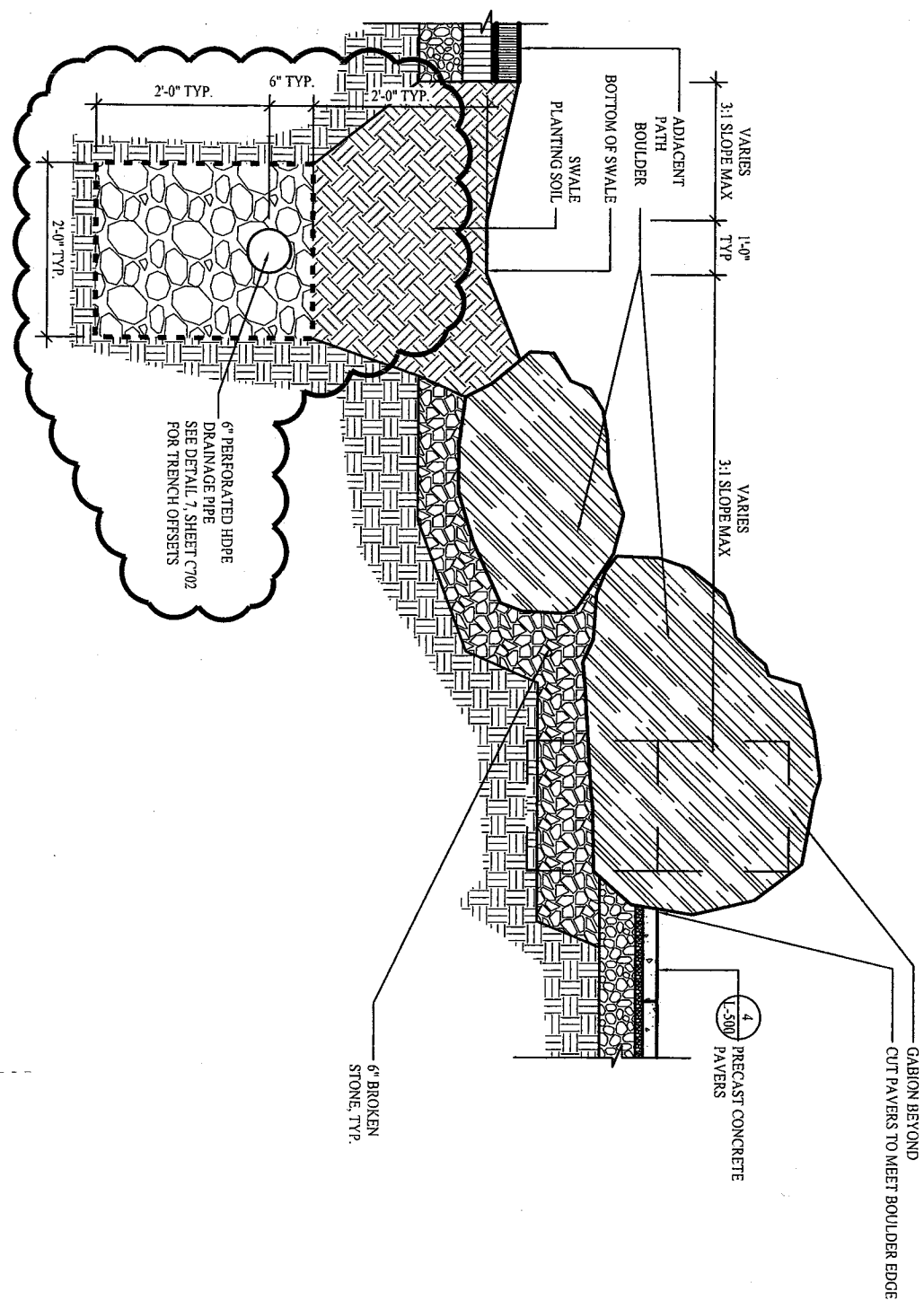
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DRAWN BY	BS
CHECK BY	JP
PROJECT NO.	11010.10
DATE	03/13/2013
SCALE	NTS
SHEET NO.	1 OF 1

LSK-004



6

PLANTED SWALE AND GABION WALL -- SECTION



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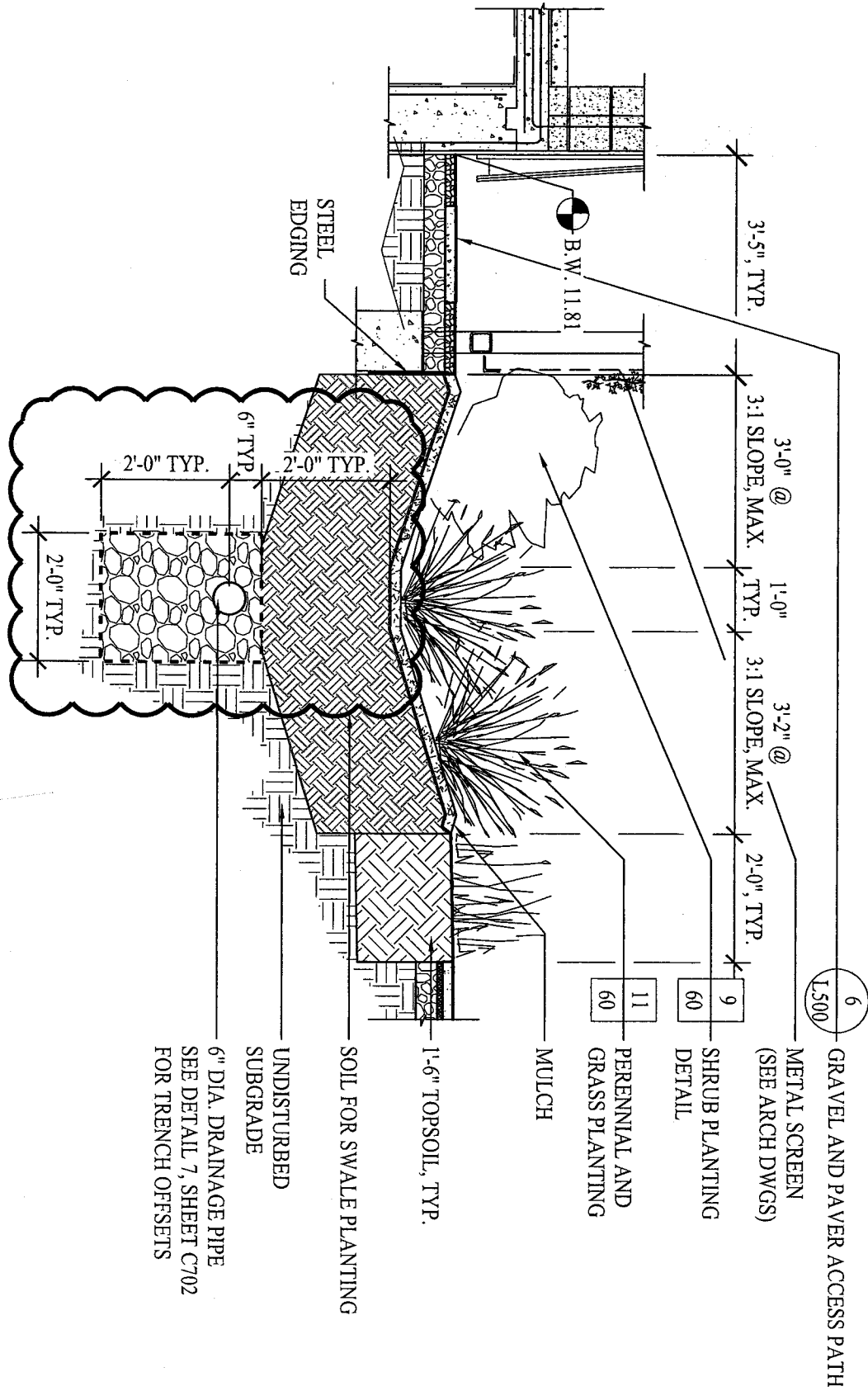
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DRAWN BY	BS
CHECK BY	JP
PROJECT NO.	11010.10
DATE	03/13/2013
SCALE	NTS
SHEET NO.	1 OF 1

LSK-005



4

NORTH SWALE - SECTION



- 6" DIA. DRAINAGE PIPE
SEE DETAIL 7, SHEET C702
FOR TRENCH OFFSETS
- UNDISTURBED
SUBGRADE
- SOIL FOR SWALE PLANTING
- 1'-6" TOPSOIL, TYP.
- MULCH
- PERENNIAL AND
GRASS PLANTING
11
- SHRUB PLANTING
DETAIL
60
- METAL SCREEN
(SEE ARCH DWGS)
9
- GRAVEL AND PAVER ACCESS PATH
6

PROJECT TITLE	BRH / STARLIGHT REF: SITE PLANTING DETAILS L-504, NORTH SWALE SECTION
DRAWN BY	BS
CHECK BY	JP
PROJECT NO.	11010.10
DATE	03/13/2013
SCALE	NTS
SHEET NO.	1 OF 1

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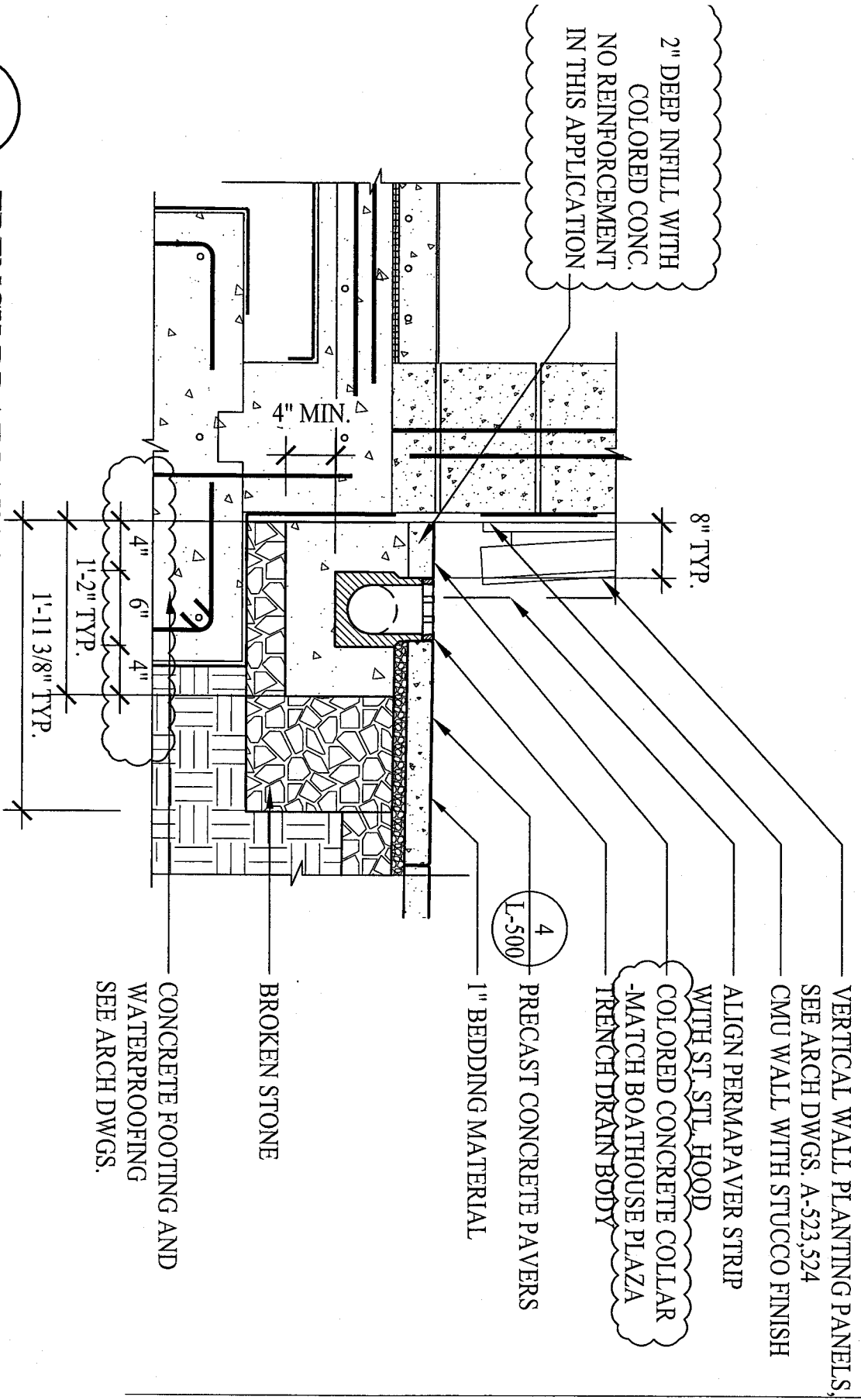
80 Maiden Lane, Suite 1901
New York, New York 10038
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www.starrwhitehouse.com

LSK-006



9

TRENCH DRAIN AT BUILDING



2" DEEP INFILL WITH
COLORED CONC.
NO REINFORCEMENT
IN THIS APPLICATION

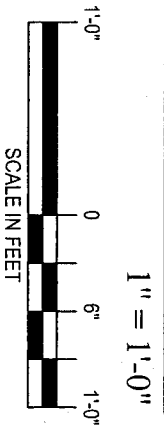
8" TYP.

4" MIN.

4" 6" 4"
1'-2" TYP.
1'-11 3/8" TYP.

4
L-500

- VERTICAL WALL PLANTING PANELS,
SEE ARCH DWGS. A-523,524
- CMU WALL WITH STUCCO FINISH
- ALIGN PERMAPAVER STRIP
WITH ST. STL. HOOD
- COLORED CONCRETE COLLAR
-MATCH BOATHOUSE PLAZA
TRENCH DRAIN BODY
- PRECAST CONCRETE PAVERS
- 1" BEDDING MATERIAL
- BROKEN STONE
- CONCRETE FOOTING AND
WATERPROOFING
SEE ARCH DWGS.



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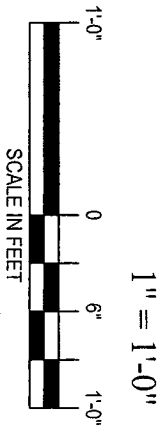
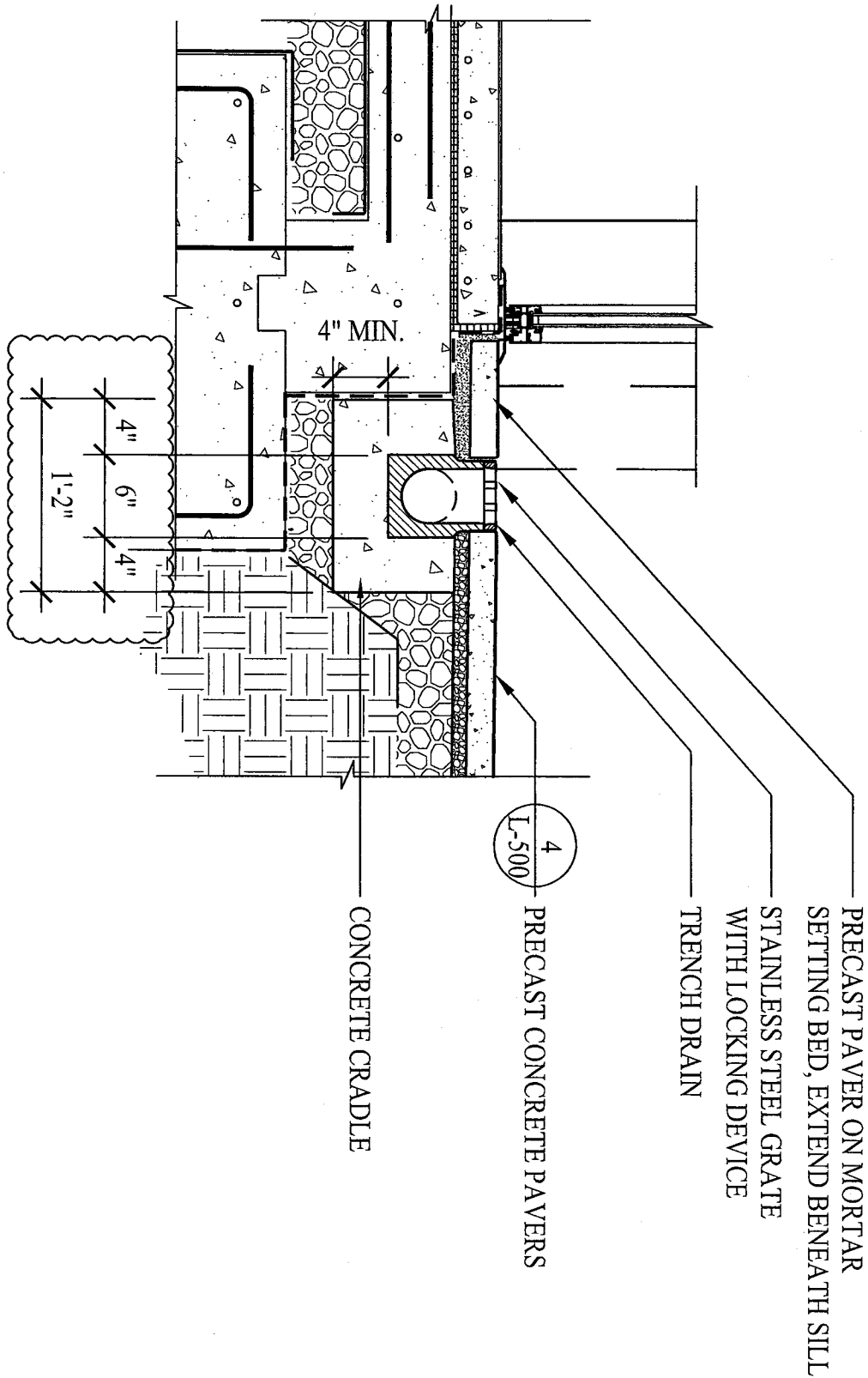
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DRAWN BY	BS
CHECK BY	JP
PROJECT NO.	11010.10
DATE	03/19/2013
SCALE	NTS
SHEET NO.	1 OF 1

LSK-007



8

TRENCH DRAIN AT BUILDING ENTRANCE



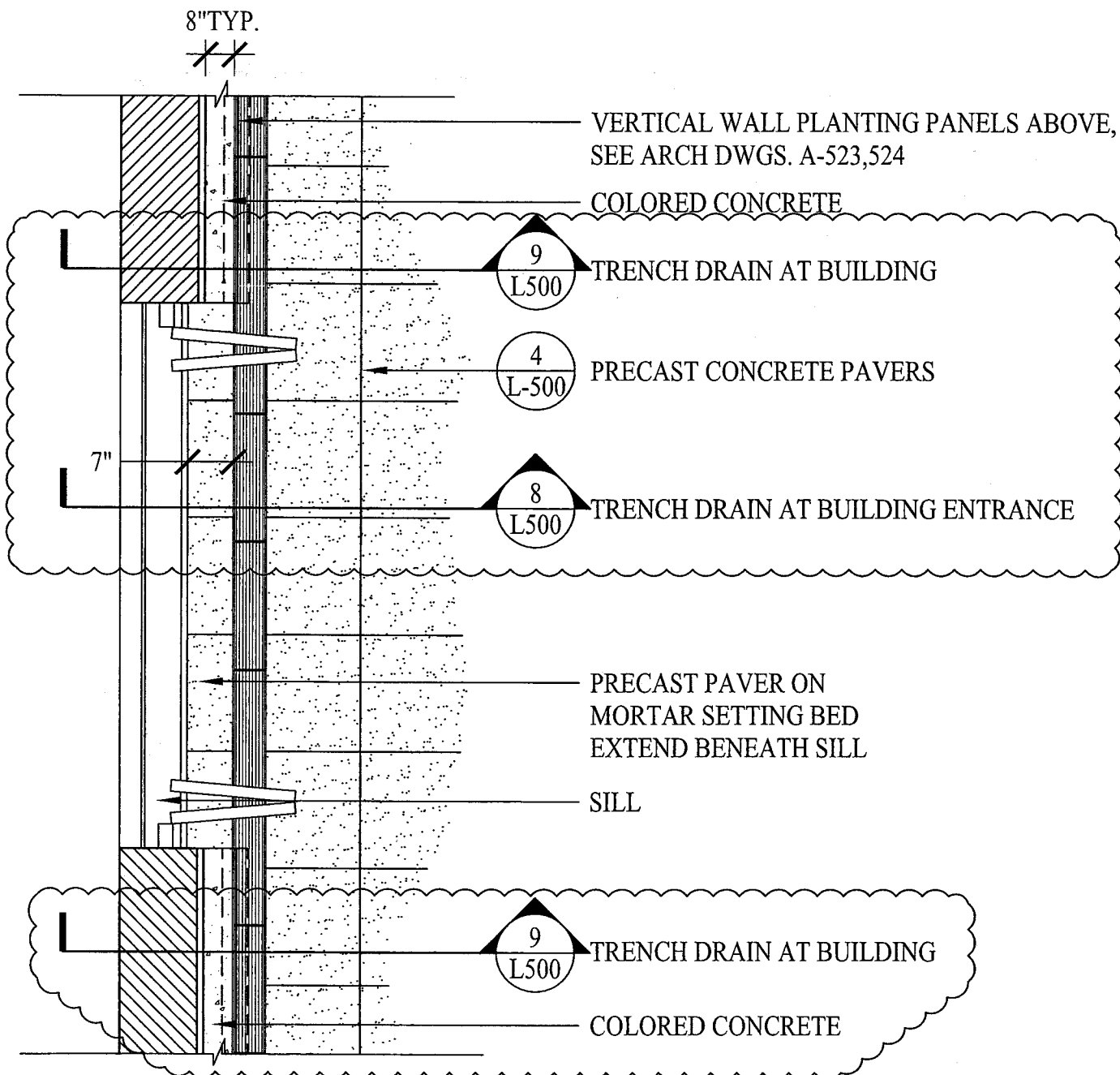
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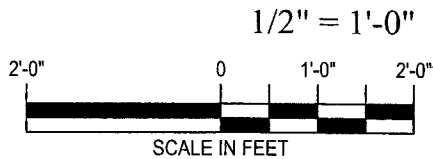
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DRAWN BY	BS
CHECK BY	JP
PROJECT NO.	11010.10
DATE	03/19/2013
SCALE	NTS
SHEET NO.	1 OF 1

LSK-008





14 TRENCH DRAIN AT BUILDING



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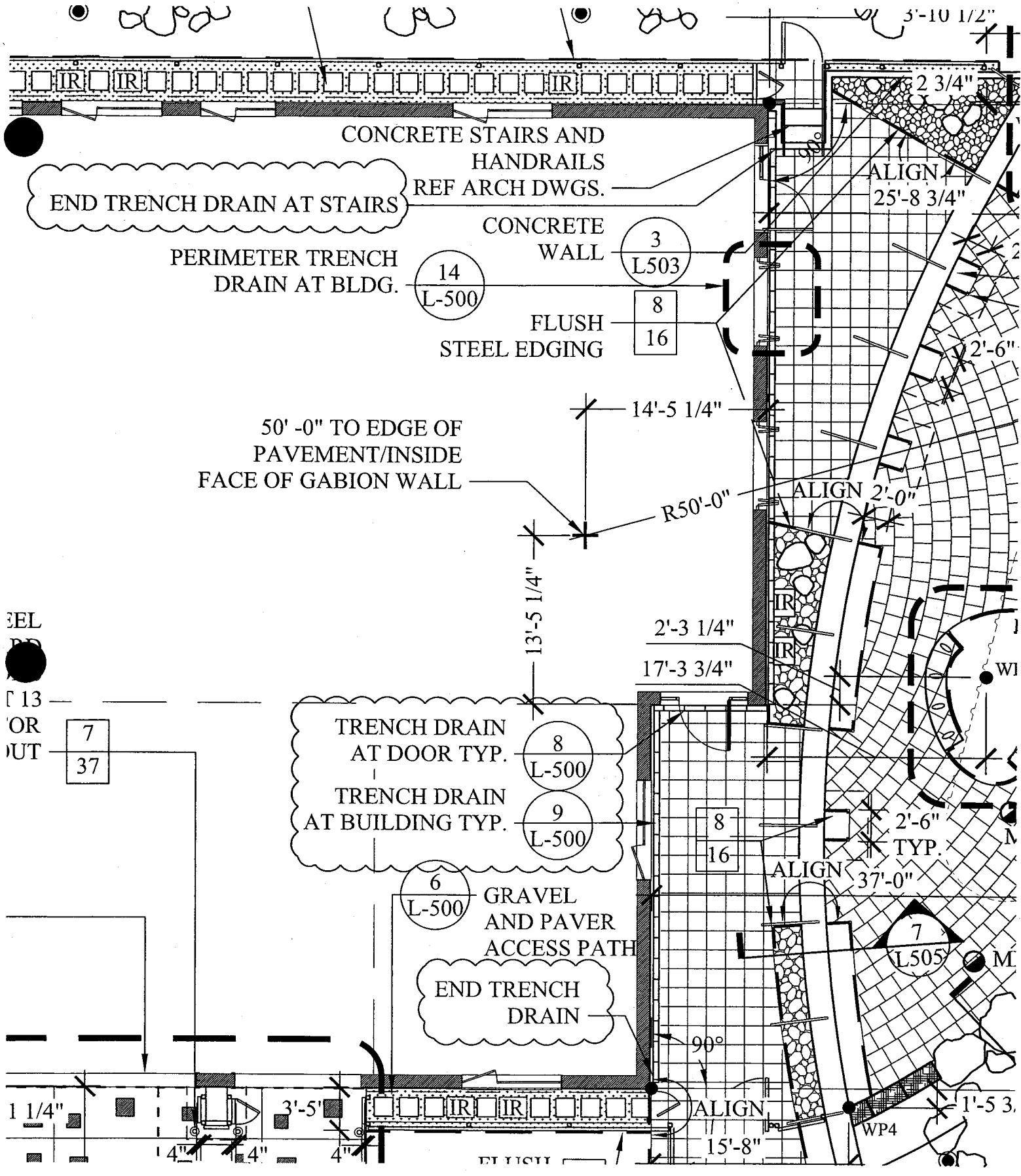
PROJECT BRH / STARLIGHT
TITLE REF: SITE DETAILS L-500, TRENCH DRAIN AT BUILDING

DRAWN BY BS
CHECK BY JP

PROJECT NO. 11010.10
DATE 03/19/2013
SCALE NTS
SHEET NO. 1 OF 1

LSK-009





BEL
 DD
 [13
 OR
 UT



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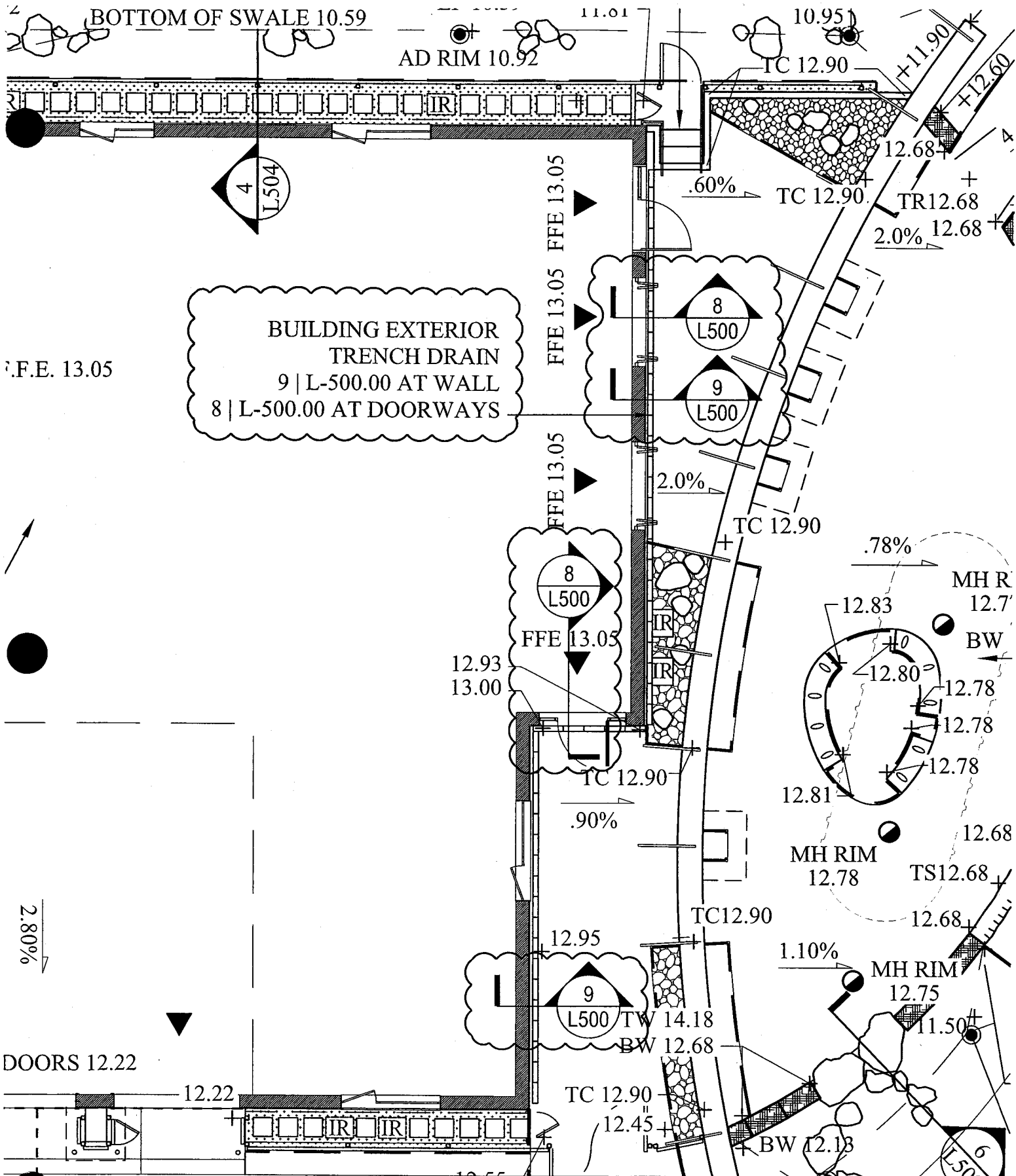
PROJECT TITLE BRH / STARLIGHT
 REF: L-201, LAYOUT AND MATERIALS PLAN

 DRAWN BY BS
 CHECK BY JP

 PROJECT NO. 11010.10
 DATE 03/19/2013
 SCALE NTS
 SHEET NO. 1 OF 1

LSK-010





BUILDING EXTERIOR
TRENCH DRAIN
9 | L-500.00 AT WALL
8 | L-500.00 AT DOORWAYS

F.F.E. 13.05

2.80%

DOORS 12.22

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PROJECT TITLE BRH / STARLIGHT
REF: L-300, GRADING PLAN

DRAWN BY BS
CHECK BY JP

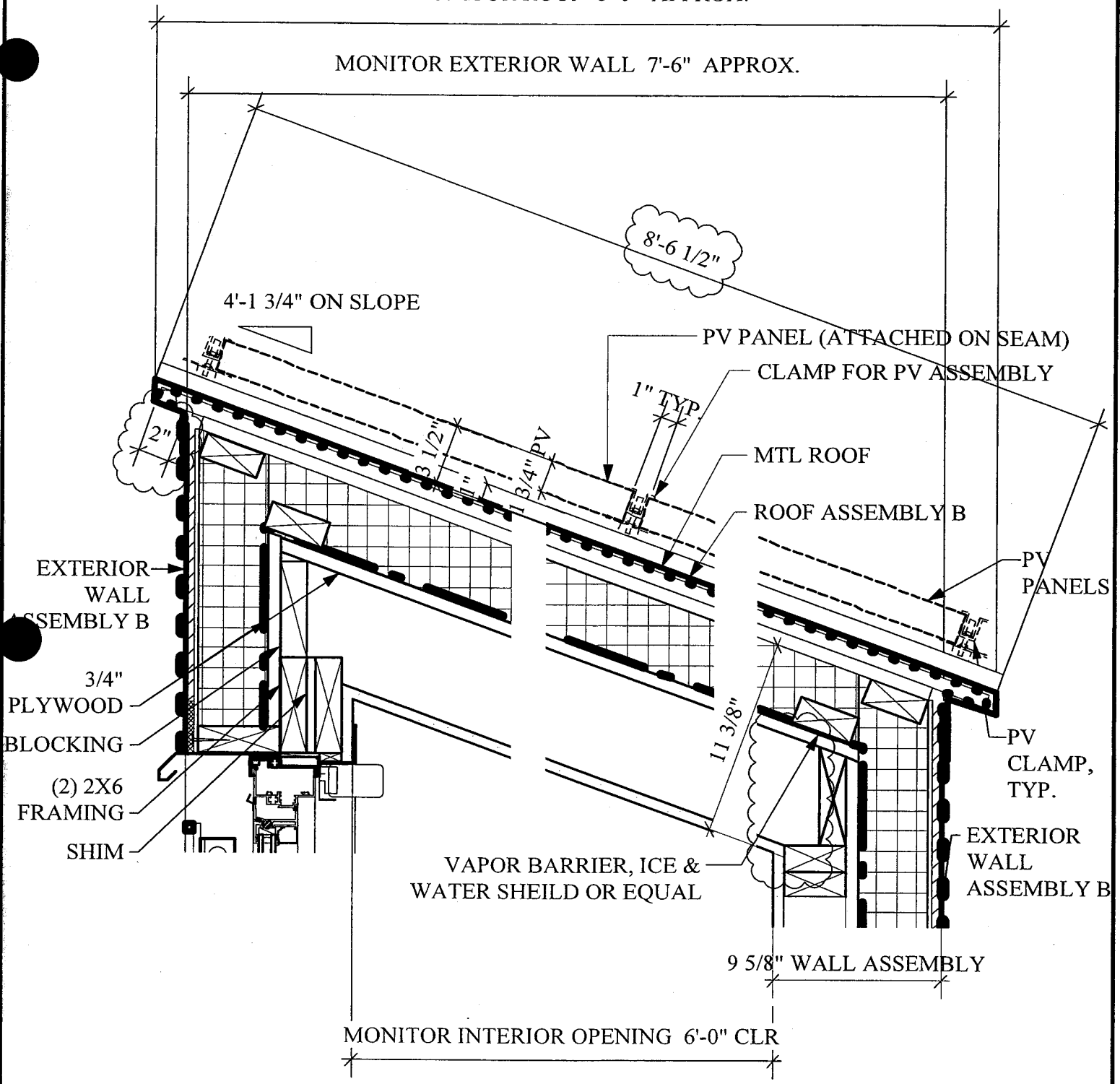
PROJECT NO. 11010.10
DATE 03/19/2013
SCALE NTS
SHEET NO. 1 OF 1

LSK-011



MONITOR ROOF 8'-0" APPROX.

MONITOR EXTERIOR WALL 7'-6" APPROX.



1 ROOF MONITOR TRANSVERSE SECTION DETAIL
 SCALE 3"=1'-0"

Kiss + Cathcart, Architects

44 COURT ST. TOWER C
 BROOKLYN NY 11201
 TEL 718 237 2238
 FAX 718 237 2025
 WWW.KISSCATHCART.COM

BRONX RIVER HOUSE

THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN
 THE BOROUGH OF BRONX, NEW YORK
 DDC PROJECT #PICROT16A

Roof Monitor Section

ASK: 002

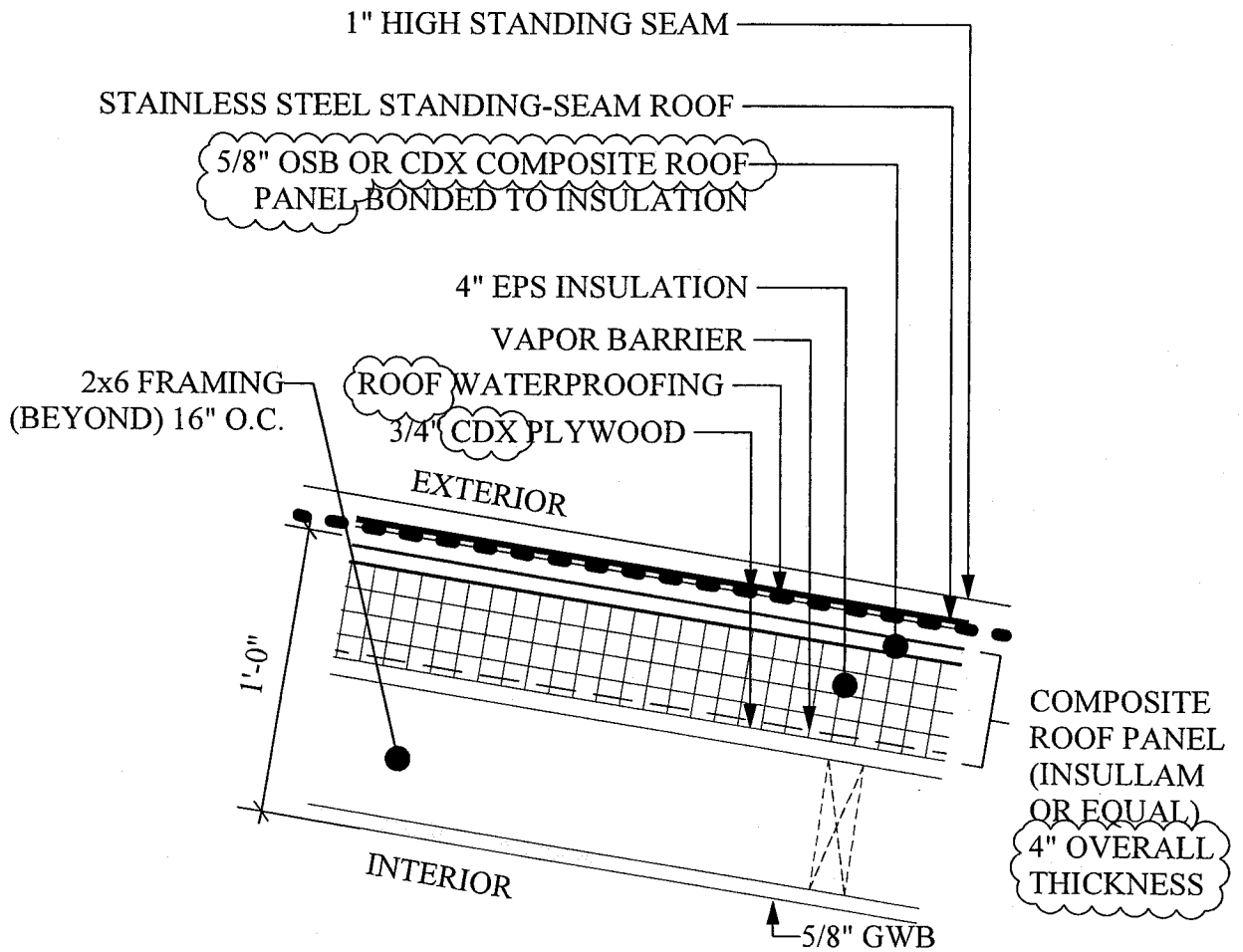
SCALE: 1 1/2" = 1'-0"

REF.: 1/A-530.00

DATE: 3/20/2013

DRAWN BY: HM

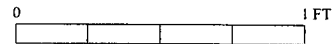




12

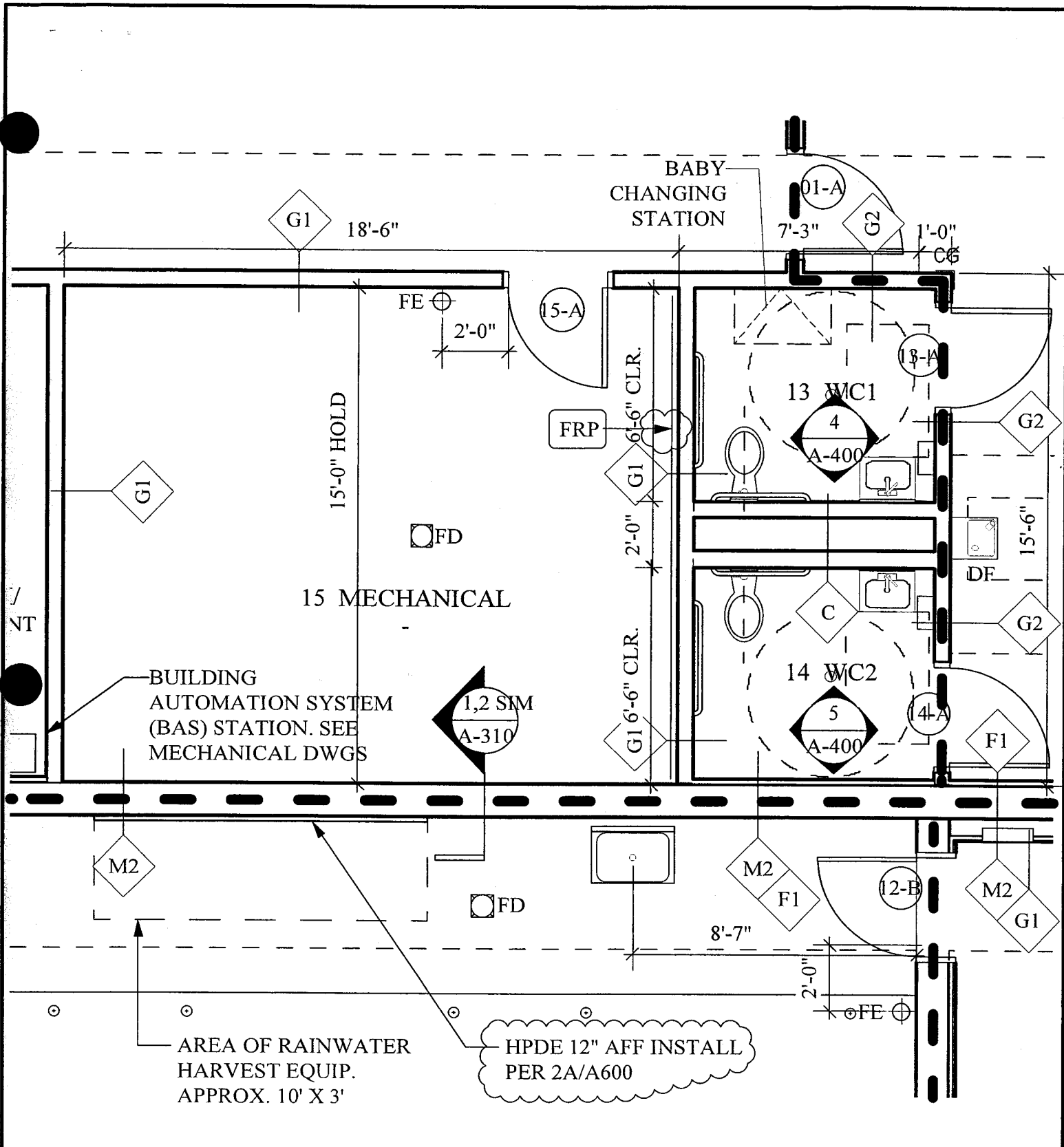
EXTERIOR ROOF ASSEMBLY B (@ MONITORS)

Scale: 1 1/2" = 1'-0"



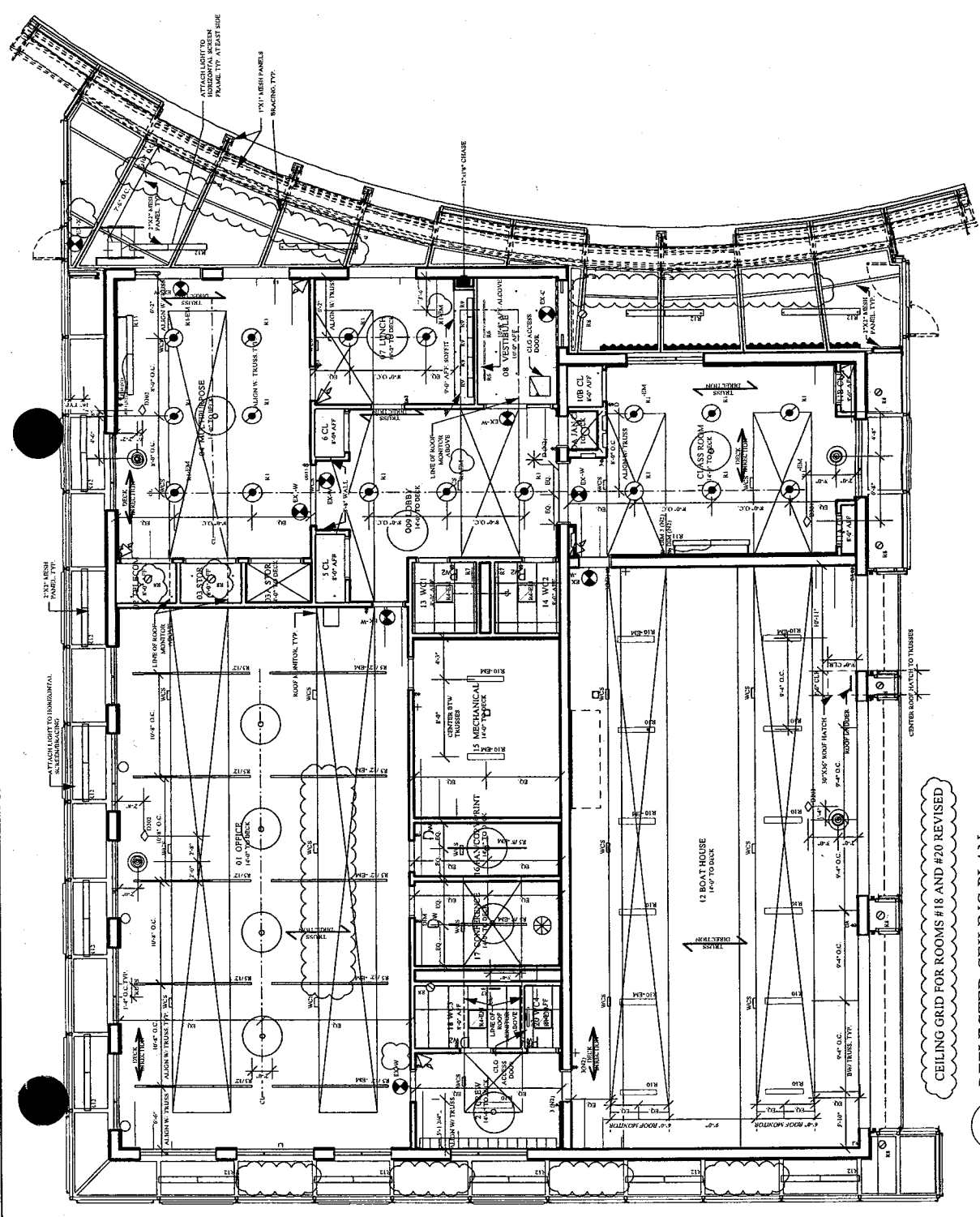
MODIFIED BID ADDENDA ASK 003





1 FIRST FLOOR PLAN
1/4"=1'-0"





CEILING GRID FOR ROOMS #18 AND #20 REVISED
REFLECTED CEILING PLAN

1

BRONX RIVER HOUSE
THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN
THE BOROUGH OF BRONX, NEW YORK
DDC PROJECT #PICROTT16

REFLECTED CEILING PLANASK: 005
SCALE: 3/32" = 1'-0"
DATE: 3/26/2013
DRAWN BY: LC

KO
thcart, Architects
1000 AVENUE OF THE STARS
SUITE 1000
WASHINGTON, DC 20004
TEL: 703.251.2000
WWW.THARTCHITECTS.COM



SYMBOL		TYP		DESCRIPTION / CATALOG NO.		LAMP	WATTS	BALLAST	FIXTURE QTY	MOUNTING REMARKS
BRG RIVER HOUSE LUMINAIRE SCHEDULE										
R1		R1		BASELITE-QSD22-FINISHTBD-4X26-STXX-AS-FRE-EM	(4) 26W CFL	(4) 26	EMERGENCY BALLAST		5/8" PENDANT, 2' W/SWIYEL & CANOPY	
R1-EM		R1-EM		BASELITE-QSD22-FINISHTBD-4X26-STXX-AS-FRE-DIM-EM	(4) 26W CFL	(4) 26	DIMMING BALLAST, EMERGENCY BALLAST		5/8" PENDANT, 2' W/SWIYEL & CANOPY	
R4-EM		R4-EM		HE WILLIAMS 50-G-S-2-2-17-S-A12125-DG/MYLAR-EB2-120-EM-AS	(2) 2' T8	(2) 17	EMERGENCY BALLAST		CEILING MOUNTED	
R5/12'		R5/12'		LINEAR LIGHTING IB22-D-1-ET5HO-120-SBL-C48-AP-DM (0-10V)-12-AS	(1) 54W T5HO / 4' SEC	(1) 54/4'	DIMMING BALLAST		CEILING MOUNTED	
R5/12'-EM		R5/12'-EM		LINEAR LIGHTING IB22-D-1-ET5HO-120-SBL-C48-AP-DM (0-10V)-12-EM-AS	(1) 54W T5HO / 4' SEC	(1) 54/4'	DIMMING BALLAST, EMERGENCY BALLAST		CEILING MOUNTED	
R5/8'-EM		R5/8'-EM		LINEAR LIGHTING IB22-D-1-ET5HO-120-SBL-C48-AP-DM (0-10V)-12-EM-AS	(1) 54W T5HO / 4' SEC	(1) 54/4'	DIMMING BALLAST, EMERGENCY BALLAST		CEILING MOUNTED	
R6		R6		HE WILLIAMS 73-4-1-28T5S-EB1-120V/R1098-AS	(1) 28W 4' T5 / 4' SEC	(1) 28/4'			CEILING MOUNTED	
R7		R7		HE WILLIAMS 20-2-1-17-A-EB-1-120-AS	(1) 17W 2' T8	(1) 17			WALL MOUNTED	
R8		R8		CANLET 68-02-11-OG-11-AS	(1) 18W	(1) 18			PENDANT	
R8-EM		R8-EM		NOT USED						
R9		R9		HE WILLIAMS 1 WO-42-2-135TP-KSH-25/A-GCO-WRS-EB2-120-AS	(2) 13W T5	(2) 13			UNDER CABINET	
R10		R10		HE WILLIAMS 84-4-2-54T5H-EBD2*AD*MK7-120-AS	(2) 54W 4' T5HO / 4' SEC	(2) 54/4'	DIMMING BALLAST		CEILING MOUNTED	
R10-EM		R10-EM		HE WILLIAMS 84-4-2-54T5H-EBD2*AD*MK7-120-EM-AS	(2) 54W 4' T5HO / 4' SEC	(2) 54/4'	DIMMING BALLAST, EMERGENCY BALLAST		CEILING MOUNTED	
R11		R11		ELLIPTIPAR-F124-T155-H-02-T (0-10V)-00-0-HC-D-02-18'-0-AS (INTERIOR APPLICATION)	(1) 54W 4' T5HO / 4' SEC	(1) 54/4'	DIMMING BALLAST		WALL MOUNTED	
R12/8'		R12/8'		ELLIPTIPAR-F164-T255-H-02-1-00-0-HB-D-02-24'-0-AS (EXTERIOR APPLICATION)	(2) 54W 4' T5HO / 4' SEC	(2) 54/8'			PENDANT	
R12/24'		R12/24'		NOT USED						
EX/C		EX/C		MULE NYELX SERIES - NYELX-1-B-U-BA-AS	4W LED	4			CEILING MOUNTED	
EX/W		EX/W		MULE NYELX SERIES - NYELX-1-B-U-BA-AS	4W LED	4			WALL MOUNTED	
EX/X		EX/X		EXTERIOR LED EXIT SIGN (TBD)					WALL-MOUNTED	
NOTES: 1. UAE-0-10V DIMMING BALLAST FOR ALL BALLAST 2. FIXTURE LISTED ARE BASIS OF DESIGN, OR APPROVED EQUAL										

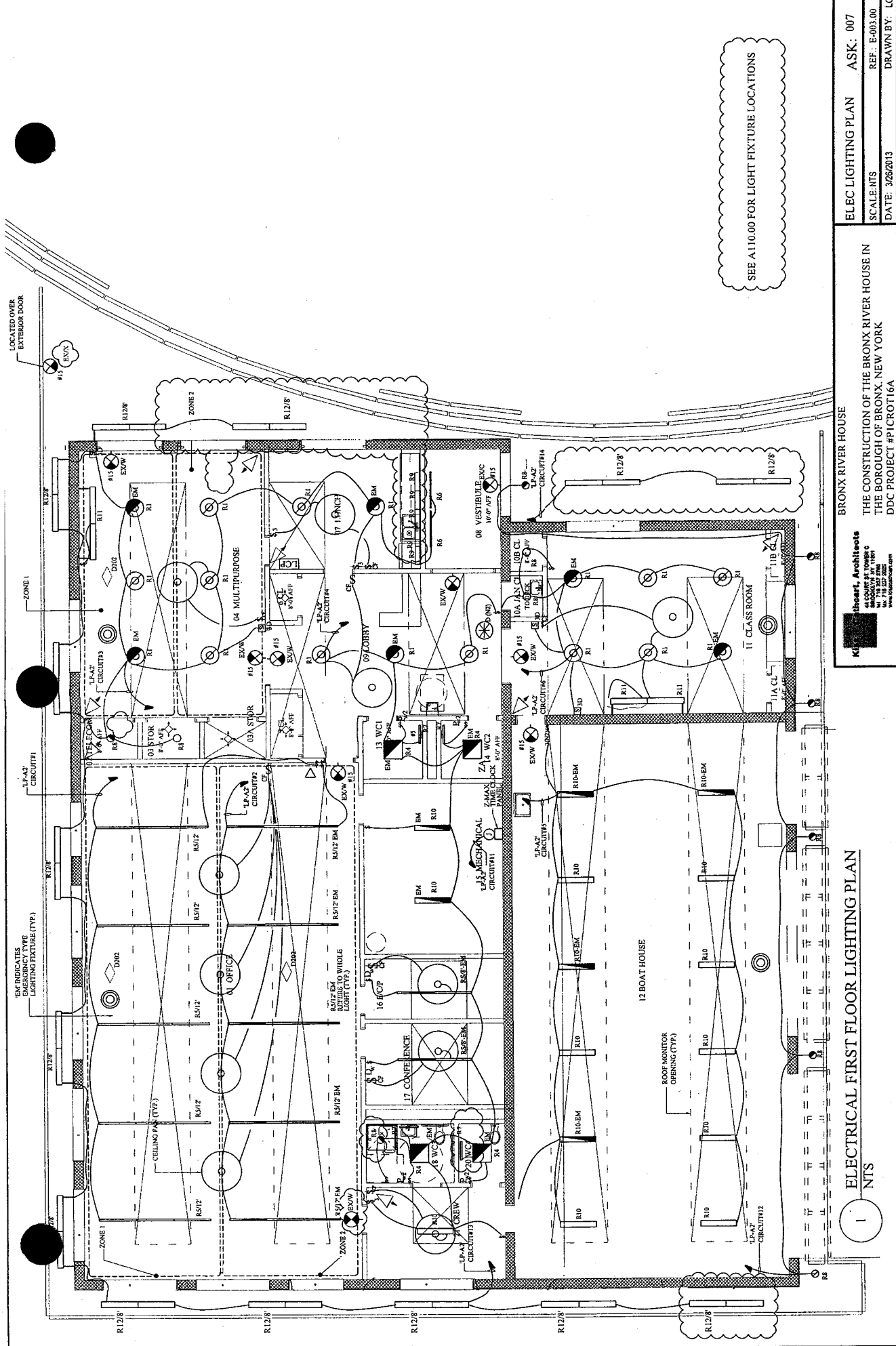
BRONX RIVER HOUSE

Kilpatrick Architects
45 South St. Tower C
New York, NY 10038
Tel: 212 279 1100
www.kilpatrick.com

THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN
THE BOROUGH OF BRONX, NEW YORK
DDC PROJECT #PICKOT16A

LUMINAIRE SCHEDULE ASK: 006
SCALE: N/A REF: E-001.00
DATE: 3/26/2013 DRAWN BY: LC





SEE A110.00 FOR LIGHT FIXTURE LOCATIONS

BRONX RIVER HOUSE
 THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN
 THE BOROUGH OF BRONX, NEW YORK
 DDC PROJECT #PICKOTT16A

Kilgus & Associates, Architects
 44 SOUTH ST. TOWER C
 NEW YORK, NY 10038
 WWW.KILGUSANDASSOCIATES.COM

ELEC LIGHTING PLAN ASK: 007
 SCALE: NTS
 DATE: 3/26/2013
 REF: E-003.00
 DRAWN BY: LC

ELECTRICAL FIRST FLOOR LIGHTING PLAN
 NTS



THE CITY OF NEW YORK
DEPARTMENT OF DESIGN AND CONSTRUCTION
DIVISION OF STRUCTURES

ADDENDUM TO THE GENERAL CONDITIONS

The General Conditions are hereby amended in accordance
with the terms and conditions set forth in this Addendum.

I. PROJECT DESCRIPTION

FMS #: **P1CROT16A**
PROJECT NAME: **New Construction of the Bronx River House**

PROJECT DESCRIPTION: This Project consists of the construction of a new one-story Park headquarters structure, consisting of a pre-drilled pile-supported timber foundation, concrete grade beams and slab, load-bearing masonry AAC exterior and interior walls with wood trusses and wood roof deck, an exterior metal fence with mesh infill, coiling overhead doors and gates, drip irrigation, plumbing, heating, ventilation and electrical. The project includes a rainwater harvesting system, lighting controls, crystalline roof-mounted photovoltaic panels and associated balance of system, data acquisition system (DAS) and lobby display, ground-sourced standing column wells (SCW) and heat pumps, and radiant slab hydronic heating. Sitework includes the construction of a parking lot, signage, fencing, paths, pavement, lawn and planting materials, precast DCV vaults, underground utilities and site electrical.

PROJECT LOCATION: **1041 East 172nd Street (a.k.a. River Road/Sheridan entrance road)**
BOROUGH: **Bronx**
CITY OF NEW YORK
ZIP CODE: **10460**
COMMUNITY BOARD #: **9**

PROJECT MANAGEMENT:

- DDC shall publicly bid and enter into a single Contract for the Project. DDC shall manage the Project using its own personnel.
- DDC shall publicly bid and enter into a single Contract 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 (September 2008) entitled "The Resident Engineer".
- DDC has entered into CM/Build Contract for the Project. The CM/Build Contractor shall be responsible for conducting a competitive bid process and entering into the contract(s) for the Project.

III. 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.

This contract is subject to a Project Labor Agreement ("PLA"). In accordance with the Labor Law, 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. However, the Contract Documents for this Project (General Conditions, Drawings and Specifications) were prepared as if the requirements of the Wicks Law for separate prime contractors did apply. To correct this situation, the Contractor is advised that the Contract Documents are revised as set forth below:

- (A) Delete any and all references to separate responsibilities, separate specifications, separate drawings and/or separate contracts for the following subdivisions of the work: Plumbing Work, HVAC Work, and Electrical Work.
- (B) Revise all such references to indicate that: (1) the Project consists of a single contract, the Contract for General Construction Work, and (2) all responsibilities and obligations in the Contract Documents assigned to the separate Contractors for the four subdivisions of the work are the responsibility of the Contractor for General Construction Work.

IV. 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.

V. APPLICABILITY OF ARTICLES AND AMENDED ARTICLES

The Contractor is advised that various Articles in the General Conditions may not apply to this Project or may apply as amended. Such Articles advise the Contractor to "Refer to the Addendum to the General Conditions for the applicability of this Article." Such Articles are set forth below. A check mark indicates whether the Article (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 Article, as set forth in the General Conditions, applies to the Project. Amended Articles, if any, are set forth following this list of Articles.

<u>Article No.</u>	<u>Article</u>	<u>Sub-Article or PART</u> (if applicable)	Applies	Does not Apply	Applies as Amended
1.04	Contract Drawings	C)	PRINTS	X	
1.05	Shop Drawings and Record Drawings	B)	INTEGRATED DRAWINGS	X	
1.09	Surveys				X
1.13	Sleeves and Hangers			X	
1.15	Temporary Heat			X	
1.20	Progress Photographs			X	
1.26	Security Guards/Fire Guards on the Site			X	

<u>Article No.</u>	<u>Article</u>	<u>Sub-Article or PART</u> (if applicable)	<u>Applies</u>	<u>Does not Apply</u>	<u>Applies as Amended</u>
1.29	Sleeve and Penetration Drawings			X	
1.30	Location of Partitions		X		
1.34	Temporary Services	PART A	X		
		PART B		X	
1.35	Temporary Use, Operation and Maintenance of Elevators during Construction	PART A – For New Buildings Up to 15 Stories		X	
		PART B – For New Buildings Over 15 Stories		X	
		PART C – Existing Buildings		X	
1.36	General Mechanical Requirements		X		
1.37	General Electrical Requirements	PART B – Section A) Temporary Lighting			X
		PART B – Section B) Site Security Lighting (New Construction)	X		
		PART D – Electrical Conduit System Including Boxes	X		
		PART E – Electrical Wiring Devices	X		
		PART F – Electrical Conductors and Terminators	X		
		PART G – Circuit Protective Devices	X		
		PART H – Distribution Centers	X		
		PART I – Motors	X		
		PART J – Motor Control Equipment	X		
1.40	Separation Between Trades			X	
1.42	Specific Requirements	C) BORINGS	X		
		E) WORK FENCE ENCLOSURE			X
		G) RESIDENT ENGINEER'S OFFICE			
		1. OFFICE SPACE IN EXISTING BUILDING		X	
		2. TRAILER OFFICE	X		
		H) ADDITIONAL EQUIPMENT FOR THE RESIDENT ENGINEER	X		
		I) PUBLIC TELEPHONE		X	
		Q) PROJECT SIGN AND RENDERING			
		PART B – PROJECT RENDERING	X		

COMPUTER WORKSTATIONS

H) Number of Computer Workstations to be provided as outlined in Article 1.42 H, item 4: 2

AMENDED ARTICLES

The Contractor is advised that the amended Articles set forth below are included in the General Conditions and apply to the Project.

1.09 Surveys

Add to the Article the following section:

J. PRECONSTRUCTION SURVEY:

1. The contractor shall prepare a topographic and utility survey of all existing conditions within 5 days of mobilizing. The survey shall be signed and sealed by a New York State licensed Land Surveyor. The Contractor shall submit to the Owner six originals of the survey drawings for record, and shall review the survey against the Contract drawings' scope of work in order to advise the Owner within a timely manner of any discrepancies and/or construction issues arising from such discrepancies. The Contractor shall also supply an AutoCAD DWG file of the survey data on CD / DVD media.
2. The Contractor shall perform a videotaped inspection of the site documenting existing conditions prior to mobilizing to the site. The digital video camera used shall be one on which sound and video information can be recorded. The video camera shall capture 1080p HD video with audio. Six copies of the DVD recordings shall be submitted to the Owner for record.

1.37 General Electrical Requirements

In PART B – Section A) Temporary Lighting, include the provisions described in Specification Section 16000 General Provisions for Electrical Work, Article 1.11 "Temporary Light and Power."

1.42 Specific Requirements

Delete 1.42E WORK FENCE ENCLOSURE in its entirety and replace with the following:

1. Contractor shall furnish and erect an 8' high chain link fence, where indicated on drawings, enclosing the entire project on all sides. All materials used shall be used. Any permit required for the installation and use of said fence shall be borne by the Contractor.
2. Contractor to maintain all construction fence (existing or provided by Contractor) throughout the project duration.
3. Fabric: Fabric shall be 9 ga. Galvanized steel wire woven into 2-inch diamond mesh, knuckled at the bottom and barbed at the top.
4. Line Posts: Line posts shall be 2 ½ inch O.D. galvanized steel, standard weight pipe conforming to F 1083, schedule 40, weighing 3.65 pounds per linear foot.
5. Terminal Posts: Terminal posts shall be 3 inch O.D. galvanized steel, standard weight pipe conforming to ASTM F1083 schedule 40, weighing 5.79 pounds per linear foot.
6. Braces: Braces shall be 1 5/8" inch O.D. galvanized steel, standard weight pipe conforming to ASTM F 1083, schedule 40, weighing 2.27 pounds per linear foot. Trusses shall be 5/16" diameter adjustable truss rods.
7. Top & Bottom Tension Wire: Tension wire shall be No. 6 gauge galvanized wire.
8. Fittings and Hardware: Hardware, fittings and post caps shall be ductile iron, cast steel or pressed steel, all hot dipped galvanized.
9. Gates: Gates shall be of similar construction as the fence and shall be provided with locks. Gates shall be placed at locations as shown on the plans or as required by the Contractor and approved by the Engineer. The Engineer shall be supplied with a set of keys, one (1) key for every lock.
10. Plywood: Plywood shall be CDX grade for exterior use, 4 x 8 sheets, sound and free of defects proscribed by the grade, where shown on drawings.
11. Installation: The Contractor shall replace damaged posts, rails, plywood panels, and hardware as required to reconstruct the construction fence. New posts shall be set directly in the ground to a minimum depth of 3 feet and anchored in position with drive anchors driven diagonally through shoes

attached to the post below ground level. The posts shall be set true to line and grade. If rock is encountered, the Contractor shall submit details for adequately securing the posts in place. Corner and gate posts shall be set in concrete footings to a minimum depth of 3 feet. Chain link fabric shall be secured to line posts with $\frac{3}{16}$ inch aluminum tie-wire spaced 18 inches apart on posts. Fabric shall be secured to terminal post with tension bars and bands and to top and bottom tension wires with 9 gauge hot rings spaced 24 inches apart. Post caps shall be installed on all posts.

12. It shall be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
13. Where required, make provision for fire hydrants, lampposts, etc.
14. LINE POST SPACING SHALL NOT EXCEED 8'-0" ON CENTER.
15. Fence Wind Screen: Provide wind screens on all fences from Dura-Screen or equal, with metal 'S' hook fasteners as manufactured by Lee NRSM, Myrtle Beach, NC, or approved equal. Color to be green. Install windscreen on all 8' high chain link fence mesh, and on existing 4' high steel fence at the Sheridan Parkway barrier. The fabric furnished shall be woven from heavy duty PVC coated polyester material and coated after weaving with a 6.0 ounce per square yard coating of dark poly-vinyl chloride coating. Wind vents shall be staggered, top and bottom, of screen length, every ten (10') feet. All hems shall be four-ply reinforced. Windscreens shall have a center seam with internal reinforcement as above. All hems and seams are to be sewn with #7 weather and ultraviolet light resistant Dacron thread. Grommets shall be of brass material spaced at a maximum of 12" apart on all hems.
16. Wind Screen Installation: Windscreen shall be installed as per manufacturer's directions using metal 's' hooks. Windscreen shall be fastened to fence at each grommet a (12" OC). For installation to existing steel fence, utilize plastic ties in lieu of metal 's' hooks.
17. Removal: Upon completion of the work, and when directed by the Owners' Representative, the construction fence and windscreen shall be removed and shall become the property of the Contractor. All debris from windscreen must be removed from site.

VI. ADDITIONAL ARTICLES

The Contractor is advised that the additional Articles set forth below are included in the General Conditions and apply to the Project.

1.43 Appendix Documents

- Geotechnical Data Report
- Stormwater Pollution Prevention Plan (SWPPP) Compliance Form

1.44 Cleaning and Television Inspection for Drain Lines

- A. The Contractor shall provide a closed circuit television inspection and digital video recording of those sewer drain lines as indicated in the Contract Documents, prepare the digital photographs of the specific views, and shall prepare a Report on the conditions of the existing pipes. The Report shall include conclusions and recommendations on the conditions of the pipes.
- B. The entity performing this work shall be approved by NYC DEP for cleaning and televising in New York City. Credentials shall be provided to the Owner for review and approval prior to the start of work.
- C. The Contractor shall arrange for oversight of the cleaning and televising work by NYC DEP Bureau of Water and Sewer Operations, and pay any related fees. The sections of work requiring DEP oversight are indicated in the Contract Documents.
- D. The Contractor shall perform cleaning as required for video quality acceptable to NYC DEP and/or the Owner.
- E. This work includes the removal of all debris, sediment, etc. that may be encountered within the pipelines and structures.
- F. A digital video recording shall be taken of the entire inspection, on DVD media. The Contractor shall ensure that the file format is compatible with Windows Media Player (or equal). The digital video recorder used shall be one on which sound and video information can be recorded. The speed and electronics of the digital video recorder shall be equal to or higher than that which has been standardized by the electronics industry.
- G. The Contractor shall record the television inspection in color and shall produce a colored digital copy of the inspection. The digital recorder shall be one which sound and video information can be recorded at the highest speed standardized by the Electronics Industry.
- H. During the course of inspection, the Engineer may indicate specific views appearing on the monitor which are to be photographed at no extra cost to the City.
- I. The size of the digital photographs shall not be less than 3" x 4".

- J. The electricity for all operations shall be provided by the Contractor at his own cost and expense.
- K. An experienced supervisor who has a minimum of three (3) years experience in the field of pipeline inspection shall coordinate the entire inspection operation as approved by the Resident Engineer.
- L. After completion of the television inspection and preparation of the Report, the supervisor shall furnish to both the Resident Engineer and the Contractor, a complete bound report of their permanent records. The report on the television inspections shall include but not be limited to: logging each section of the sewer televised, giving specific details as to service connections, water infiltration from the joints, and other points of interests noted during the inspection.
- M. The digital photographs taken during the inspection shall be mounted within the report and keyed as to their exact location on the route sheet. The route sheet shall be provided by the Resident Engineer and shall become part of the supervisor's report.
- N. The digital video recordings taken during the inspection shall be keyed as to their exact location on the route sheet and shall be submitted to the Resident Engineer with the results of the inspection and recommendations for future reconstruction of the sewer lines.
- O. The Report and digital video recordings (6 copies of each) shall be delivered to the Resident Engineer not more than ten (10) calendar days after the completion of the television inspection and digital video recording. This Report shall be signed by the experienced supervisor and Contractor present at the time of the television inspection. The Contractor shall perform the Work promptly, diligently and complete the Work without delay.

1.45 Priority of Utilities

Utilities need to be prioritized in the construction order of operations to insure the water service to previously installed water fountains and spray showers online within 60 days from Notice to Proceed.

1.46 Standing Column Well System Construction Sequence

This project includes a pre-set construction sequencing of work for the drilling and completion of the two specified Standing Column Well Systems indicated on the Drawings, and in the Specifications. Refer to Section 15870 Earth Coupling Wells.

Work of Part A shall be completed within 60 days from contract Registration and Notice to Proceed as listed in the following sequence:

A. PART A

1. Drilling and Testing the First Standing Column Well:

- a. The Contractor shall be responsible to obtain and maintain all required permits from the governing authorities having jurisdiction for the performance of drilling operations required for the work. The Contractor shall prepare and file any required reporting and pay any fees required to the governing authorities having jurisdiction. The Contractor shall disinfect all downhole drilling equipment prior to drilling.
- b. All Standing Column Well drilling and testing operations performed by the Contractor will be monitored by a Special Inspector whose services will be retained by the City of New York.
- c. The Contractor shall drill the first of two Standing Column Wells, as specified in the contract documents, to the total interim depth of 450 foot as intervals described herein: the Contractor shall provide all materials necessary for drilling through soil until bedrock is reached, approximately 30 feet down, and stop to facilitate the performance of tests to determine ground water quality, well yield, and depth to bedrock. Subsequently as directed by the Commissioner, the Contractor shall provide all materials necessary for drilling through bedrock to the required total 450 foot depth, approximately 420 feet down. The purpose of testing is to determine if the well ground water quality meets permitting requirements and will not promote excessive iron precipitation, scaling or biofouling.
- d. During the drilling of the well, the Contractor shall retrieve continuous split- spoon samples at 2-foot intervals to either the depth of the water table or the top of the bedrock, approximately 30 feet down. All spoon samples shall be logged, stored and protected on site as directed by the Commissioner. Drilling activities shall be performed under the supervision of qualified and experienced personnel hired by the Contractor and monitored by the Special Inspector retained by the City of New York. All drilling and testing operations performed by the Contractor shall be documented in a report and submitted by the Contractor

to the Commissioner for review. The Contractor's report, in addition to the laboratory's water and soil test results, will be reviewed by the Commissioner. The Contractor shall be responsible to contain all ground water and soil extracted from the site well and resulting from drilling operations on site in a temporary container or other approved method, until the water and soil test results are reviewed and determined. The Contractor shall dispose of stored water and soil in compliance with required regulations from governing authorities.

- e. Well ground water and soil samples will be collected by the Special Inspector and forwarded to a New York State certified laboratory retained by the City of New York.
- f. The certified laboratory will analyze the water and soil samples, at a minimum for the parameters listed herein in Table 1, and prepare and submit a detailed report of findings within 10 business days to the Commissioner for review and determination.
- g. During the interim time required for the testing and analysis of the samples by the certified laboratory, preparation and submission of the detailed report of findings, and review of the report by the Commissioner, the Contractor shall be responsible to temporarily close and protect the open site well from contamination and secure the site well area for public safety.
- h. After review by the Commissioner of the laboratory's water and soil analysis report, the Contractor, as directed by the Commissioner, shall conduct an initial single well pumping test for a period of eight hours, to determine the well's capability to achieve a sustained minimum flow of 10 gallons per minute.
- i. Single Well Pumping Test Requirements:

- 1.) The Contractor shall perform pumping tests as specified herein for the total duration as indicated. Based on tested performance, the Contractor shall determine the well bore time drawdown relationship based with a suitable method of analysis, example: Theis Method or equivalent.
- 2.) The Contractor shall perform the step-drawdown test to determine the yield characteristics of the well bore under controlled variable discharge conditions. Increase the well discharge rate from an initial constant rate through a sequence of progressively higher pumping rate intervals. Each interval is to be of equal and sufficient duration to allow the dissipation of well bore storage effects. The incremental pumping rates used in a step-drawdown test should be selected to reasonably stress the well bore during testing.
- 3.) The Contractor shall perform a recovery test at the end of the pumping test to determine the residual well bore drawdown. Report all findings of the initial well bore pump testing in a properly formatted and complete reference document. The Contractor shall submit the well test report, including the complete pumping test data and semi-log test performance plot as part of the well test report, to the Commissioner for review.

2. Drilling and Testing the First Standing Column Well Allowances:

Allowances for the General Contractor are herein established for the work listed above ("Part A") when so ordered and authorized by the Commissioner through a written Work Order Letter:

Part A-1:

- Work to be included: Mobilization and Demobilization (including the mobilization and demobilization of all equipment required to conduct activities of Part A), Permits, Soil Drilling and Grout (approximately 30 feet), Continuous Split-Spoon Sampling, and the Disposal of Contaminated Soil Cuttings and Water (including the testing and disposal of soil and groundwater to a permitted facility per all local, state and federal regulations)
- Amount: \$17,000.00

Part A-2:

- Work to be included: 10" Rock Drilling (approximately 420 feet), Sacrificial 10" Diameter Steel Casing, Pump for Pump Test, Standby Time for the driller and helper to conduct an 8 hour pump test, and Water Handling (including Frac tank rental, water generated during soil and rock drilling, pump test, water quality testing per disposal facility criteria and disposal of clean/ contaminated water disposal per state, local and federal regulations)
- Amount: \$135,000.00

B. PART B

1. Testing and completion of the First Standing Column Well:

- a. As directed by the Commissioner, the Contractor shall resume drilling operations and complete the drilling of the first Standing Column Well to a depth of 1500 foot as specified in the contract documents. The Contractor shall disinfect all downhole drilling equipment prior to drilling.
- b. The Contractor shall provide a closed circuit video inspection and digital video recording of the completed Standing Column Well to a depth of 1500 foot. The video inspection shall be monitored by the Special Inspector. The digital video recording shall be taken of the entire inspection to a depth of 1500 foot, on DVD media. All media shall be able to record and display continuous depth locations. The Contractor shall ensure that the file format is compatible with Windows Media Player (or equal). The digital video recorder used shall be one on which sound and video information can be recorded. The speed and electronics of the digital video recorder shall be equal to or higher than that which has been standardized by the electronics industry.
- c. The entity (videographer) performing the downhole video inspection and recording shall have a minimum of three years' experience in the performance of video inspections and recordings of work of similar nature. The Contractor shall submit the credential of the videographer to the Commissioner for review and approval prior to performing the work.
- d. The Contractor shall inspect and prepare the well as required to achieve a video inspection quality acceptable to the Commissioner.
- e. Until directed by the Commissioner to complete the installation of the first Standing Column Well system as specified in the contract documents, the Contractor shall be responsible to temporarily close and protect the open site well from contamination and secure the site well area for public safety.

C. PART C

1. Drilling and Testing of the Second Standing Column Well:

- a. As directed by the Commissioner, the Contractor shall commence drilling operations for the second Standing Column Well as specified in the contract documents. The Contractor shall be responsible to obtain and maintain all required permits from the governing authorities having jurisdiction for the performance of drilling operations required for the work. The Contractor shall prepare and file any required reporting, and pay any fees required to the governing authorities having jurisdiction. The Contractor shall disinfect all downhole drilling equipment prior to drilling.
- b. The Contractor shall drill the second of two Standing Column Wells, as specified in the contract documents, to the full specified depth of 1500 foot. The Contractor shall facilitate the performance of tests during the progress of the work to determine ground water quality, well yield, and depth to bedrock. The purpose of testing is to determine if the well ground water quality meets permitting requirements and will not promote excessive iron precipitation, scaling or biofouling.
- c. During the drilling of the well, the Contractor shall retrieve continuous split spoon samples at 2-foot intervals to either the depth of the water table or the top of the bedrock. All spoon samples shall be logged, stored and protected on site as directed by the Commissioner. Drilling activities shall be performed under the supervision of qualified and experienced personnel hired by the Contractor and monitored by the Special Inspector retained by the City of New York. All drilling and testing operations performed by the Contractor shall be documented in a report and submitted by the Contractor to the Commissioner for review. The Contractor's drilling and sampling report, in addition to the laboratory's water and soil test results will be reviewed by the Commissioner. The Contractor shall be responsible to contain all ground water and soils extracted from the site well and resulting from drilling operations on site in a temporary container or other approved method, until the water and soil test results are reviewed and determined. The Contractor shall dispose of stored water and soil in compliance with required regulations from governing authorities.

- d. Well ground water and soil samples will be collected by the Special Inspector and forwarded to a New York State certified laboratory retained by the City of New York.
- e. The certified laboratory will analyze the water and soil, at a minimum for the parameters listed herein in Table 1, and prepare and submit a detailed report of findings within 10 business days to the Commissioner for review and determination.
- f. During any interim time required for the testing and analysis of the samples by the certified laboratory, preparation and submission of the detailed report of findings, and review of the report by the Commissioner, the Contractor shall be responsible to temporarily close and protect the second open site well from contamination and secure the site well area for public safety.
- g. At the achieved depth of 1500 foot the Contractor shall conduct individual pumping tests for a period of seventy two hours to achieve a minimum flow of 5 gallons per minute for each 1500 foot well bore.
- h. Well Pumping Test Requirements:
 - 1.) The Contractor shall perform pumping tests as specified herein for the total duration as indicated. Based on tested well bore performance the Contractor shall determine the properties of the aquifer (transmissivity, hydraulic conductivity, storativity) by developing the time drawdown relationship with a suitable method of analysis, example: Theis Method or equivalent.
 - 2.) The Contractor shall perform the step-drawdown test to determine the yield characteristics of each well bore under controlled variable discharge conditions. Increase the well discharge rate from an initial constant rate through a sequence of progressively higher pumping rate intervals. Each interval is to be of equal and sufficient duration to allow the dissipation of well bore storage effects. The incremental pumping rates used in a step-drawdown test should be selected to reasonably stress the well bore during testing.
 - 3.) The Contractor shall perform a recovery test at the end of the pumping test to determine the residual well bore drawdown. Report all findings of well bore pump testing in a properly formatted and complete reference document. The Contractor shall submit the well test report, including the complete pumping test data and semi-log test performance plot, as part of the well test report to the Commissioner for review.
- i. The Contractor shall provide a closed circuit video inspection and digital video recording of the completed second Standing Column Well at a depth of 1500 foot. The video inspection shall be monitored by the Special Inspector. The digital video recording shall be taken of the entire inspection to a depth of 1500 foot, on DVD media. All media shall be able to record and display continuous depth locations. The Contractor shall ensure that the file format is compatible with Windows Media Player (or equal). The digital video recorder used shall be one on which sound and video information can be recorded. The speed and electronics of the digital video recorder shall be equal to or higher than that which has been standardized by the electronics industry.
- j. The entity (videographer) performing the video inspection and recording shall have a minimum of three years' experience in the performance of video inspections and recordings of work of similar nature. The Contractor shall submit the credential of the videographer to the Commissioner for review and approval prior to performing the work.
- k. The Contractor shall inspect and prepare the well as required to achieve video inspection quality acceptable to the Commissioner.
- l. As directed by the Commissioner, the Contractor shall complete the installation of the first and second Standing Column Well systems as specified in the contract documents.

Table 1
New York City Department of Design & Construction
Project P1CROT16A Bronx River House
Laboratory Services

<u>Parameters</u>	<u>Matrix</u>	<u>Method</u>
NYSDEC STARS VOCs + MTBE	Soil/GW	EPA 8021
NYSDEC STARS SVOCs	Soil/GW	EPA 8270
TCL Volatiles + MTBE + TBA	Soil/GW	SW 8260B
TCL SVOCs, BN	Soil/GW	SW 8270C
TLC PCBs	Soil/GW	SW 8082
TPH Finger Print	Soil/Product/GW	NYSDOH 31014
TCLP Lead	Soil	NYSDOH 31014
Full TCLP (RCRV VOCs, RCRA SVOCs)		
TCLP Metals, Pesticides, Herbicides)	Soil	EPA 1311
TPH Gasoline Range Organics (GRO)	Soil/GW/Product	EPA 8015 Mod
TPH Diesel Range Organics (DRO)	Soil/GW/Product	EPA 8015 Mod
Target Analyte List (TAL) Metals	Soil/Water	EPA 200.7/SW 6010B
RCRA Metals	Soil	SW 6010B
RCRA Metals	Water	EPA 200.7
Chromium, Copper, Lead, Nickel and Zinc	Water	EAP 200.7
Chromium Hexavalent	Water	SW 7198A
Cyanide, Total	Water	EPA 335.2
Cyanide, Free	Water	SM 4500 I
Amenable Cyanide	Water	EPA 335.1
Mercury	Water	EPA 245.1
RCRA Characteristics:		
Corrosivity as PH	Soil	SW 9045C
Ignitability	Soil	SW 1030
Reactive Cyanide and Sulfide	Water	SW 846
PH	Water	PA 150.1
Oil and Grease	Water	EPA 1664/413.1
Amenable Cyanide	Water	EPA 335.1
Manganese	Soil	SW 6010B
Manganese	Water	EPA 200.7
Ferrous Iron (dissolved)	Water	(Standard Methods) SM 3500D
Chloride	Water	SM 4500C
Methane, Ethane, Ethene	Water	SW 8015 Mod.
Nitrate	Soil	EPA 352.1 Mod.
Nitrate	Water	EPA 352.1
Sulfate	Soil	EPA 375.4 Mod.
Sulfate	Water	EPA 375.4
Ammonia as Nitrogen	Soil/Water	EPA 350.3 Mod./EPA 350.3
Phosphate (as P)	Soil/Water	EPA 365.1 Mod/EPA 365.1
Total Iron	Water	ASP 200.7
Total Hexavalent Chromium	Water	ASP 200.7
PCBs	Water	EPA 608
Flash Point	Liquid/Solid	110-1020
PH	Soil	SW 9045C
PH	Water	SW 9040B
Moisture Content	Soil	ASTM D2974-87
Porosity	Soil	ASTM D-2216
Grain Size	Soil	ASTM D-224
Remediation Evaluation		
Loss on Ignition (LOI) Volatile Solids	Soil	SM 2540G

Paint Filter	Soil	SW 9095
Total Heterotrophic Bacteria	Soil	SM 9215
Total Heterotrophic Bacteria	Water	Method SM 9215 (Modified)
Petroleum Degraders	Soil	SM 9215B (Modified)
Petroleum Degraders	Water	SM 9215 (Modified)
Chemical Oxygen Demand (COD)	Water	EPA 410.4
Biologically Available Iron (Fe ⁺³)	Water	SM 3500D
Biological Oxygen Demand (BOD) 5-day	Water	EPA 405.1
Total Kjeldahl Nitrogen (TNK)	Soil/Water	SM 417E (16 th Ed) 10 ppm DL
Phosphorous (Total)	Soil	SW 846
Phosphorous (Total)	Water	EPA 365.3
Total Organic Carbon	Soil	SW 9060
Density	Product	D1298-87
System Design Parameters		
Total Suspended Solids	Water	EPA 160.2
Total Settleable Solids	Water	EPA 160.5
Total Dissolved Solids	Water	EPA 160.1
Total Iron	Water	EPA 6010 or 7420
Alkalinity	Water	EPA 310
Total Hardness	Water	EPA 130.2
Langliers' Index	Water	
Iron Related Bacteria (IRB)	Water	Plate Count & Bart Test

VII. SPECIAL EXPERIENCE REQUIREMENTS FOR THE PROJECT

- (1) **GENERAL:** The following are set forth below: (a) Special Experience Requirements applicable to the contractor or subcontractor that will perform specific areas of work.
- (2) **REVISION OF SPECIFICATIONS AND DRAWINGS:** In the event the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth below, such Special Experience Requirement is deemed deleted, except as otherwise expressly provided in Section VIII of this Addendum.
- (3) **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 contractor intends to perform these specific areas of work with its own forces, it must demonstrate compliance with the special experience requirements. If the contractor intends to subcontract these specific areas of work, the 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.
 - (a) **Special Experience Requirement #1:** 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. This Special Experience Requirement applies to the contractor or subcontractor that will perform specific areas of work specified in the section set forth below.

General Construction Work:

- Section 02300: Earth Work

- (b) **Special Experience Requirement #2:** *The contractor or subcontractor performing the drilling 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. The three (3) prior projects must have involved drilling fractured bedrock standing column wells. In addition, the contractor or subcontractor performing the drilling work must be in compliance with registration and certification requirements of the New York State Department of Environmental Conservation. This Special Experience Requirement applies to the contractor or subcontractor that will perform the drilling work specified in the section set forth below.*

HVAC Work:

- Section 15870: Earth Coupling Wells

- (c) **Special Experience Requirement #3:** *The contractor or subcontractor installing the equipment required for the Earth Coupling Wells 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, such the contractor or subcontractor must be in compliance with registration and certification requirements of the New York State Department of Environmental Conservation. This Special Experience Requirement applies to the contractor or subcontractor that will perform the installation of equipment specified in the section set forth below.*

HVAC Work:

- Section 15870: Earth Coupling Wells

VIII. 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 Bid Booklet contains a Notice which identifies a particular product from a designated manufacturer as a "Proprietary Item", 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 Bid Booklet. 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 Bid Booklet, 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 Bid Booklet. In the event of any conflict or inconsistency between (1) the Notice regarding Alternate Bids set forth in the Bid Booklet and (2) a provision in the Specifications and/or the Contract Drawings regarding Alternate Bids, the Notice set forth in the Bid Booklet shall prevail. If the agency is not requesting the submission of Alternate Bids, as indicated by the absence of a Notice in the Bid Booklet, 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, 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, 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) 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.
- (b) 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.
- (c) 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)

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 FOR GENERAL CONSTRUCTION	
Article 14 Contract	Time of Completion	Consecutive Calendar Days	548 CCDs	
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time	\$600	
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 less than \$500,000	10%
			If 100% bonds are not required, and Contract Price is more than \$500,000	10%
Article 24 Contract	Maintenance & Guaranty	Percent of Contract Price	1%	
Article 77 Contract	MWBE Program	See Subcontractor Utilization Plan in the Bid Booklet		

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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
■ Commercial General Liability Art. 22.1.1	\$ 1,000,000 per occurrence \$ 2,000,000 aggregate (applicable separately to this Project) Additional Insureds: 1. City of New York, including its officials and employees, and
■ Workers' Compensation Art. 22.1.2 ■ Disability Benefits Insurance Art. 22.1.2 ■ Employers' Liability Art. 22.1.3 <input type="checkbox"/> Jones Act Art. 22.1.4 <input type="checkbox"/> U.S. Longshoremen's and Harbor Workers Compensation Act Art. 22.1.4	Workers' Compensation: Statutory per New York State law without regard to jurisdiction Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction Employers' Liability: \$1,000,000 each accident
■ Builders' Risk Art 22.1.5 <input type="checkbox"/> Installation Floater	Applicable to Builders' Risk or Installation Floater: _____ 100 _____ % of total value of Work City of New York and the Contractor named as Loss Payee for the Work in order of precedence, as their interests may appear. <u>Note:</u> Article 22.1.5 is revised by deleting the following sentence: "Such policy shall name as insureds the City, the Contractor, and its Subcontractors". This deletion applies to Builders' Risk and Installation Floater.

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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
<input checked="" type="checkbox"/> Comprehensive Business Auto Coverage Art. 22.1.6	\$ <u>1,000,000</u> per accident If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered autos (endorsement CA 99 48) as well as proof of MCS 90 Additional Insured: 1. City of New York, including its officials and employees
<input type="checkbox"/> Pollution/Environmental Liability Art. 22.1.7	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Protection and Indemnity Art. 22.1.8(a)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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.

<input type="checkbox"/> Ship Repairers Legal Liability Art. 22.1.8(b)	\$ _____ each occurrence [Contracting agency to fill in total value of City vessels involved]
<input type="checkbox"/> Collision Liability/Towers Liability Art. 22.1.8(c)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Pollution Liability Art. 22.1.8(d)	\$ _____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER] Art. 22.1.9 <input type="checkbox"/> Railroad Protective Liability	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART I. 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.

<p>[OTHER]</p> <p align="right">Art. 22.1.9</p> <p><input type="checkbox"/> Asbestos Liability</p>	<p>Only required of the Contractor or Subcontractor performing any required asbestos removal.</p> <p>\$1,000,000 each occurrence, \$2,000,000 aggregate (Combined Single Limit);</p> <p>Additional Insureds: 1. City of New York, including its officials and employees, and</p> <p>2. _____ 3. _____</p>
<p>[OTHER]</p> <p align="right">Art. 22.1.9</p> <p><input type="checkbox"/> Boiler Insurance</p>	<p>\$200,000</p>
<p>[OTHER]</p> <p align="right">Art. 22.1.9</p> <p>■ Professional Liability</p> <p>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.</p>	<p>\$1,000,000 per occurrence</p> <p>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.</p> <p>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.</p>

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART II. Broker's Certification

[Pursuant to Article 22.3.1(a) of the **Contract**, every Certificate of Insurance must be accompanied by either the following certification by the broker setting forth the following text and required information and signatures or complete copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.]

CERTIFICATION BY BROKER

The undersigned insurance broker represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects, and that the described insurance is effective as of the date of this Certification.

[Name of broker (typewritten)]

[Address of broker (typewritten)]

[Signature of authorized official or broker]

[Name and title of authorized official (typewritten)]

Sworn to before me this
____ day of _____, 201_

NOTARY PUBLIC

SCHEDULE A (FOR PUBLICLY BID PROJECTS)

Relating to Article 22 - Insurance

PART III. 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: Article 1.22 of the 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
02510	Water Distribution- registers	10 years
02731	Sanitary Pump Station	1 year
02760	Pavement Markings	5 years
02931	Vertical Wall Planter Panels	2 years
07130	Sheet Membrane Waterproofing	10 years
07180	Traffic Coating System	10 years
07450	Cement Board Rainscreen System	5 years
07541	Roof Waterproofing System	30 years
07542	Waterproofing System for Walls	30 years
07610	Sheet Metal Roofing	10 years
07900	Joint Sealants	10 years
08330	Roll Up Doors	2 years
08340	Roll Up Grilles	2 years

08410	Aluminum Swinging Entrance Doors	3 years on Defects, 15 years on Visual Finishing
08520	Aluminum Windows- including Glass, Glazing & Aluminum Finish	10 years
08700	1. Surface Closers 2. Locksets etc. 3. Exit Devices 4. Balance of Hardware	25 years 1 year 3 years 1 year
09681	Carpet	5 years
10100	Porcelain Enamel Markerboards	25 years
13650	1. PV Modules 2. Inverter & Transformer	20 years 5 years
15452	Heat Tracing Material	5 years
15870	Earth Coupling Wells (all components)	1 year
15960	Direct Digital Control System	1 year
16510	Electronic Ballasts for Fluorescent Lamps	3 years
16950	Lighting Control Panel	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.

SCHEDULE C

Contract Drawings

(Reference: Article 1.04(A) of the General Conditions)

The Schedule set forth below lists all Contract Drawings for the Project.

General

	TITLE SHEET
G-001.00	GENERAL NOTES & SYMBOLS
G-002.01	CODE COMPLIANCE
G-003.01	DOB NOTES
G-004.00	RENDERINGS
X-001.00	TOPOGRAPHICS SURVEY
X-002.00	TOPOGRAPHIC SURVEY
B-101.00	BORING LOCATION PLAN
B-201.00	BORING PROFILES

Civil

C-101.00	OVERALL PROJECT PLAN
C-201.00	REMOVALS
C-251.00	SEWER INSPECTION AND TELEVISION PLAN
C-301.00	EROSION AND SEDIMENT CONTROL PLAN
C-391.00	EROSION AND SEDIMENT CONTROL DETAILS
C-401.00	GRADING AND DRAINAGE PLAN
C-501.00	UTILITY PLAN
C-601.00	CONSTRUCTION COORDINATE PLAN
C-701.00	CIVIL DETAILS
C-702.00	CIVIL DETAILS
C-703.00	PUMP STATION PLAN AND DETAILS
C-801.00	SITE CONNECTION PROPOSAL

Site Electrical

SE-001.00	SITE GENERAL NOTES, LEGEND, AND GAS PIPING RISER DIAGRAMS
SE-100.00	GAS AND ELECTRIC SITE PLAN
SE-200.00	ONE-LINE DIAGRAM
SE-201.00	ELECTRIC DETAIL SHEET #1
SE-202.00	ELECTRIC DETAIL SHEET #2
SE-203.00	LIGHTING DETAILS

Rainwater Harvesting

R-100.00	RAINWATER HARVESTING SYSTEM LAYOUT
R-200.00	RAINWATER HARVESTING SYSTEM SECTIONS AND DETAILS
R-300.00	RAINWATER HARVESTING SYSTEM DETAILS

Landscape

L-100.00	TREE PROTECTION PLAN
L-200.00	MATERIALS PLAN STARLIGHT PARK
L-201.00	LAYOUT AND MATERIALS PLAN BRONX RIVER HOUSE
L-300.00	GRADING PLAN BRONX RIVER HOUSE
L-400.00	PLANTING PLAN STARLIGHT PARK
L-401.00	PLANTING PLAN BRONX RIVER HOUSE
L-402.00	PLANTING AREA PLANS
L-500.00	SITE DETAILS
L-501.00	SITE DETAILS

L-502.00 SITE DETAILS
L-503.00 SITE DETAILS
L-504.00 SITE DETAILS
L-505.00 PLANTING DETAILS

Architectural

A-010.00 SITE PLAN
A-020.00 RENDERINGS
A-100.01 FIRST FLOOR PLAN
A-101.00 ROOF PLAN
A-102.00 PV LAYOUT PLAN
A-103.00 ROOF MONITOR PLAN
A-110.00 REFLECTED CEILING PLAN
A-120.00 FIRST FLOOR FINISH PLAN
A-200.00 ELEVATIONS – EAST & WEST
A-201.00 ELEVATIONS – NORTH & SOUTH
A-300.00 SECTIONS - LONGITUDINAL
A-301.00 SECTIONS - TRANSVERSAL
A-310.00 TYPICAL BUILDING SECTIONS
A-400.00 INTERIOR DETAILS - BATHROOMS
A-401.00 INTERIOR DETAILS – OTHER ROOMS
A-402.00 INTERIOR DETAILS – OTHER ROOMS
A-410.01 INTERIOR DETAILS – MILLWORK, CLOSETS, CLGS
A-411.00 INTERIOR DETAILS – CLOSET SHELVING
A-500.00 CEMENT BOARD RAINSCREEN
A-510.00 TYPICAL EXTERIOR DETAILS – GARAGE DOOR & GATE
A-511.00 TYPICAL EXTERIOR DETAILS – GATES
A-520.00 TYPICAL EXTERIOR DETAILS – VERTICAL SCREENS
A-521.00 TYPICAL EXTERIOR DETAILS – SLOPED SCREEN
A-522.00 TYPICAL EXTERIOR DETAILS - SCREENS
A-523.00 GWPP ELEVATIONS
A-524.00 VERTICAL WALL PLANTER PANEL DETAILS
A-530.00 ROOF DETAILS - 1
A-531.00 ROOF DETAILS - 2
A-600.01 TYPICAL EXTERIOR AND INTERIOR ASSEMBLY
A-700.01 DOOR SCHEDULE & TYPES
A-701.01 DOOR DETAILS
A-710.00 WINDOW TYPES & DETAILS
A-720.00 SIGNAGE PLAN & SCHEDULE
A-800.00 FIRST FLOOR FURNITURE PLAN
A-801.01 FIRST FLOOR PLUMBING LAYOUT

Irrigation

K-001.00 IRRIGATION PLAN DIAGRAM
K-002.00 IRRIGATION ELEVATION DIAGRAM
K-003.00 IRRIGATION DETAILS

Structural

FO-100.00 FOUNDATION AND 1ST FLOOR FRAMING PLAN
S-101.00 ROOF FRAMING PLAN
S-200.00 GENERAL NOTES & LOAD SCHEDULES
S-201.00 TYPICAL FOUNDATION DETAILS
S-202.00 TYPICAL SUPERSTRUCTURE DETAILS
S-300.00 FOUNDATION SECTIONS
S-400.00 TYPICAL SUPERSTRUCTURE SECTIONS

Plumbing

P-001.01	LEGEND, NYC BUILDING NOTES, PLUMBING FIXTURE SCHEDULE
P-002.01	PLUMBING 1 ST FLOOR STORM PLAN
P-003.01	PLUMBING 1 ST FLOOR PLAN
P-004.01	PLUMBING ROOF PLAN
P-005.01	PLUMBING DETAILS 1
P-006.01	PLUMBING DETAILS 2
P-007.01	SANITARY AND STORM DRAINAGE RISER DIAGRAMS
P-008.01	WATER RISER DIAGRAMS
P-009.01	NON POTABLE WATER SCHEMATIC AND DETAIL
P-010.01	PLUMBING UTILITY PLAN

Mechanical

M-001.00	HVAC ABBREVIATIONS, SYMBOLS, BUILDING & VENTILATION NOTES
M-002.01	FIRST FLOOR HVAC PLAN
M-003.00	ROOF HVAC PLAN
M-004.00	FIRST FLOOR PIPING PLAN
M-005.00	HVAC SCHEDULE 1
M-006.01	HVAC SCHEDULE 2
M-007.01	HVAC SCHEDULE 3
M-008.00	WATER FLOW RISER AND AIR FLOW RISER DIAGRAM
M-009.00	HVAC DETAILS 1
M-010.00	HVAC DETAILS 2
M-011.00	HVAC DETAILS 3
M-012.00	GEOHERMAL SCHEMATIC DIAGRAM
M-013.00	SCHEMATIC OF EARTH COUPLING PIPING
M-014.00	FIRST FLOOR RADIANT PLAN
M-015.00	MECHANICAL ROOM PART PLAN
M-016.00	HVAC CONTROL DIAGRAMS 1
M-017.00	HVAC CONTROL DIAGRAMS 2

Electrical

E-000.00	ELECTRICAL SITE PLAN
E-001.00	ELECTRICAL SYMBOLS, ABBREV., NOTES AND SCHEDULES
E-002.00	ELECTRICAL FIRST FLOOR POWER PLAN
E-003.00	ELECTRICAL FIRST FLOOR LIGHTING PLAN
E-004.00	ELECTRICAL ROOF PLAN
E-005.00	ELECTRICAL LAYOUT PART PLAN & DETAILS
E-006.01A	ELEC PHOTOVOLTAIC SYSTEM, ROOF PLAN & DETAILS (BASE)
E-007.00	ELECTRICAL RISER & SINGLE LINE DIAGRAM
E-008.00	ELEC PHOTOVOLTAIC SYSTEM SINGLE LINE DIA.
E-009.00	ELECTRICAL PV EQUIPMENT LAYOUT
E-010.00	ELECTRICAL DETAILS-1
E-011.01	ELECTRICAL DETAILS & PANEL SCHEDULE
E-012.00	MECHANICAL ROOM PART PLAN

Fire Alarm

E-013.00	ELECTRICAL FIRST FLOOR FIRE ALARM PLAN
E-014.00	ELECTRICAL ROOF FIRE ALARM PLAN
E-015.00	FIRE ALARM RISER DIAGRAM & SEQUENCE OF OPERATION
E-016.00	FIRE ALARM DETAILS

LIST OF STANDARD DPR DETAIL DRAWINGS APPLICABLE- BUT NOT INCLUDED
ALL DRAWINGS ARE FROM REVISION SET TYLA/R146-R7 UNLESS OTHERWISE INDICATED

<u>SHEET NO.</u>	<u>TITLE</u>	<u>REV. DATE</u>
TYLA/146-R7-#1	CONSTRUCTION SIGN	01/15/06
TYLA/146-R7-#2	DRAINAGE DETAILS-NO.1	01/15/06
TYLA/146-R7-#3	DRAINAGE DETAILS-NO.2	01/15/06
TYLA/146-R7-#4	PARK LEAF MANHOLE AND CATCH BASIN COVERS	01/15/06
TYLA/146-R7-#13	PAVEMENT DETAILS-NO.1	01/15/06
TYLA/146-R7-#14	PAVEMENT DETAILS-NO.2	01/15/06
TYLA/146-R7-#15	CURBS AND PIERS	01/15/06
TYLA/146-R7-#16	CURBS, RAMPS AND MISC DETAILS	01/15/06
TYLA/146-R7-#20	CONCRETE AND STEEL GAME TABLE & BIKE RACK	01/15/06
TYLA/146-R7-#29	CHAIN LINK FENCE DETAIL	01/15/06
TYLA/146-R7-#33	STEEL FENCE-DETAILS	01/15/06
TYLA/146-R7-#37	GUIDE RAIL/BOLLARD DETAILS	01/15/06
TYLA/146-R7-#60	PLANTING DETAILS	01/15/06
TYLA/146-R7-#61	PLANTING AND EROSION CONTROL DETAILS	01/15/06
TYLA/146-R7-#64	GROUNDING & SEALING METHOD	01/15/06
TYLA/146-R7-#65	ROADWAY TYPE BOXES	01/15/06

SCHEDULE D

Electrical Motor Control Equipment

(Reference: Article 1.37, Part K of the 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.

Legend for Control Type

DB Disconnect Circuit Breaker (Switch)	P Pilot Light	BG Break Glass Station
TS Thermal Switch	F Firestat	HOA Hand-Off Auto.
MS Magnetic Starter	T Thermostat	PB Push Button Station
CMS Comb. Mag. Starter	AL Alternator	RO Remote "off"

Equip. Ident.	Location	# of Units	HP or KW	Volts and Phase	Control Type: See legend above	Remarks:
AHU-1	Roof	2	7.5 HP	208v, 3 ph	DB	
AHU-2	Roof	1	1/3 HP	120v, 1 ph	DB	
HP-1	MER	1	19 Kw	208v, 3-ph	DB	
HP-2	MER	1	19 Kw	208v, 3-ph	DB	
HP-3	MER	1	19 Kw	208v, 3-ph	DB	
HP-4	MER	1	19 Kw	208v, 3-ph	DB	
CUH-1	Vestibule	1	1/15 HP	120v, 1 ph	DB	
HWH-1	Boat House Storage	1	1/3 HP	120v, 1 ph	DB	
HWH-2	Boat House Storage	1	1/3 HP	120v, 1 ph	DB	
EF-1	Roof	1	1/6 HP	120v, 1 ph	DB	

EF-2	Roof	1	1/6 HP	120v, 1 ph	DB	
EF-3	Roof	1	1/6 HP	120v, 1 ph	DB	
P-1	In ground	1	1-1/2 HP	208v, 1ph	DB	
P-2	In ground	1	1-1/2 HP	208v, 1ph	DB	
P-3	MER	1	1 HP	208v, 3ph	DB	
P-4	MER	1	1 HP	208v, 3ph	DB	
P-5	MER	1	3/4 HP	120v, 1ph	DB	
P-6	MER	1	3/4 HP	120v, 1ph	DB	
P-7	MER	1	1/2 HP	120v, 1ph	DB	
P-8	MER	1	1/2 HP	120v, 1ph	DB	
P-9	MER	1	3 HP	208v, 3ph	DB	
P-10	MER	1	3 HP	208v, 3ph	DB	

SCHEDULE E

Separation of Trades

(Reference: Article 1.40 of the General Conditions)

NOT USED

SCHEDULE F

Shop Drawing and Material Samples Schedule

(Reference: Article 1.41 of the General Conditions)

The Schedule set forth below lists all submittal requirements for the Contract. In the event of any conflict between the Specifications and this Schedule F, Schedule F shall take precedence; provided, however, in the event of an omission from Schedule F (i.e., Schedule F omits either a reference to or information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Contractor's submittal obligation, as set forth in the Specifications, shall remain in full force and effect.

CONSULTANT: Kiss + Cathcart, Architects DATE: _____
 TELEPHONE NUMBER: 718-237-2786
 DDC PROJECT MANAGER: Maha Aloush APPROVED: _____
 TELEPHONE NUMBER: 718-391-2360 (DDC RESIDENT ENGINEER/CPM)

SPEC. SECT. #	DESCRIPTION	COORD WITH CONTR.	FMS ID #/PROJECT ID #/ CONTRACT REGISTRATION #/ PROJECT NAME:	SUBMITTAL	SUB. DATE	REQ'D DEL.	FABRIC. TIME	TRADE: SHOP DRAWING LOG SHEET #				USE SEPARATE SHEET FOR EACH TRADE (NA)							
								SHOP DWG	SAMPLE	CAT. CUTS	RECD	RETD	ACTION	RECD	RETD	ACTION	RECD	RETD	ACTION
01330	LEED Requirements			NA	NA														
01332	LEED Submittals			NA															
01335	(VOC) Limits			NA															
01506	Construction Waste Management			NA															
01511	Construction IAQ Management			IAQ Plan, photos (3x)						yes									
01810	Commissioning			Training, syllabus, reports, videos						NA									
02060	Aggregate Materials- Landscape			EMRF, mat. Analysis, mat. Source						yes									

02065	Structural Soil	EMRF, Prod. Data, test results, certificates, qualification, schedule & protection plan, settlement plan	Yes																					
02120	Harvesting System	EMRF	NA																					
02130	Harvesting System Controls	Shops	NA	Yes																				
02140	Filtration and Treatment	EMRF, lit./prod. Data, shops, maintenance & data	NA																					
02205	protection, demolition and relocation of existing utilities	permits surveys record of locations design mix	NA																					
02230	Tree Protection	EMRF,	NA																					
02300	Earthwork	test reports shops certification	Yes	Yes																				
02316	Excavation	EMRF	NA																					
02370	Erosion Control	permits shops Prod. Data	NA																					
02371	Gabions	Prod. Data, shops, calcs	Yes																					
02375	Boulders	EMRF, photos	Yes																					
02455	Timber Piles	certification prod. data affidavit record schedule survey report concrete work	NA																					
02510	Water Distribution	prod. data certificates shops	NA	Yes																				
02521	Decommission Groundwater Well	NA	NA																					
02530	Sanitary Sewer	shops prod. data	NA																					
02550	Natural Gas Distribution	prod. data certification	NA																					
02580	Electrical Sitework	prod. data	NA	Yes																				

02630	Storm Drainage		shops prod. data concrete design	NA															
02631	Trench Drains		EMRF (Man. Literature)	yes															
02721	Aggregate Base Courses		EMRF	NA															
02731	Sanitary pump station		prod. data shops wiring diagrams 27-pt. submittal list	NA															
02740	Asphalt Concrete Pavement		design mix certification	yes															
02750	Concrete Pavement		EMRF application instructions, methodolog y, prod. data	yes	yes														
02760	Pavement Markings		prod. certify work plan prod. data guarantee	yes															
02761	Unit pavements		EMRF, ma. Literature, test results,	Yes (2x)															
02771	Stone Curbs		EMRF,	Yes (2x)															
02796	Natural Stone porous paving system		EMRF, prod. Data, MSDS, shops,	yes															
02810	Irrigation and Controller System		EMRF Shops technical product data Record Drawings Maintenance Data	yes															
02821	Metal Barrier Gates		EMRF, shops, foundry certificate, request for pat substl.	yes															
02825	Range Fences		EMRF,	NA															
02840	Timber Barrier Rail		EMRF, shops, wood treatment affidavit	NA															
02871	Bicycle Rack		EMRF, shops,	NA															
02872	Precast Concrete Bench		EMRF, shops	yes															

02890	Traffic Signage		prod. certificate shops graphic	yes																	
02910	Topsoil		EMRF, prod. Data, certificates, test reports, qualifications, schedule + protection plan, settlement plan	yes																	
02920	Lawns and Grasses		EMRF, prod. Data, certificates	NA																	
02930	Planting		EMRF, state cert., invoices	NA																	
02931	Vertical Wall planter panels		EMRF, prod. Data + install. Instr., certification	yes																	
03300	Cast-In-Place Concrete		prod. data shops joint layouts lab reports mat. certificates procedure descriptions recycling certification formwork specs lab reports (recycling) cut sheets	yes	yes																
03320	Concrete Floor Topping		EMRF Manufacturers Data Lab Reports Shops Maintenance Instructions batch ticket info	yes																	
03700	Concrete exterior Improvements		concrete formula material certificate	NA																	
04225	Autoclaved Aerated Concrete Units		EMRF Product Data Quality Control Shops Calculations	yes																	

09660	Resilient Tile Flooring		EMRF man. Data cert letter	yes																
09681	Carpet		EMRF prod. data shops certification maintenance data	yes																
09900	Painting and Finishing		EMRF material list man. data	yes																
10100	Visual Display Boards		EMRF prod. data shops	yes																
10260	Comer Guards		EMRF shops	yes																
10400	Signage		EMRF prod. data shops	yes																
10500	Lockers		EMRF prod. info	Yes																
10522	Fire Extinguishers and Cabinets		EMRF prod. data	yes																
10800	Toilet Accessories		EMRF prod. data sett. draw. schedule	NA																
11132	Projection Screen		EMRF prod. data	NA																
11450	Appliances		EMRF Prod. data	NA																
12480	Floor Mats and Frames		EMRF prod. data maintenance data	yes																
13650	Photovoltaic System		product data shops qual. data test reports O&M data	NA																
13845	Resource Monitoring Display		Prod. Data, shops	NA																
15000	Special Requirements MEP		5x of prel. list of equipment + sched. 5x inst. Manual	NA																

15050	Seismic Restraints		Data sheets, unit list, calcs, shops, report	NA	NA	yes														
15100	General Prov. Plumbing		NA	NA																
15110	Pipe, Tube and Fittings Plumbing		NA	NA																
15120	Valves for plumbing work		NA	NA																
15130	Hangers + Supp. Plumbing		NA	NA																
15150	Insulation for Plumbing Work		NA	NA																
15160	Plumbing Accessories		NA	NA																
15300	Plumbing Fixtures and Trims		NA	NA																
15320	Domestic Hot Water Heaters		outline drawing	NA																
15380	Testing and Adjustments		NA	NA																
15390	Manufacturers for Plumbing Work		NA	NA																
15452	Dom. Hot Water System		Install. drawings reference list	NA	yes															
15600	General Prov. Mech Work		shops	NA																
15710	Heat Exchangers		prod. data shops coordin. drawings operation + maintenance data	NA																
15735	Pumps for Mechanical		shops	NA																
15745	Outdoor Air Handling Units		shops	NA																
15748	Coils		shops	NA																
15750	Air Filters		shops	NA																
15754	Duct Terminal Units		shops	NA																

15760	Fans																	shops	NA							
15770	Unit Heaters																	shops	NA							
15771	Cabinet Heaters																	shops	NA							
15774	Radiant Heating Hydronic Piping																	shops prod. data	NA							
15801	Mechanical Specialties																	shops	NA							
15810	Vibration Isolation																	shops	NA							
15815	Water Treatment and Cleaning																	shops	NA							
15820	Piping for Mechanical																	shops	NA							
15830	Valves for Mechanical																	shops	NA							
15840	Sheet Metal Ductwork																	shops	NA							
15850	Insulation for HVAC work																	Shops	NA							
15860	Heat Pumps																	shops	NA							
15870	Earth Coupling Wells																	shops	NA							
15900	Testing and Balancing																	test reports	NA							
15960	Direct Digital Control System																	shops	NA							
16000	Gen. Provisions Elec. Work																	shops	NA							
16111	Receways + Installation Comp.																	shops man. list	NA							
16123	Wire and Cable (600 Volts)																	shops	NA							
16141	Wiring Devices + Install. Comp.																	shops	NA							
16170	Grounding and Bonding																	shops	NA							
16180	Power, Control and Alarm Wiring System																	shops	NA							
16426	Distribution Switchboards																	shops	NA							
16440	Safety Disconnect Switches																	shops	NA							

16470	Panelboards	shops	NA																	
16510	Lighting Fixtures	shops	NA																	
16721	Fire Alarm + Smoke System	shops	NA																	
16741	Empty Raceway System	shops	NA																	
16902	Electric Controls and Relay	shops	NA																	
16903	Ceiling Fans	shops prod. cuts	NA																	

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01335	Volatile Organic Compound (VOC) Limits for Adhesives, Paints, Sealants and Architectural Coatings
01506	Construction Waste Management
01511	Construction IAQ Management
01810	Commissioning

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02065	Structural Soil
02120	Harvesting System
02130	Harvesting System Controls
02140	Harvesting System Filtration and Treatment
02205	Protection, Demolition and Relocation of Existing Utilities
02230	Tree Protection and Tree Pruning
02300	Earthwork
02316	Pneumatic Excavation
02370	Erosion Controls
02371	Gabion Retaining Walls
02375	Boulders
02455	Timber Piles
02510	Water Distribution
02521	Decommission Groundwater Well
02530	Sanitary Sewerage
02550	Natural Gas Distribution
02580	Electrical Sitework
02630	Storm Drainage
02631	Trench Drains
02721	Aggregate Base Courses
02731	Sanitary Pump Station
02740	Asphalt Paving
02750	Concrete Pavement
02760	Pavement Markings
02761	Unit Pavements
02771	Stone Curbs and Steps
02796	Natural Stone Porous Paving System
02810	Irrigation and Controller System
02821	Metal Barrier Gates
02825	Range Fence
02840	Timber Barrier Rail
02871	Bicycle Rack
02872	Precast Concrete Bench
02890	Traffic Signage
02910	Topsoil

02920	Lawns and Grasses
02930	Planting
02931	Vertical Wall Planter Panels

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03300	Cast In Place Concrete
03320	Concrete Floor Topping
03700	Cement and Concrete for Exterior Improvements

DIVISION 4 - MASONRY

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12480	Floor Mats and Frames
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DIVISION 13 - SPECIAL CONSTRUCTION

13650	Photovoltaic System
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15000	Special Requirements for Mechanical and Electrical Work
15050	Seismic Restraints for Isolated and Unisolated Equipment, Piping, Ductwork and Tanks
15100	General Provisions for Plumbing
15110	Pipe, Tube and Fittings for Plumbing Work
15120	Valves for Plumbing Work
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15160	Plumbing Equipment, Specialties and Accessories
15300	Plumbing Fixtures and Trims
15320	Domestic Hot Water Heaters
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15745	Outdoor Air Handling Units
15748	Coils

15750	Air Filters
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15760	Fans
15770	Unit Heaters
15771	Cabinet Heaters
15774	Radiant Heating Hydronic Piping
15801	Mechanical Specialties
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15815	Water Treatment and Cleaning
15820	Piping for Mechanical
15830	Valves for Mechanical
15840	Sheet Metal Ductwork
15850	Insulation for Mechanical Work
15860	Heat Pumps
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16000	General Provisions for Electrical Work
16111	Raceways and Installation Components
16123	Wire and Cable (600 Volts)
16141	Wiring Devices and Installation Components
16170	Grounding and Bonding
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16426	Distribution Switchboards
16440	Safety and Disconnect Switches
16470	Panelboards – Lighting and Distribution
16510	Lighting Fixtures
16721	Fire Alarm and Smoke Detection System
16741	Empty Raceway System (Telephone and Computer Data)
16902	Electric Controls and Relays
16903	Ceiling Fans
16950	Lighting Control Panel

APPENDIX

Geotechnical Data Report
Stormwater Pollution Prevention Plan (SWPPP) Compliance Form

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**CONTRACT # 1
GENERAL CONSTRUCTION WORK**

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SECTION 01330 - LEED REQUIREMENTS

The Commissioner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. Contractor shall furnish all materials, equipment and labor required for the complete installation and coordination of the work as specified under this Article. This Article is one of several Articles relating to the projects' GREEN BUILDING requirements.

Abbreviations used:

USGBC: US Green Building Council
LEED: Leadership in Energy and Environmental Design
CWM: Construction Waste Management
EMRF: Environmental Materials Reporting Form
IAQ: Indoor Air Quality
VOC: Volatile Organic Compounds

PART 1 GENERAL

1.1 SUMMARY

- A. This Article includes administrative, procedural, and product requirements for compliance with the Leadership in Energy and Environmental Design (LEED) standard, including LEED Coordinator services.
- B. LEED requirements should be followed in conjunction with requirements in the Articles for individual construction activities.
- C. This Commissioner has established that this Project shall achieve a minimum of a LEED Silver rating.
- D. The Commissioner requires the Contractor(s) to implement practices and procedures to meet the Project's environmental performance goals, which include achieving a minimum LEED® "Silver" rating. Specific project features include (but are not limited to): recycled-content materials, construction waste recycling, erosion and sedimentation control, low VOC products, indoor air quality, energy efficiency, water efficiency. The Contractor shall ensure that the requirements related to these goals 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 Requirements. The following LEED Prerequisites and Credits have been targeted for the project in order to contribute to the points required for a LEED "Silver" rating.
- E. LEED Coordinator: General Contractor to provide a LEED-certified agent or consultant for the project. LEED Coordinator responsibilities include but not limited to:
 1. Organize a LEED kickoff meeting prior to construction, outlining and confirming the Contractors LEED responsibilities and procedures;
 2. Prepare CWM and IAQ plan (See other Sections for additional info);

3. Prepare monthly report containing summary or update on recycled content, certified wood, and construction waste management plan and other LEED responsibilities;
4. Keep records of all backup materials, such as EMRF, VOC limits, construction hauling tickets (including impacted soils), certified wood chain-of-custody invoices, and other relevant information associated with LEED Construction points
5. Store backup material for potential audit for 3 (three) years after substantial completion;
6. At conclusion of project provide copies of all backup material to Architect.

Basis of Design: LEED COORDINATOR shall match the expertise and services provided by the following consultant firms:

- Community Environmental Center (CEC), Queens, NY
- Peter Cardonna Architects, East Setauket, NY
- Great Forest, New York, NY
- Sustainable Design Collaborative, Hastings-on-Hudson, NY
- P.W. Grosser Consulting, Bohemia, NY
- or approved equal

F. LEED Prerequisites:

1. Compliance with prerequisites are required in order to achieve a LEED certified structure.
2. Prerequisite SS 1, Construction Activity Pollution Prevention.
3. Prerequisite EA 1, Fundamental Commissioning of the Building Energy Systems.
4. Prerequisite EA 2, Minimum Energy Performance.
5. Prerequisite EA 3, Fundamental Refrigerant Management.
6. Prerequisite MR 1, Storage & Collection of Recyclables.
7. Prerequisite EQ 1, Minimum IAQ Performance.
8. Prerequisite EQ 2, Environmental Tobacco Smoke (ETS) Control.

G. Applicable LEED Credits:

1. This list has been modified to reflect the Design Team and Contractors responsibilities for the specific project Bronx River House. Following each LEED credit is the following legend: (C) refers to a construction point that requires active Contractor involvement and reporting. (D) refers to a design point that has already been incorporated into the project, and as long as Contractor purchases and installs the specified products or executes the required procedures, no additional Contractor work or documentation is required. There are 60 (sixty) targeted points, of which 14 (fourteen) are Construction related (C). Construction

related LEED points require contractor tracking and coordination. Innovation and Design (ID) points are speculative, design-oriented and are subject to change.

2. Credit SSc1, Site Selection. (D)
3. Credit SSc2 , Development Density & Community Connectivity. (D)
4. Credit SSc3, Brownfield Redevelopment. (D)
5. Credit SSc4.1, Alternative Transportation - Public Transportation Access. (D)
6. Credit SSc4.2, Alternative Transportation - Bicycle Storage and Changing Rooms. (D)
7. Credit SSc4.3, Alternate Transportation – Low-Emmiting and Fule Efficient Vehciles (D)
8. Credit SSc4.4, Alternative Transportation - Parking Capacity. (D)
9. Credit SSc5.1, Site Development - Protect or Restore Open Space. (D)
10. Credit SSc5.2, Site Development - Maximize Open Space. (D)
11. Credit SSc6.1, Stormwater Design – Quantity Control, 25% decrease. (D)
12. Credit SSc6.2, Stormwater Design – Quality Control, treats runoff. (D)
13. Credit SSc7.1, Heat Island Effect – Non-Roof. (C)
14. Credit SSc7.2, Heat Island Effect - Roof. (D)
15. Credit SSc8 - Light Pollution Reduction. (D)
16. Credit WEc1.1, Water Efficient Landscaping - Reduce by 50%. (D)
17. Credit WEc1.2, Water Efficient Landscaping - No Potable Water Use or No Irrigation. (D)
18. Innovative Wastewater Technologies (D)
19. Credit WEc3.1, Water Use Reduction – 20% Reduction. (D)
20. Credit WEc3.1, Water Use Reduction – 30% Reduction. (D)
21. Credit EAc1, Optimize Energy Performance: target 10.5% Reduction. (D)
22. Credit EAc1, Optimize Energy Performance: target 14.5% Reduction. (D)
23. Credit EAc1, Optimize Energy Performance: target 17.5% Reduction. (D)
24. Credit EAc1, Optimize Energy Performance: target 21.0%% Reduction. (D)
25. Credit EAc1, Optimize Energy Performance: target 24.5%% Reduction. (D)
26. Credit EAc1, Optimize Energy Performance: target 28.0%% Reduction. (D)

27. Credit EAc1, Optimize Energy Performance: target 31.5%% Reduction. (D)
28. Credit EAc1, Optimize Energy Performance: target 35.0%% Reduction. (D)
29. Credit EAc1, Optimize Energy Performance: target 38.5% Reduction. (D)
30. Credit EAc1, Optimize Energy Performance: target 42.0% Reduction. (D)
31. Credit EAc2: On-Site Renewable Energy- 2.5%. (D)
32. Credit EAc2: On-Site Renewable Energy- 7.5%. (D)
33. Credit EAc2: On-Site Renewable Energy- 12.5%. (D)
34. Credit EAc3, Enhanced Commissioning. (C)
35. Credit EAc4, Enhanced Refrigerant Management. (D)
36. Credit EAc5, Measurement & Verification. (D)
37. Credit EAc6, Green Power. (C) (by City of New York)
38. Credit MRc2.1, Construction Waste Management: Divert 50% from Disposal. (C)
39. Credit MRc2.2, Construction Waste Management: Divert 75% from Disposal. (C)
40. Credit MRc4.1, Recycled Content: 10% (post-consumer + pre-consumer). (C)
41. Credit MRc4.2, Recycled Content: 20% (post-consumer + pre-consumer). (C)
42. Credit EQc1, Outdoor Air Delivery Monitoring. (D)
43. Credit EQc3.1, Construction IAQ Management Plan: During Construction.(C)
44. Credit EQc3.2, Construction IAQ Management Plan: Before Occupancy. (C)
45. Credit EQc4.1, Low-Emitting Materials: Adhesives & Sealants. (C)
46. Credit EQc4.2, Low-Emitting Materials: Paints & Coatings. (C)
47. Credit EQc4.3, Low-Emitting Materials: Carpet Systems. (C)
48. Credit EQc4.4, Low-Emitting Materials: Composite Wood & Agrifiber Products.
(C)
49. Credit EQc5, Indoor Chemical and Pollutant Source Control. (D)
50. Credit EQc6.1, Controllability of Systems: Lighting. (D)
51. Credit EQc6.2, Controllability of Systems: Thermal Comfort. (D)
52. Credit EQc7.1, Thermal Comfort: Design. (D)
53. Credit EAc7.2, Thermal Comfort: Verification. (C) by Design Team
54. Credit EQc8.1, Daylight & Views: daylight 75% of spaces. (D)

55. Credit EQc8.2, Daylight & Views: views for 90% of spaces. (D)
56. Credit ID 1-1, Green Building Education. (D)
57. Credit ID 1-2, Rainwater Harvesting or Exemplary Energy Reduction EAc1. (D)
58. Credit ID 1-3, Exemplary Water Reduction WEc3.2. (D)
59. Credit ID 1-4, Vegetation and Microclimate (Green Screen). (D)
60. Credit ID 2, LEED Accredited Professional. (D)

H. Optional LEEDS Credits - Local materials

1. The following materials shall be tracked through EMRF forms to determine if project may obtain credit for LEED local material requirements MRc5.1 and MRc5.2. The contractor must track and quantify all material purchases for percentages of raw materials extracted, processed and manufactured regionally (by cost, within 500 miles), per LEED 2.2 guidelines. Soil and earth are excluded. This list is not intended to be exclusive.
 - a. Cast-in-place concrete
 - b. Unit pavers
 - d. Gravel and broken stone
 - e. Masonry
 - f. Pavements and pavement foundation materials
 - g. All products listed under CSI Divisions 2-10 are included in the recycled and regional material LEED targets, unless noted otherwise. (CSI Divisions 11 through 16 are excluded from recycled and regional & local materials credits).

1.2 REFERENCE STANDARDS

- A. LEED -NC v 2.2 Reference Guide.

1.3 DEFINITIONS

- A. Point of Final Assembly: Location where individual components are assembled into the product that is furnished and installed by the tradesmen.
- B. Chain of Custody: A tracking procedure to document the status of a product from the point of harvest or extraction to the ultimate end use.
- C. Volatile Organic Compounds (VOCs): Carbon compounds emitted by materials that participate in atmospheric photochemical reactions.
- D. Chlorofluorocarbons (CFCs): halogenated substances that deplete atmospheric ozone.
- E. Hydro chlorofluorocarbons (HCFCs): a class of chemicals that can be substituted for CFCs in building systems that have limited ozone depletion potential.
- F. Post-Consumer Recycled Content: consumer waste that has become a raw material (feedstock) for another product.

- G. Post-Industrial Recycled Content: output from a process that has not been used as a part of a consumer product, that is sold, traded, or exchanged under commercial terms (including auditable transactions between profit centers within an organization) as feedstock for another industrial process, and that would otherwise be landfilled or somehow disposed of as a waste.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

END OF SECTION

SECTION 01332 - LEED SUBMITTALS

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. All four Prime Contractors shall furnish all materials, equipment and labor required for the complete installation and coordination of the work as specified under this Article. This Article is one of several Articles relating to the projects' GREEN BUILDING requirements.

Abbreviations used:

USGBC: US Green Building Council
LEED: Leadership in Energy and Environmental Design
CWM: Construction Waste Management
EMRF: Environmental Materials Reporting Form
IAQ: Indoor Air Quality
VOC: Volatile Organic Compounds

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the environmental performance goals for the Project, which include achieving LEED™ certification. Specific project goals which may impact this and the other Articles of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below and in related Articles of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or his Subcontractors, shall not be allowed if such changes compromise the stated GREEN BUILDING criteria.

1.2 ARTICLE INCLUDES

- A. Work of this Article includes all labor, materials, equipment and services necessary to complete submittal requirements as specified herein, including, but not limited to, the following:
1. Green building submittal requirements.

1.3 RELATED ARTICLES

- A. Construction Waste Management – Section 01506.
B. LEED Requirements –Section 01330.

PART 2 PRODUCTS

2.1 GREEN BUILDING SUBMITTAL REQUIREMENTS

- A. GREEN BUILDING Submittals are required for all installed products and materials, CSI (Construction Specification Institute) Standard Specification Divisions 2 through 10, except components of Mechanical and Electrical systems. For CSI Specification

Divisions 15 and 16, GREEN BUILDING Submittals are only required for field-applied adhesives, sealants, paints and coatings installed as part of the work located on the INTERIOR (inside the weatherbox) of an architectural structure.

- B. The Contractor and his subcontractors shall submit the GREEN BUILDING Certification items for all installed products and materials, regardless of their green or sustainable performances. This is required in order to quantify the actual material costs of products so the LEED target percentages can be determined. GREEN BUILDING Submittals shall include the following, as applicable:
1. For all installed products and materials complete the ENVIRONMENTAL MATERIALS REPORTING FORM (EMRS) (blank and sample copy of forms included), including the following, as applicable:
 - a. Cost breakdowns for the materials included in the Contractor's or subcontractor's work. Cost breakdowns shall include material-only cost.
 - b. The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - c. Indication of whether the manufacturing location of the product(s) is within 500 miles of the project site and distance between project site and manufacturer.
 - d. Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site and distance between the project site and the source of raw materials. Also indicate percent by weight of material or products meeting this regional requirement.
 2. Provide back-up documentation to validate all information provided on the above Forms, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes, as applicable:
 - a. Recycled Content: 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 Materials: Provide back up documentation.
 - c. Roof Paving Materials: Product data sheet or letter from manufacturer listing the Solar Reflectance Index (SRI) of the product. SRI must be calculated according to ASTM E 1980.
 - d. Roofing Materials: Product data sheet or letter from manufacturer listing the Solar Reflectance Index (SRI) of the product or ballast. SRI must be calculated according to ASTM E 1980.
 - e. Ground Paving Materials: Product data sheet or letter from manufacturer listing the Solar Reflectance Index (SRI) of the product. SRI must be calculated according to ASTM E 1980. Concrete pavements, asphalt pavements and Synthetic Turf fields are included in this category.
 - f. Wood and Agrifiber Products: All wood products (whether sustainably harvested or not) must submit an EMRF: WOOD AND AGRIFIBER PRODUCTS ONLY. (blank form attached for your use). Where required, provide wood that meets USGBC certified wood requirements.
 3. Product cut sheets with the Contractor's or subcontractor's stamp, confirming that the submitted products are the products installed in the Project.

PART 3 EXECUTION

- 3.1 The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per LEED credit, to be submitted at the end of the project. GREEN BUILDING Submittal Information shall be available for review on a monthly basis. Incomplete or inaccurate LEED Submittals may result in the rejection of the submitted products or assemblies.
- 3.2 The General Contractor shall submit summary reports for recycled content and local/regional products. The summary reports shall include calculations, listings of products, and back-up documentation as appropriate for each credit.
- 3.3 The Contractor shall complete the ENVIRONMENTAL MATERIALS REPORTING FORM for all products in CSI Standard Specification Divisions 2 through 10 according to the following schedule and requirements:
- A. At the beginning of construction, submit the ENVIRONMENTAL MATERIALS REPORTING FORM with the specification sections updated according to the submittal log and with estimated construction cost and materials cost columns completed. This is to estimate the possibility of achieving MR credits 3, 4, 5, 6 and 7.
 - B. During construction, the Contractor shall update and submit the MATERIALS TRACKING FORM, with actual product data and cost data, every month.
 - C. At the completion of construction, submit a final ENVIRONMENTAL MATERIALS REPORTING FORM with all product data and cost data.
- 3.4 EMRF FORMS
- A. Samples of EMRF attached

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Environmental Materials Reporting Form: All Materials in Divisions 2 - 10



Project Name: Bronx River House

Contractor: _____ Spec Section: _____

Contact Name: _____ Tel. No. _____

Submittal No: _____

Notes:
LEED-NC v2.2 MR credit 4--Recycled Content requires that the sum of all post-consumer recycled content plus one-half of all pre-consumer recycled content constitutes at least 20% (by cost) of all permanently installed materials in Divisions 2-10 for the project.
LEED-NC v2.2 MR credit 5--Regional Materials requires that at least 20% (by cost) of all permanently installed materials in Divisions 2-10 are regional.
LEED-NC v2.2 MR credit 6--Rapidly Renewable Materials requires that at least 2.5% (by cost) of all permanently installed materials in Divisions 2-10 are rapidly renewable.

ATTACH MANUFACTURER'S DOCUMENTATION (e.g. CUT SHEET OR LETTER) TO SUPPORT ALL CLAIMS MADE BELOW EXCEPT COST

	Product	Manufacturer	Product Cost (excluding labor)	% Rapidly Renewable (by Weight)	% POST Consumer Recycled Content (by weight)	% PRE Consumer Recycled Content (by weight)	Miles From Project Site to Manufacturing Location	Miles From Project Site to Point of Material Extraction	% Regional Content (by weight)
1									
2									
3									
4									
5									
6									
7									
8									

Post Consumer Recycled Content—Material derived from discarded waste material generated by households or commercial, industrial, and institutional facilities, measured as a percentage (%) by weight of the final product.

Pre Consumer Recycled Content (or Post Industrial)—Material recovered from industrial and manufacturing processes that is diverted from the solid waste stream for use in a different manufacturing process, measured as a percentage (%) by weight of the final product.

Regional Content—Material extracted/harvested/recovered and manufactured within a radius of 500 miles from the project site. For products with multiple components, determine the percent of the product, by weight, that is regional.

Rapidly Renewable Content—Bio-based material that is sustainably harvested within a 10 year cycle. Rapidly renewable materials include bamboo, cotton, linseed oil (in linoleum), wool and cork. For products with multiple components, determine the percent of the product, by weight, that is rapidly renewable.

Contractor Certification:

I, _____, a duly authorized representation of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, 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 Construction Manager and Architect.

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ DATE: _____

Environmental Materials Reporting Form: All Materials in Divisions 2 - 10

		Project Name: EXAMPLE	
Contractor:	Email:	Spec Section:	
Contact Name:	Tel. No.:	Submittal No.:	

Notes:
LEED-NC v2.2 MR credit 4--Recycled Content requires that the sum of all post-consumer recycled content plus one-half of all pre-consumer recycled content constitutes at least 20% (by cost) of all permanently installed materials in Divisions 2-10 for the project.
LEED-NC v2.2 MR credit 5--Regional Materials requires that at least 20% (by cost) of all permanently installed materials in Divisions 2-10 are regional.
LEED-NC v2.2 MR credit 6--Rapidly Renewable Materials requires that at least 2.5% (by cost) of all permanently installed materials in Divisions 2-10 are rapidly renewable.

ATTACH MANUFACTURER'S DOCUMENTATION (e.g. CUT SHEET OR LETTER) TO SUPPORT ALL CLAIMS MADE BELOW EXCEPT COST

	Product	Manufacturer	Product Cost (excluding labor)	% Rapidly Renewable (by Weight)	% POST Consumer Recycled Content (by weight)	% PRE Consumer Recycled Content (by weight)	Miles From Project Site to Manufacturing Location	Miles From Project Site to Point of Material Extraction	% Regional Content (by weight)
1	CIP Conc., 3500 PSI Mix	XYZ Ready Mix	\$100/yd	-	-	3%	20	see below for each component	97
2	Sand (1000 lb/yd)	LJ Natural	Not Needed	-	-	-	100	100	100
3	Coarse Ag (500 lb/yd)	Tilcon	Not Needed	-	-	-	210	210	100
4	Cement (100 lb/yd)	Holcim	\$25/yd	-	-	-	330	330	100
5	Fly Ash (50 lb/yd)	Fly Ash Direct	\$25/yd	-	-	100	550	550	0
6	Slag (None)	-	-	-	-	-	-	-	-
7									
8	Total yds of mix = 450								

Post Consumer Recycled Content—Material derived from discarded waste material generated by households or commercial, industrial, and institutional facilities, measured as a percentage (%) by weight of the final product.
Pre Consumer Recycled Content (or Post Industrial)—Material recovered from industrial and manufacturing processes that is diverted from the solid waste stream for use in a different manufacturing process, measured as a percentage (%) by weight of the final product.
Regional Content—Material extracted/harvested/recovered and manufactured within a radius of 500 miles from the project site. For products with multiple components, determine the percent of the product, by weight, that is regional.
Rapidly Renewable Content—Bio-based material that is sustainably harvested within a 10 year cycle. Rapidly renewable materials include bamboo, cotton, linseed oil (in linoleum), wool and cork. For products with multiple components, determine the percent of the product, by weight, that is rapidly renewable.

Contractor Certification:
 I, _____, a duly authorized representation of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, 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 Construction Manager and Architect.

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ DATE: _____



Environmental Materials Reporting Form: Wood & Agrifiber Products Only Project Name: Bronx River House

Contractor: _____ Email: _____ Spec Section: _____

Contact Name: _____ Tel. No. _____ Submittal No: _____

End of Section

Notes:
 LEED-NC v2.2 MR credit 7--Certified Wood requires that at least 50% (by cost) of all permanently installed, non-recycled, wood-based materials in the project are certified in accordance with the USGBC Guidelines.
 LEED-NC v2.2 EQ credit 4.4--Low Emitting Materials: No Added Urea Formaldehyde requires that all composite wood and agrifiber products permanently installed inside of the building's weather proofing system contain no added urea-formaldehyde. This applies to entire product, including adhesives, binders, coatings etc..

ATTACH MANUFACTURER'S DOCUMENTATION (e.g. CUT SHEET OR LETTER) TO SUPPORT ALL CLAIMS MADE BELOW EXCEPT COST

	Wood or Agrifiber Product	Manufacturer	Product Cost (excluding labor)	FOR ALL INTERIOR WOOD OR AGRIFIBER PRODUCTS: Does Product Contain Added Urea Formaldehyde? (Y/N)		FOR ALL PERMANENTLY INSTALLED, NON-RECYCLED WOOD-BASED PRODUCTS:		Supplier's Chain of Custody Certificate Number
				Certified Content? (Y/N)	% Certified (by weight)	Certified Content? (Y/N)	% Certified (by weight)	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Contractor Certification: I, _____ a duly authorized representation of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, 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 Construction Manager and Architect.

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ DATE: _____

SECTION 01335 VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES,
PAINTS, SEALANTS, AND ARCHITECTURAL COATINGS

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. All four Prime Contractors shall furnish all materials, equipment and labor required for the complete installation and coordination of the work as specified under this Article. This Article is one of several Articles relating to the projects' GREEN BUILDING requirements.

Abbreviations used:

USGBC: US Green Building Council
LEED: Leadership in Energy and Environmental Design
CWM: Construction Waste Management
EMRF: Environmental Materials Reporting Form
IAQ: Indoor Air Quality
VOC: Volatile Organic Compounds

PART 1 GENERAL

1.1 SUMMARY

- A. This Article includes requirements for reduced-emission, reduced-toxicity construction adhesives, paints, sealant and architectural coatings. These requirements apply to all products within the weatherbox (interior) of the project (i.e. exterior materials are not subject to VOC limits). These requirements apply to all prime contracts.

1.2 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.3 REFERENCE STANDARDS / QUALITY ASSURANCE

- A. Adhesives, Sealants and Sealant primers: (VOC content)
1. South Coast Air Quality Management District (SCAQMD) Rule #1168 . VOV limits listed correspond to an effective date of July 1, 2005 and rule amendment date of January 7, 2005 (LEED-NC Reference Guide v2.2 Third Edition, p. 339).

2. Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000. (LEED-NC Reference Guide v2.2 Third Edition, p. 340).
3. Bay Area Air Quality Management District (BAAQMD) is no longer a referenced standard in LEED-NC v2.2.

B. Paints: (VOC Content and Prohibited Compounds)

1. "Green Seal Standard for Architectural Coating" (GS-11), "Green Seal Standard for Anti-Corrosive Paints" (GC-03), South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings.

1.4 RELATED DOCUMENTS.

- A. LEED Submittals – CSI Article 34.
- B. LEED Requirements- CSI Article 33.
- C. Construction Waste Management – CSI Article 36.
- D. Construction IAQ Management – CSI Article 37.
- E. All sections in the Item Specifications with interior adhesive or sealant applications.
- F. Painting and Finishing – CSI Section 09900.

1.5 DELIVERY AND STORAGE

- A. To the extent feasible, do not store adhesives, sealants, paints, and other Architectural coatings with materials that have a high capacity to adsorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, textiles, etc.). Do not store adhesives, sealants, paints, and other Architectural coatings in occupied spaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. GREEN BUILDING Performance Criteria:

1. VOC Content of Adhesives:

- a. The volatile organic compound (VOC) content of adhesives 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. The VOC limits defined by SCAQMD (based on 1/7/05 amendments) are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U. S. EPA Reference Test Method 24). Unless otherwise specified below, the VOC content of all adhesives, adhesive bonding primers, or adhesive primers shall not be in excess of 250 grams per liter.
- b. Architectural Applications:
 - 1). Indoor carpet adhesive 50 g/L

2).	Carpet pad adhesive	50
3).	Wood flooring adhesive	100
4).	Rubber floor adhesive	60
5).	Subfloor adhesive	50
6).	Ceramic tile adhesive	65
7).	VCT and asphalt tile adhesive	50
8).	Drywall and panel adhesive	50
9).	Cove base adhesive	50
10).	Multipurpose construction adhesive	70
11).	Structural glazing adhesives	100
12).	Single Ply Roofing Membrane Adhesive	450
13).	Top and Trim Adhesive	250

c. Specialty Applications:

1).	PVC welding	510
2).	CPVC welding	490
3).	ABS welding	400
4).	Plastic cement welding	250
5).	Adhesive primer for plastic	550
6).	Contact Adhesive	80
7).	Special Purpose Contact adhesive	250
8).	Structural Wood Member adhesive	140
9).	Sheet Applied Rubber Lining Operations	850
10).	Adhesive Primer for Traffic Marking Tape	150

d. Substrate Specific Applications

1).	Metal to metal	30
2).	Plastic foams	50
3).	Porous material (except wood)	50
4).	Wood	30
5).	Fiberglass	80

2. VOC Content of Paints

a. The Volatile Organic Compound (VOC) content of paints shall not exceed the limits defined in the "Green Seal Standard for Architectural Coating" (GS-11). The VOC limits are as follows. All VOC limits are defined in grams per liter, less water.

b. Paint and Anti-Corrosive Paint VOC Limits

1).	Non-flat interior coatings	150 g/L
2).	Flat interior coatings	50
3).	Anti-corrosive/anti-rust coatings	250
4).	Varnishes	350
5).	Lacquers	550
6).	Floor coatings	100
7).	Sealers	
	(a) Waterproofing	250
	(b) Sanding	275
	(c) Other	200
8).	Stains	250

9.)	Shellac: clear	730
10.)	Shellac: pigmented	550

3. Prohibited Compounds in Paints

- a. Paints shall comply with the prohibited compound requirements of the "Green Seal Standard for Architectural Coating" (GS-11), Green Seal, Washington D.C.
- b. Prohibited compounds, as defined in the green seal standard, shall include:
 - 1). Halomethanes: methylene chloride.
 - 2). Chlorinated ethanes: 1,1,1 trichloroethane.
 - 3). Aromatic solvents: benzene, toluene (methylbenzene), Ethylbenzene.
 - 4). Chlorinated ethylenes: vinyl chloride.
 - 5). Polynuclear aromatics: naphthalene.
 - 6). Chlorobenzenes: 1,2 dichlorobenzene.
 - 7). Phthalate esters: di (2-ethylhexyl) phthalate, Butyl Benzyl Phthalate, di-n-butyl hthalate, di-n-octyl phthalate, diethyl phthalate, dimethyl phthalate.
 - 8). Miscellaneous semi-volatile organics: isophorone.
 - 9). Metals and their compounds: antimony, cadmium, hexavalent chromium, lead, mercury.
 - 10). Preservatives (antifouling agents): formaldehyde.
 - 11). Ketones: methyl ethyl ketone, methyl isobutyl ketone.
 - 12). Miscellaneous volatile organics: acrolein, acrylonitrile.

4. Requirements For Sealants

- a. The volatile organic compound (VOC) content of sealants or sealant primers used in this project shall not exceed the limits defined in South Coast Air Quality Management District (SCAQMD) Rule #1168.
- b. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less exempt compounds.
 - 1). Sealants:

(a).	Architectural	250
(b).	Marine Deck	760
(c).	Roadways	250
(d).	Single Ply Roof Material Installation/Repair	450
(e).	Non-membrane Roof Installation/Repair	300
(f).	Other	420
 - 2). Sealant Primer:

(a).	Architectural – Nonporous	250
(b).	Architectural – Porous	775
(c).	Other	750

PART 3 EXECUTION

3.1 INSTALLATION

- A. Coordinate installation of all adhesives, sealants, paints, and coatings with the ventilation and sequencing criteria defined in Section 01511 - Construction IAQ Management.
- B. When installed over concrete slabs, verify compatibility of adhesives with curing compounds, leveling agents, or sealing agents used for slab preparation.

3.2 VOC REPORTING FORM

- A. Sample Form attached.

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VOC Reporting Form: Adhesives, Sealants, Paints, Coatings and Carpet Systems

Project Name: Bronx River House
 Spec Section:
 Submittal No:

Contractor:
 Email:
 Tel. No.

Contact Name:



Notes:

LEED-NC v2.2 EQ credit 4.1--Low Emitting Materials: Adhesives and Sealants requires that all field-applied adhesives, sealants, and sealant primers used inside of the building's weatherproofing system comply with SCACMD Rule #1168 VOC limits AND that aerosol adhesives comply with Green Seal Standard for Commercial Adhesives GS-36.
LEED-NC v2.2 EQ credit 4.2--Low Emitting Materials: Paints and Coatings requires that all field-applied paints and coatings used inside of the building's weatherproofing system comply with either GS-11 (for architectural paints, coatings and primers), GS-03 (for anti-corrosive/anti-rust paints applied to ferrous substrates) or SCAQMD Rule 1113 (for Clear wood finishes, floor coatings, stains, sealers and shellacs)
LEED-NC v2.2 EQ credit 4.3--Low Emitting Materials: Carpet Systems requires that all carpet and carpet cushion installed in the building's interior shall meet the requirements of the Carpet and Rug Institute (CRI) Green Label Plus program.

ATTACH MANUFACTURER'S DOCUMENTATION (e.g. CUT SHEET OR LETTER) TO SUPPORT ALL CLAIMS MADE BELOW

Product Name/Model	Manufacturer	FOR ALL FIELD-APPLIED, INTERIOR ADHESIVES, SEALANTS, PAINTS & COATINGS, Provide Product VOC Content in g/L (less water):	FOR ALL INTERIOR CARPET & CARPET CUSHION: Does product comply with CRI Green Label Plus Program? (Y/N)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

Contractor Certification:

I, _____, a duly authorized representation of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, 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 Construction Manager and Architect.

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____ DATE: _____

END OF SECTION

SECTION 01506 - CONSTRUCTION WASTE MANAGEMENT

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. All four Prime Contractors shall furnish all materials, equipment and labor required for the complete installation and coordination of the work as specified under this Article. This Article is one of several Articles relating to the projects' GREEN BUILDING requirements.

Abbreviations used:

USGBC:	US Green Building Council
LEED:	Leadership in Energy and Environmental Design
CWM:	Construction Waste Management
EMRF:	Environmental Materials Reporting Form
IAQ:	Indoor Air Quality
VOC:	Volatile Organic Compounds

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.
- B. All subcontractors shall be subject to this Section, with the lead responsibility being the General Contractor.

1.3 SECTION INCLUDES

- A. Work of this section includes the following requirements:
 - 1. Waste Management Requirements goals.
 - 2. Waste management plan.
 - 3. Management plan implementation.

4. Progress Reports
5. Special programs.

1.4 RELATED ARTICLES

- A. LEED Submittals – Section 01332
- B. LEED Requirements – Section 01330
- C. Construction IAQ Management Plan – Section 01511

1.5 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.
- B. Construction and Demolition (C&D) Waste: includes non-hazardous waste and recyclables generated from construction, renovation, and the demolition or deconstruction of pre-existing structures. This includes (for example) building materials, packaging, trash debris and rubble. Hazardous materials are not to be included in this calculation. Land clearing debris, including soil, vegetation, rocks, etc are not to be included in this calculation.
- C. Contractor Waste Documentation Form: A form to be completed by each contractor documenting construction and packaging materials expected to be brought to the site; the form identifies the estimated quantity, weight and % that can be returned or recycled for each material.
- D. Diversion from Landfill requirements: The end-of-project recycling rate shall equal, at minimum, 75% by weight or volume of the total non-hazardous project waste from construction and demolition on site. Land clearing debris, including soil, vegetation, rocks, etc. are not to be included in this calculation. Diversion from landfill does not include using the material as alternative daily cover at a landfill site, nor does it include burning, incinerating or thermally destroying waste.
- E. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
- F. 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.
- G. Return: To give back reusable items or unused products to vendors.
- H. Reuse: To reuse excess or discarded construction material in some manner on the Site.
- I. Salvage: To remove a waste material from the Site for resale or reuse.
- J. Tipping Fee: Fee charged by landfill for disposal of waste volumes; typically quoted for one ton of waste.

- K. 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.
- L. Waste Management Plan: Contractor shall prepare a project-related plan for the collection, transportation and disposal of waste generated at the Site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill. These plans will form the basis of the Project Construction Waste Management Plan.

1.6 WASTE MANAGEMENT REQUIREMENTS

- A. The Owner has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be returned, reused, salvaged, or recycled. Waste disposal in land fills shall be minimized.
- C. The Owner will seek LEED (Leadership in Energy and Environmental Design) certification 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.
 - 1. The Owner requires that a minimum of 75% waste materials be recycled and/or salvaged. The Contractor shall report monthly during the construction period to demonstrate that 75% of the on site waste is recycled, reused or salvaged.
- D. Diversion Requirements: The end-of-project recycling rate shall equal, at minimum, 75% by weight of the total project waste from construction, demolition, and land clearing activities on site. Excavation soil, hazardous waste and land-clearing debris are excluded from the calculation. The following waste categories are likely candidates to be diverted from landfill (i.e., reused, recycled, or salvaged) for this project:
 - 1. Concrete;
 - 2. Concrete masonry units (CMU);
 - 3. Asphalt;
 - 4. Metals (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, brass, bronze);
 - 5. Cardboard, paper, packaging;
 - 6. Beverage containers;
 - 7. Reuse items indicated on the Drawings and/or elsewhere in the Specification;
 - 8. Clean dimensional wood;
 - 9. Roofing;

10. Drywall;
 11. Carpet and pad;
 12. Ceiling tiles;
 13. Glass;
 14. Plastics;
 15. Paint;
- E. Fluorescent lamps, HID lamps and mercury-containing thermostats removed from the Site shall be recycled.
- F. If conditions do not allow for recycling on site (to be determined by Contractor), the Waste Contractors should include off-site opportunities to recycle and reuse removed material in the Waste Management Plan.
- G. With regard to these requirements the Contractor shall develop, for the Owner's review, a Waste Management Plan for this Project.

1.7 WASTE MANAGEMENT PLAN

- A. The Contractor is responsible for developing and executing the Waste Management Plan. The Contractor shall submit to the Owner and Architect a Waste Management Plan.
- B. The Contractor shall be responsible for coordination and implementation of the overall Waste Management Plan. In addition, all trade sub-contractors shall be responsible for coordination with the Contractor with regard to waste recycling relevant to their scope of work. All other subcontracts, if any, (i.e. electrical, mechanical, plumbing) shall review the submitted plan, comment appropriately, and, upon approval of the plan, provide signatures indicating understanding of, and intent to fully comply, with the Plan.
- C. Waste Management Plan: The Waste Management Plan shall contain the following:
1. List of materials targeted for reuse, salvage, or recycling, and name(s) of receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials.
 2. Description of onsite and/or offsite sorting methods for all materials to be removed from site.
 3. If mixed construction and demolition waste is to be sorted off-site, provide a letter from the processor stating the average percentage of mixed Construction and Demolition waste they recycle.
 4. Landfill information: Name(s) of landfill(s) where waste will be disposed, and applicable tipping fees.

5. Materials handling procedures: description of the means by which reused, recycled or salvaged waste materials will be protected from contamination.
6. Transportation: description of means of transportation and destination for recyclable materials (whether materials will be separated on-site and self-hauled to designated center, or mixed C&D waste will be collected by a waste hauler and removed from the site).
7. Meetings: description of regular meetings to be held to address waste management.
8. Sample spreadsheet and description of how the plan will be documented on a monthly basis.

1.8 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Owner.
- C. Instruction: The Contractor shall provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.
- D. Separation Facilities: If waste sorting will be done on-site, the Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
- E. Hazardous Wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
- F. The Contractor shall provide calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating the percentage, by weight or volume, of the construction wastes that were recycled or salvaged (The unit of measure must be consistent for all materials throughout tracking and documentation). The general process is as follows:
 1. Record and document the total weight (in tons) of all demolition construction waste materials sent to the landfill.
 2. Record and document the material types and the weights (in tons) that were recycled or salvaged.
 3. Divide the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and land filled waste), and multiply by 100 to calculate the percentage, by weight, of the construction wastes that were recycled or salvaged.

1.9 PROGRESS REPORTS

- A. The Contractor shall submit monthly a Waste Management Progress Report, containing the following information: Project title, name of company completing report, dates of period covered by the report, % of waste recycled during this period and total % of waste recycled to date.
- B. Progress Report on the disposal of site waste, including:
 - 1. Recycled Materials. For each material, provide the following:
 - a. Amount (in tons);
 - b. Dates removed from the Site;
 - c. Receiving Party.
 - 2. Reused or Salvaged Materials. For each material, provide the following:
 - a. Amount (in tons);
 - b. Description of intended or actual use.
 - c. Receiving Party.
 - 3. Land Filled Materials. Provide the following:
 - a. Amount (in tons);
 - b. Dates removed from the Site;
 - c. Identity of the transfer station or landfill.
 - 4. If mixed construction and demolition waste is to be sorted off-site, provide a letter from the processor stating the average percentage of mixed Construction and Demolition waste they recycle at the facility that handles the waste from this project.
- C. Include legible copies of on-site logs, weight tickets and receipts. Receipts shall be from recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling or disposal. The Waste Contractors shall save such original documents (as above) for the life of the Project plus three (3) years.
 - 1. This information shall be compiled into a single submittal at the end of construction.

1.10 SPECIAL PROGRAMS

- A. The Contractor shall be responsible for compliance with any Owner's programs involving rebates or similar incentives related to recycling, if applicable to the Project. Revenues or other savings obtained for recycling or returns shall accrue to the Contractor.

1.11 REFERENCES, RESOURCES

- A. The Owner encourages the Contractor to seek information from websites and experts in salvage or recycling in order to minimize disposal costs. There may be opportunities to

sell or donate salvage and accrue rebates or similar incentives (which would accrue to the contractor); also there are outlets that will pick up, and in some cases buy recyclable materials. Examples of information resources are as follows:

1. Web Resources (provided for information only; no warranty or endorsement is implied):
 - a. U.S. Green Building Council, including description of the GREEN certification process and requirements for C&D waste recycling (www.usgbc.org)
 - b. U.S. Environmental Protection Agency, includes construction and demolition waste issues, and links to other resources (<http://www.epa.gov/epaoswer/non-hw/debris-new/>)

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

END OF SECTION

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SECTION 01511 - CONSTRUCTION IAQ MANAGEMENT

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. All four Prime Contractors shall furnish all materials, equipment and labor required for the complete installation and coordination of the work as specified under this Article. This Article is one of several Articles relating to the projects' GREEN BUILDING requirements.

Abbreviations used:

USGBC:	US Green Building Council
LEED:	Leadership in Energy and Environmental Design
CWM:	Construction Waste Management
EMRF:	Environmental Materials Reporting Form
IAQ:	Indoor Air Quality
VOC:	Volatile Organic Compounds

PART 1 GENERAL

1.1 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT

- A. The Owner has established that this Project shall 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, poor housekeeping, shall be minimized.

1.2 GREEN BUILDING GENERAL REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.3 SUMMARY

- A. This Article includes requirements for the development of a Construction Indoor Air Quality Management Plan (alternatively referred to as the Plan). The Plan shall be developed by the General Contractor and the LEED Coordinator. The Plan shall be implemented throughout the duration of the project construction under the direction, and shall be documented per the Submittal Requirements of Item 1.8 below. The Plan is included as part of the GREEN BUILDING requirements for the project.

- B. The Contractor shall provide, prior to the beginning of construction, a copy of the IAQ Plan, and upon completion of the project the Construction IAQ Summary Report.

1.4 RELATED SECTIONS

- A. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.
- B. All item sections that include adhesives, sealants, and architectural coatings products.
- C. Section 01335 – Volatile Organic Compound (VOC) Limits For Adhesives, Sealants and Architectural Coatings.
- D. Section 01330 – LEED Requirements.
- E. CSI Section 09900 – Painting

1.5 REFERENCES, RESOURCES

- A. SMACNA IAQ Guidelines for Occupied Buildings Under Construction, First ed., Nov. 1995, The Sheet Metal and Air Conditioner National Contractors Association.
- B. ANSI/ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size".

1.6 GREEN BUILDING GENERAL REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include meeting the requirements of achieving LEED Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below, 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 GREEN BUILDING Performance Criteria.

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN - OVERVIEW

- A. The Contractor shall prepare and submit a Construction IAQ Management Plan to the Owner and Consultant for approval. The Construction IAQ Management Plan shall meet the following criteria:
 - 1. Construction activities shall be planned to meet or exceed the minimum requirements included in Chapter 3 of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction", First Edition, 1995;
 - 2. Absorptive materials shall be protected from moisture damage when stored on-site and after installation;

3. Filtration media shall be installed to protect ductwork and/or equipment used during the construction process, per Item 2.1 FILTRATION MEDIA of this specification.
4. A Sequence of Finish Installation Plan shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".
5. Upon approval of the Plan by the Owner, it shall be implemented by the Mechanical Contractor and Subcontractors and all other PRIME CONTRACTORS through the duration of the construction process, and documented in accordance with the GREEN BUILDING Submittal Requirements of this Contract.
6. Pre-occupancy flush-out: After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu. ft. of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%.
OR
Post-occupancy flush-out: If occupancy is desired prior to completion of flush-out, the space may be occupied following delivery of a minimum of 3500 cu. Ft. of outdoor air per square foot of floor area of the space. Once the space is occupied. It shall be ventilated at a minimum rate of .30 cfm/sq. ft. of outside air or the design minimum outside air rate determined in LEED point EQp1, whichever is greater. During each day of the flush out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. of outdoor air has been delivered to the space.
OR
IAQ Testing: Confirm the effectiveness of the IAQ management plan by testing the facility prior to occupancy, through a testing protocol consistent with "Compendium of Methods for the Determination of Air Pollutants in Indoor Air", by US EPA or similar testing protocol. Filter changes and balancing are required prior to sampling, Sampling should be comprehensive, not less than one per 25,000 sq. ft., or one per mechanical unit, and whatever is less. Take samples in the breathing space of the room 3 to 6 feet above floor level, during normal occupied hours with HVAC system operating with normal start times at the minimum outdoor air flow rate. Provide all records. If concentrations of indoor pollutants exceed the maximum level, flush out the space by increasing the rate of outdoor air and retest. Resample and confirm compliance before allowing the space to be occupied. Retesting may be limited to only those chemical contaminants that produced the excessive chemical concentrations in the initial tests.

1.8 GREEN BUILDING SUBMITTALS REQUIREMENT

- A. The Contractor and/or subcontractor shall submit the following required records and documents:
 1. A construction schedule outlining the start-up date and expected duration of all Construction IAQ Management Plan control measures.
 2. A copy of the Construction IAQ Management Plan and the Sequence Installation Plan, as defined in section 1.6 of this specification; to be submitted prior to the beginning of construction.

3. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contractor's or Subcontractor's 'approved' stamp as confirmation that the products submitted are the products installed on the project.
4. (18) photographs - (6) photographs taken on (3) different occasions during construction, labeled with the SMACNA approach illustrated- that 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 shall include integral date stamping, and shall be submitted with brief descriptions. All the above photographs shall be submitted to the Architect upon substantial completion of construction.

PART 2 PRODUCTS

2.1 FILTRATION MEDIA

- A. If air handlers are used during construction, filtration media must be used at each return grill and have a Minimum Efficiency Reporting Value (MERV) of at least 8, as determined by ASHRAE 52.2-1999.
- B. All filtration media shall be replaced immediately prior to occupancy and must have a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-1999. MERV 13 filters shall also be used during flush-out period.

PART 3 EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT PLAN – DETAILED REQUIREMENTS

- A. SMACNA Guidelines, as stated in 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 shall be organized in accordance with the SMACNA format, and shall address measures to be implemented by the

Contractor and/or Subcontractors in each of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.

1. HVAC Protection: Will include Return Side, Central Filtration, Supply Side and Duct Cleaning
 - a. Contractor will direct subcontractors to protect air handling and distribution equipment, and air supply and return ducting during construction. The designated person will inspect work and monitor subcontractor(s) to insure compliance.
 - b. All ductwork arriving on site will be sealed with plastic sheeting and stored on pallets or dunnage until installed.

- c. Contractor will direct subcontractors to cover and protect all exposed air inlets and outlets, openings, grilles, ducts, plenums, etc. to prevent water, moisture, dust and other contaminate intrusion.
- d. Contractor will direct subcontractors to apply protection immediately after ducting.
- e. Ducting runs will be protected at the end day's work.
- f. Contractor will direct subcontractor to inspect temporary filtration weekly and replace as required to maintain the proper ventilation rates in the building.
- g. Permanently installed HVAC system shall not be used during construction.

2. Source Control

- a. Contractor will direct subcontractors to protect stored on-site or installed absorptive or porous materials such as batt.
- b. Contractor will not allow subcontractors to use wet damaged porous materials in the building.
- c. Contractor will require subcontractors to use low emitting paints, sealants, adhesives and carpet.
- d. Product Substitution: avoid substitutions that compromise IAQ goals.
- e. Modifying Equipment Operation: avoid changes in operations that compromise IAQ goals.
- f. Changing Work Practices
- g. Local Exhaust: provide local exhaust to keep contaminants from settling.
- h. Air Cleaning
- i. Cover or Seal all exposed or unused equipment and products.

3. Pathway Interruption

- a. Depressurize Work Area
- b. Pressurize Occupied Space
- c. Erect Barriers to Contain Construction Areas
- d. Relocate Pollutant Sources
- e. Temporarily Seal the Building

4. Housekeeping: Protect stored on-site or installed absorptive materials from moisture damage.

- a. Store materials on elevated platforms under cover, and in a dry location.
- b. If materials are not stored in an enclosed location, cover tops and sides of material with waterproof sheeting, securely tied.
- c. Phase construction such that absorptive materials are installed only in areas that are weathertight.

5. Scheduling

B. Protect of Materials from Moisture Damage

- 1. As part of the HOUSEKEEPING section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage shall be described. This section should also describe measures

to be taken if moisture damage does occur to absorptive materials during the course of construction.

C. Replacement of Filtration Media

1. Under the HVAC PROTECTION section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy. Filtration media shall meet the requirements of Item 2.1 (Filtration Media) of this specification.

D. Sequence of Finish Installation for Materials

1. Absorptive materials should be installed *after* the installation of materials or finishes which have high short-term emissions of VOC's, 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 air stream); 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.
2. The Contractor shall develop a sequencing schedule that identifies how the sequencing will occur for the project. The schedule shall be submitted to the Owner and Consultant in accordance with the Submittal Requirements of this Section.

E. If building HVAC systems are used to supply the ventilation air, filtration media shall be installed per the requirements of Item 2.1 (Filtration Media) of this specification.

F. Air Purging (Flush-out): Purging or testing must comply with USGBC requirements, outlined in section 1.7A.6 above. There are three potential compliance paths, as follows:

1. Perform a pre-occupancy flush-out of all habitable spaces.
2. Perform a post-occupancy flush-out of all habitable spaces.
3. Perform an IAQ testing in all habitable spaces to determine chemical contaminants are below maximum levels.

G. Implementation and Coordination

1. The General Contractor shall be responsible for implementation of the Construction IAQ Management Plan, and for the coordination of the Plan with all affected trades and other subcontractors. The Contractor shall designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner on a regular basis, and for assembling the required LEED documentation. The Contractor shall include

provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to the Owner on implementing a stop work order, or to rectify non-compliant conditions.

2. Subcontractors shall be responsible for the implementation of specific control measures, as specified in the Construction IAQ Management Plan. Subcontractors shall coordinate their responsibilities through the Contractors' designated Construction IAQ Representative.

END OF SECTION

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SECTION 01810 - COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DIVISIONS / SECTIONS

- A. Green Building Requirements - Division 1.
- B. Plumbing- Division 15 .
- C. Heating and Ventilation – Division 15 .
- D. Electrical- Division 16.

1.2 RELATED DOCUMENTS

- 1. ASHRAE Guideline 1-1996 "The HVAC Commissioning Process".
- 2. ASHRAE Guideline 0-2005 "The Commissioning Process".
- 3. USGBC LEED v 2.2 Reference Guide "New Construction & Major Renovation"

1.3 SUMMARY

A. Background/Purpose

- 1. Commissioning activities are the responsibility of the owner's commissioning authority. The commissioning plan is the vehicle by which the commissioning process is planned, executed and documented. Draft and final versions of the commissioning plan for this project shall be produced by the commissioning authority. The commissioning authority and the Prime Contractors are responsible for producing the final commissioning plan, with all necessary commissioning sequences. The Prime Contractors are responsible for providing or obtaining from subcontractors all documentation related to the commissioning effort and submitting it to the commissioning authority for inclusion in the final version of the commissioning plan. All system and equipment start up, check out and pre-functional testing will be conducted by the respective manufacturers and contractors. Functional testing shall be performed by the contractors and supervised, witnessed, and verified by the commissioning authority. This specification is to be used in conjunction with all other contract documents. Any discrepancies or conflicts shall be identified and the Owner and A/E shall be notified in writing. A clarification will then be issued to the appropriate parties and entities.
- 2. The commissioning process will involve the participation of representatives from the Owner, Commissioning Authority, Prime Contractors, Subcontractors, testing and balancing firms, major equipment suppliers and construction trades.

3. The Commissioning Authority is not authorized to release, revoke, alter, or expand the requirements of the Contract Documents, approve or accept any portion of the Work, or perform any of the duties of the Prime Contractors or Subcontractors.
4. Mechanical, Electrical, and Plumbing (MEP) system pre-installation checks, installation check, test and start-up, testing and balancing, preparation of O&M manuals, and operator training are the responsibility of the Prime Contractors and Subcontractors, with observation, verification and commissioning supervision the responsibilities of the Commissioning Authority. The commissioning process does not relieve contractors from the obligation of completing all specified Work in a satisfactory and fully operational manner. Nor does the commissioning process relieve any obligation resting with the trades for operation and maintenance manuals and training

B. Goals of the Cx (Commissioning) Process

1. The function of the commissioning process is to provide a complete and thorough evaluation of the operation and performance of all components, systems, and sub-systems being commissioned.
2. Ensure that equipment and systems operate as described in the Owners Project Requirements (OPR) and contract documents.
3. Verify contract conformance of equipment and systems.

1.4 DEFINITIONS

A. Building Systems Commissioning:

1. Commissioning is the process that ensures building systems are designed, installed, functionally tested, and capable of being operated and maintained in conformance with the design intent (owner's requirements). Commissioning for this project follows requirements outlined in section 1.2 RELATED DOCUMENTS of this Article. This approach will be applied to all commissioned systems.

B. Installation check:

1. A comprehensive check sheet to verify that the equipment has been correctly installed as per the contract documents.

C. Functional check:

1. An operational check comprised of a full range of tests based on the sequence of operations to demonstrate that the building systems are able to perform the specified sequence of operations.

D. Seasonal Test:

1. A functional check that was postponed due to the inability of the equipment to be tested out of season. The CxA, Prime Contractor and Subcontractor will be required to return to perform the postponed checks during the next appropriate season.

E. Commissioning Plan:

1. A document defining the Cx process and scope as the project progresses through its various phases.

F. Issue

1. Any defects, problems, and deficiencies that do not meet contract requirements or the intent of the project design. All Issues are entered into a commissioning issues log by the Commissioning Consultant to enable tracking and closeout.

G. Abbreviations – The following are common abbreviations used in this section:

A/E	Architect/Engineer	IC	Installation Check
AHU	Air Handling Unit	FC	Functional Check
Cx	Commissioning	OPR	Owners Project Requirements
CxA	Commissioning Authority	SOP	Sequence of Operation
CxP	Commissioning Plan	Subs	Subcontractors (to the Prime Contractor)
		TAB	Test, Adjust, Balance
HVAC	Heating, Ventilation, Air-Conditioning	VAV	Variable Air Volume Unit

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PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 SCHEDULING

- A. All critical commissioning activities will be incorporated into the Project Schedule as required.

3.2 COORDINATION

- A. The CxA reports directly to the Client. Coordination of testing will be by the PC.

3.3 CONTRACTOR RESPONSIBILITIES

A. Commissioning Tasks

- 1. Commissioning Tasks for the Contractor shall include but not be limited to:
 - a. Documenting the construction process.
 - b. Reporting on the project schedule to the Owner.
 - c. Attending commissioning meetings.
 - d. Checking, test and start-up of equipment to be performed by the contractor.
 - e. Performing functional tests while Commissioning Authority directs test steps.
 - f. Testing, adjusting, and balancing hydronic and air systems.
 - g. Cooperating with the Commissioning Authority.
 - h. Providing qualified personnel for participation in commissioning tests, including seasonal testing required after the initial testing.
 - i. Providing qualified personnel and the necessary equipment to conduct the commissioning tests.
 - j. Providing equipment, materials, and labor, as necessary, to correct construction and/or equipment deficiencies found during commissioning.
 - k. Providing operation and maintenance manuals and as-built drawings to the Commissioning Authority for verification.
 - l. Providing on-site and off-site training and demonstrations for systems specified.

B. Documentation

- 1. Timely and accurate documentation is essential for the commissioning process to be effective. Documentation required as part of the commissioning process shall be provided to the Commissioning Authority by the Contractor and shall include, but not be limited to:
 - a. Vendor Equipment Submittals.

- b. Coordination Drawings.
- c. Construction Completion Checklists.
- d. Pre-start and start-up procedures.
- e. Training agenda and materials.
- f. As-built records.
- g. Field Commissioning reports.
- h. Operational and Maintenance (O&M) manuals.

C. Commissioning Checklists

1. Detailed Installation and Functional checks that are used to determine whether a system performs in accordance with the Design Intent and Contract Documents shall be executed on all commissioned CSI Division 15 and 16 equipment and systems to ensure that operation and performance conforms to the Contract Documents. Functional testing is preceded by both contractor and Commissioning Authority checks and tests. Once a system has passed all functional tests, it will be eligible for acceptance by the Architect/Engineer and turnover to the Owner. The following checks and tests precede functional performance testing, and are the responsibility of the appropriate contractor:
 - a. Pre-Installation Check Sheets - are to be completed for all materials and equipment that shall be inspected for damage or for compliance with an approved submittal upon arrival from the supplier. Pre-installation check sheets are supplied and completed by the appropriate manufacturer, contractor representative and submitted for the record.
 - b. Installation (Construction Completion - Pre-Start) Checklists - are comprised of a full range of checks developed to determine that a system is installed correctly. Installation check sheets are supplied by the Cx Authority, and completed by the appropriate manufacturer, contractor foreman and submitted for the record. The purpose of these sheets is to ensure that the proper installation of the equipment has been completed, and that the equipment is ready for start-up and pre-functional checkout.
 - c. Check, Test, Start (Pre-functional) Checklists - are comprised of a full range of checks and tests to determine that all components, equipment, systems and interfaces between systems operate in accordance with contract documents. This includes all operating modes, interlocks, control responses, and specific responses to abnormal or emergency conditions. Check, test, and start-up check sheets are supplied and completed by the appropriate manufacturer, contractor foreman and submitted for the record.
2. Detailed functional checks that are used to determine whether a system performs in accordance with the Design Intent and Contract Documents shall be executed on all commissioned CSI Division 15 and 16 equipment and systems to ensure that operation and performance conforms to the Contract Documents. Functional tests shall be supervised, witnessed, and verified by the Commissioning Authority. Function Checklists are as described below:
 - a. Functional Checklists – are comprised of a full range of tests based on the sequence of operations to demonstrate that the building systems are able

to perform the specified sequence of operations and satisfy the owner's project requirements. Functional Checklists are supplied and completed by the CxA. The functional tests are performed by the contractors under supervision and observation of the CxA.

D. Correction of Issues

1. During the course of project construction and start-up, issues will be identified and logged by the CxA. "Issue logs" will be forwarded to the A/E and PC for review. After this occurs, the issue sheets will then be forwarded to the appropriate contractor for response and resolution.
2. When the Contractor receives an issue, the Contractor must either correct the issue or explain it. All issue sheets must be filled out and returned to the CxA within 5 business days by the Contractor.
3. The CxA will track all issues. The commissioning meeting agenda will include a review of open and disputed issues.

E. Testing and balancing Specific Requirements

1. The Contractor will be responsible for TAB , and required to provide NIST traceable calibration sheets for all equipment used for TAB work.
2. The CxA will conduct field visits during the balancing activities to verify that balancing is being properly followed and applied.
3. Upon completion of balancing activities and issuance of the balancing report, the CxA, along with the A/E, will review the report.

F. Automatic Temperature Controls Contractor Specific Requirements

1. The Automatic Temperature controls' contractor will provide a submittal package including controls drawings, schematics and written sequences of operation for the CxA.
2. The Automatic Temperature controls' contractor will supply personnel necessary to assist in performing any work related to setup, operation and function of equipment.
3. The Automatic Temperature controls' contractor may be required to set up data logs/trending for the CxA to verify proper system controls (If trending capability exists).
4. A random sample of instrumentation (temperature, humidity, pressure, and flow sensors) will be checked for proper calibration.
5. The Automatic Temperature controls' contractor will be required to demonstrate and verify that the system performs as per the contract documents.

G. Retesting by the Owners' Commissioning Agent (CxA)

1. One retest will be allowed per like component. Additional tests will be charged to the installing contractor responsible for the problem.
2. The costs for additional retesting will be absorbed by the contractor and will be billed on a T&M basis at the rates established in the CxA master contract. The CxA may waive this requirement at their discretion for special circumstances.
3. The CxA will not perform any additional retests unless the responsible contractor has formally approved the costs for retests.

H. Systems Manual

1. A Systems Manual shall be compiled by the CxA containing all the necessary documentation for the operating staff to be able to understand and operate the commissioned systems effectively. The A/E, Contractor and subcontractors will supply all required documentation for this manual as per LEED requirements. The documentation shall include the following:
 - a. System single line diagrams
 - b. As built sequences of operations
 - c. Control Drawings
 - d. Operating instructions for integrated systems
 - e. Recommended schedule of maintenance requirements
 - f. Recommended schedule for sensor and actuator calibration

I. Training

1. The Contractor shall be responsible for training coordination and scheduling of required training and for ensuring that all required training is completed. The Commissioning Authority shall oversee the content and adequacy of the training of Owner personnel. Acting through trade contractors, and with assistance from the Commissioning Authority, the Contractor shall:
 - a. Prepare and submit a syllabus describing an overview of the program, describing how the program will be conducted, when and where meetings are to be held, names and company affiliations of lecturers, description of contents and outline for each lecture, and recommended reference material and outside reading.
 - b. Provide the Commissioning Authority with training plan 30 days before the planned training.
 - c. Provide designated Owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of equipment.

3.4 EQUIPMENT/SYSTEMS TO BE COMMISSIONED

A. The following types of equipment and their associated systems included in the contract documents identify (but do not limit) items to be commissioned.

- a. Ground Sourced Heat Pump System
- b. Air Handling Units
- c. VAV Boxes
- d. Radiant Slab Heating
- e. Rooftop Photovoltaic System
- f. Daylight Dimming System
- g. CO2 Monitoring
- h. Domestic Water Heater
- i. Lighting Controls
- j. Rainwater Harvesting System

END OF SECTION

SECTION 02060 - AGGREGATE MATERIALS - LANDSCAPE

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Aggregate material for Pavements
- B. Aggregate for Gravel and Paver Access Path
- C. Aggregate materials for River Cobble Pavement
- D. Aggregate for Stone Border
- E. Aggregate materials for Stone Dust Setting

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
- B. Section 02721 Aggregate Base Courses
- C. Section 02740 Asphalt Concrete Pavement
- D. Section 02750 Concrete Pavement
- E. Section 02761 Unit Pavements
- F. Section 03700 Cement and Concrete for Exterior Improvements

1.4 REFERENCES

- A. NYSDOT Standard Specifications (latest edition), Section 300 - Bases and Subbases, Section 703 - Aggregates.
- B. AASHTO - M147 - Materials for Aggregate and Soil-Aggregate.

- C. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- D. ASTM D2487 - Classification of Soils for Engineering Purposes

1.5 SUBMITTALS FOR REVIEW

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. All submittals shall be in accordance with General Conditions.
- C. Submit gradation and material analysis for ALL types of aggregate materials to Owner's Representative, for approval prior to ordering or delivering to site.
- D. Materials Source: Submit name of imported materials suppliers to Owner's Representative.
- E. Samples
 1. Foundation Aggregates
 - a. A three-pound (3 lb.) bag of proposed aggregate materials shall be

submitted for approval, with a sieve analysis and name of supplier attached. All samples shall be clearly labeled with Contract No., manufacturer, color, and finish.

2. River Cobble and River Jack
 - a. Submit samples showing color and size gradation.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with applicable state and local standards.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS

- A. AGGREGATE for Concrete Pavement

Material for Foundation shall be a straight run of single size aggregate and shall consist of either all one and one-half (1 1/2") inch stone or all three-quarter (3/4") inch stone in accordance with ASTM C33, free from organic or other deleterious material. In addition, Foundation Material may contain no more than five (5%) percent of fines, defined as aggregates passing a No.4 sieve or smaller.

- B. AGGREGATES FOR PRECAST CONCRETE PAVEMENT

1. Base Aggregate: Shall consist solely of crushed ledge rock and shall be broken stone or gravel as defined in Section B, free draining, well graded, uniformly mixed washed stone aggregate. The total thickness of the base stone aggregate shall be as indicated on the drawings. Materials shall meet the gradations shown below.

- a. Base Coarse Aggregate-3/4 inch material

Percent Passing by Weight	Sieve Size
100	1 1/2"
80-90	3/4"
30-65	3/8"
10-40	#4
0-10	#16
0-5	#200

- b. Base Fine Top Aggregate-3/8 inch material

Percent Passing by Weight	Sieve Size
100	1/2"
85-100	3/8"
10-30	#4
0-10	#8
0-2	#200

2. The aggregate must contain three and one-half to four percent (3½ - 4%) moisture content to ensure that fine particles don't migrate and to facilitate proper compaction. The Contractor shall provide certification from the source

plant that aggregate meets all requirements. If deliveries of base aggregate show segregation of sizes, material shall be deposited in stockpiles and thoroughly mixed prior to installation. Bank run gravel, rounded sands and recycled concrete material shall be rejected for use as base aggregate.

- 3. Joint Filler: Stone dust used for joints shall be #10 bluestone screening.
- 4. Joint Filler: Upon the completion of the work of laying the pavers in each section, to the satisfaction of the Commissioner, the surface of the pavers shall be swept clean, and the joints filled with fine sand. All joints shall be filled the same day as the pavers are laid. Stone dust not be applied if the pavers are wet or if the air conditions are such that the sand does not readily enter the joints. Stone dust shall be well worked into the joints by means of brooms or other approved devices operating slowly backward and forward and shall continue until the joints are flush with top surface. Immediately after the joints are filled, the pavement shall be lightly sprayed with water and cleaned.

C. Aggregate for Gravel and Paver Access Path

- 1. Broken Stone as specified in Section 02300 Earthwork.

2.2 STONE BORDER

- A. Hudson Valley River Stone, as supplied by Geo.Schofield, Inc., Bound Brook, NJ, or approved equal. Cobbles shall be naturally rounded cross-bedded sandstone and quartzite made up of multi-colored grays, tans and reds with a textured finish. Size: 4"-8".

2.3 RIVER COBBLE PAVEMENT

- A. Cobbles shall be Delaware River Building Stone, as supplied by Harmony Sand & Gravel, Belvidere, NJ, or approved equal. Cobbles shall be hand split, four (4) to six (6) inches thick and from three (3) to six (6) inches in width and from six (6) to eight (8) inches in length.
- B. Base Aggregate: Shall consist solely of crushed ledge rock and shall be broken stone or gravel as defined in Section B, free draining, well graded, uniformly mixed washed stone aggregate. The total thickness of the base stone aggregate shall be as indicated on the drawings. Materials shall meet the gradations shown below.

Base Fine Top Aggregate-3/8 inch material	
Percent Passing by Weight	Sieve Size
100	1/2"
85-101	3/8"
10-31	#4
0-10	#8
0-2	#200

- C. The aggregate must contain three and one-half to four percent (3½ - 4%) moisture content to ensure that fine particles don't migrate and to facilitate proper compaction. The Contractor shall provide certification from the source plant that aggregate meets all requirements. If deliveries of base aggregate show segregation of sizes, material shall be deposited in stockpiles and thoroughly mixed prior to installation. Bank run gravel, rounded sands and recycled concrete material shall be rejected for use as base aggregate.
- D. Joint Filler:
1. River Cobble with Sheet Moss: (See Section 02910)
 - 50% Base Fine Top Aggregate
 - 50% Topsoil for Planting Beds
 2. River Cobble at Vine Planting Pit:
 - Stone Dust, #10 bluestone screening
- E. Topsoil: As specified in Topsoil for Planting Beds. (See section 02910).

2.4 AGGREGATE FOR STONE DUST SETTING BED

- A. Stone Dust, #10 bluestone screening.

2.5 SOURCE QUALITY CONTROL

- A. Perform testing and analysis of aggregate material in accordance with ASTM C136.
- B. If tests indicate materials do not meet specified requirements, change material or material source and retest.
- C. Provide materials of each type from same source throughout the work.

PART 3 EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site as needed at locations designated by the Owner's Representative.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface

to prevent free standing surface water.

END OF SECTION

SECTION 02065 - STRUCTURAL SOIL

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

- A. It shall be the responsibility of the successful turf contractor to provide all labor, materials, equipment and tools necessary for the complete installation of structural soil as indicated in the contract documents.

1.4 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements.
B. Section 02300 Earthwork
C. Section 02740 Asphalt Concrete Pavement
D. Section 02930 Landscape Planting
E. Section 03700 Cement and Concrete for Exterior Improvements

1.5 DESCRIPTION

- A. Structural Soil is a designed medium which can meet or exceed pavement design and installation requirements while remaining root penetrable and supportive of tree growth. The structural soil material consists of the following components: crushed stone; clay loam; and hydrogel.
- B. The work includes all labor, materials, equipment and appurtenances for the complete execution of all work of this section as shown on the drawings, these specifications and conditions at the site, and shall include but not be limited to the following:

1. Testing off-site borrow soil, mulch, and amendment materials for approved use in structural soil mix. Verification testing of on-site sub-soils as required.
2. Furnishing material from approved off-site source(s) for structural soil mixes and furnishing other soil amendment materials.
3. Amending, preparing, and mixing structural soils for plant bed areas, throughout the life of the contract.
4. Preparing sub-grade at planting areas.
5. Preparation shall include amending and mixing structural soil with controlled fill material soil to the depths indicated for transition zones of each planting area.
6. Placing, spreading, and fine grading pre-mixed structural soils materials indicated for plant areas.
7. Protecting all plant mix installations with vinyl snow fencing, filter fabric, or other approved means as required until substantial completion. Substantial completion shall be defined as the point during the construction progress when the client has full use of the site for its intended use.

1.6 REFERENCES:

- A. Association of Official Agricultural Chemists.
- B. American Society for Testing and Materials (ASTM)

1.7 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional

requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Product Data:

1. Submit the manufacturer's license to produce the patented "CU Soil".
2. Submit technical descriptive data for each manufactured or packaged product of this Section. Include manufacturer's product testing and analysis and installation instructions for manufactured or processed items and materials.
3. Clay Loam: Submit test results for particle size, bulk density, pH, percent organic content by weight, nutrient levels including nitrogen, phosphorus, and potassium, soluble salts in ppm, and chemical analysis. In addition, submit the locations of all field sources for the clay loam and a list of all chemicals, insecticides, and herbicides applied to the clay loam in the previous five (5) years, and a list of all crops grown in the clay loam source fields in the previous three (3) years.
4. Crushed Stone: Submit test results for particle size, loose and rodded unit weight, bulk specific gravity, soundness, absorbance, and stone dimension description, as per ASTM D 4791, for the crushed stone.

C. Certificates:

1. Submit certified analysis for each soil treatment, amendment, and fertilizer material specified and as used. Include guaranteed analysis and weight for packaged materials.
2. Test Reports: Submit written reports of each sample tested. Soil tests must be unique and individual to each sample taken and are not be resubmitted or reused. Samples and analysis must be submitted within 14 calendar days of sampling. Each report shall include the following as a minimum and such other information required specific to material tested:
 - a. Date issued.
 - b. Project title and names of Contractor and material supplier.
 - c. Testing laboratory name, address and telephone number, and name(s), as applicable, of each field and laboratory inspector.
 - d. Date, place, and time of sampling or test, with record of temperature and weather conditions.
 - e. Location of material source.
 - f. Type(s) of test.
 - g. Results of tests including identification of deviations from acceptable ranges. Identify any toxic substance(s) harmful to plant growth or life.

D. Samples:

1. A three pound (3 lb.) bag of crushed stone shall be submitted with test results and contract name and number attached for approval prior to installation.

E. Statement(s) of Qualifications:

- D. Submit to confirm qualifications.

F. Schedule and Protection Plan:

- D. Submit a detailed plan for scheduling and sequencing of work and for protection of completed work including coordination with contractors requiring access through the site. Indicate with schedules and plans the utilization of erosion control (filter fabric) and protection against over compaction and contamination by means of (snow) fencing.

- G. Settlement methodology: Submit a plan with a schedule describing the proposed method intended for settling installed work.

1.8 QUALITY ASSURANCE

- A. All Structural Soil shall be mixed using appropriate soil measuring, mixing, and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. Structural soil must be mixed in the presence of the licensee, and no soil shall be placed until inspected by the licensee. No mixing of Structural Soil at the project site shall be permitted unless a large paved area is available for mixing and the site has been pre-approved for use by the Commissioner. No Structural Soil shall be mixed or placed in air temperatures below 40 degrees Fahrenheit or delivered or placed in frozen, wet, or muddy conditions. Material shall be delivered at or near optimal compaction moisture content, as determined by AASHTO T 99 (ASTM D 698). No material shall be delivered or placed in an excessively moist condition, beyond two percent (2%) above optimal compaction moisture content, as determined by AASHTO T 99 (ASTM D 698).
- B. Do not mix or transport structural soil when rain is expected. Place pavement immediately after placing and compacting structural soil to prevent excessive hydration.
- C. Structural Soil components and the finished mixture shall be protected from excess water absorption and erosion at all times. Do not store materials unprotected from rainfall, nor allow excess water to enter the site prior to compaction. If water is introduced into the material after grading, allow material to drain to near optimal compaction moisture content.
- D. The mixing procedure, performed by a front end loader shall proceed as follows: On a flat asphalt or concrete paved surface, spread an eight inch to twelve inch (8-12") layer of the specified crushed stone. Spread evenly over the crushed

stone a proportional amount of dry Hydrogel. Spread over the dry Hydrogel and crushed stone a proportional amount of clay loam. Blend the entire amount by using a front end loader or other suitable equipment until a consistent blend is achieved.

- E. Add moisture gradually and evenly during the blending and mixing operation as required to produce the required moisture content. Add soil amendments to alter soil fertility, including fertilizer and pH adjustment at the rates recommended by soil test results. The soil pH shall be adjusted to fall between 5.5 and 6.5 two months after mixing, if the material is stored. The soil component Carbon/ Nitrogen ratio shall be adjusted to be less than 1:33 within two months after mixing.
- F. The Contractor shall mix sufficient quantity in advance of the time the material is needed at the job site to allow adequate time for the required quality control testing. Storage piles shall be protected from rain and erosion by covering with plastic sheeting.

1.9 REGULATORY REQUIREMENTS

- A. Comply with all rules, regulations, laws and ordinances of local, state and federal authorities having jurisdiction. Provide labor, materials, equipment and services necessary to make Work comply with such requirements without additional cost to Owner.
- B. Procure and pay for permits and licenses required for work of this section.

1.10 PROJECT SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Perform both off-site mixing and on-site soil work only during suitable weather conditions. Do not disc, rototill, or work soil when frozen, excessively wet, or in otherwise unsatisfactory condition.
 - 2. Soil mixes shall not be handled, hauled or placed during rain or wet weather or when near or above field capacity.

1.11 PRODUCT INSTALLATION

- A. The Contractor shall notify the Commissioner of any subsurface conditions which will affect the Contractor's ability to complete the work, and shall locate and confirm the locations of all underground utility lines and structures prior to starting any excavation in the area to receive Structural Soil by calling New York City/Long Island Call One Center, (800) 272-4480. The Contractor shall be liable to repair any damage to underground utilities or structures caused by their activity during the progress of this work, at their own expense. Where tree roots larger than one inch (1") diameter are damaged, the Contractor shall ensure that damaged root sections are cleanly cut with sterilized pruning equipment.
- B. Structural Soil shall only be installed after the installation of all walls, curbs, footings, and utility work in the area has been completed. For site elements

dependent on the Structural Soil for foundation support, postpone installation until immediately after the installation of the Structural Soil. The Contractor shall be responsible for any and all damage caused by the installation of structural soil and all disturbed areas shall be restored to their original condition, to the satisfaction of the Commissioner.

- C. Site Preparation: The Contractor shall excavate and compact the proposed subgrade to the required depths and dimensions indicated on the drawings and as specified in Section 02300, Earthwork. Do not over excavate compacted subgrades of adjacent pavement or structures. Confirm that the subgrade is at the proper elevation and compacted as required. The excavation shall be cleared of all construction debris, trash, rubble, and foreign material.
- D. When planting trees in the Structural Soil, the rootball shall rest on the Structural Soil or the prepared subgrade at such a level that the crown of the tree is at finished grade. Cut and remove rope or wire from the top fifty percent (50%) of the rootball and pull the burlap back to the edge of the rootball, removing as much burlap and twine as possible. All plastic or synthetic product must be completely removed from the rootball at the time of planting. If soil is covering the crown, it must be removed so that the crown sits at the proper level. Any wire basket enclosed rootball will need to have at least two-thirds (2/3) of the basket cut away from the sides and top to prevent future root disturbance. Wire must not be galvanized or aluminum wire.
- E. Install the first six inch (6") lift of Structural Soil mix over the prepared subgrade. Install succeeding layers in six inch (6") lifts and compact each lift. Compact all materials to not less than ninety five percent (95%) of peak dry density from a standard AASHTO compaction curve (AASHTO T 99). No compaction shall occur when moisture content exceeds the maximum listed herein. Delay compaction at least twenty four (24) hours if moisture content exceeds the maximum allowable, and protect the Structural Soil during delays in compaction with plastic or plywood, as directed by the Commissioner.
- F. Prior to placing pavement, the licensed CU Soil provider and the Commissioner shall check the CU Soil material for consistency with the color and texture of the approved sample supplied by the Contractor. In the event that the material supplied varies significantly from the approved sample, the Commissioner may request that the Contractor test the installed Structural Soil. Any mix which varies significantly from the approved testing results, as determined by the Commissioner, shall be removed and new Structural Soil installed that meets the specifications.

1.12 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials to the location where soils are to be mixed, in unopened bags or containers, each bearing the name, guarantee, and trademark of the producer, material composition, manufacturers' certified analysis, and the weight of the material. Retain packaging for the Owner's Representative.

- B. Soil, mulch, or amendment materials stored on-site temporarily in stockpiles prior to placement shall be protected from intrusion of contaminants and erosion. Commissioner shall approve all temporary storage means and methods.
 - 1. After mixing, soil materials shall be covered with a tarpaulin until time of actual use. Ensure proper drainage away from stockpile.

PART 2 – PRODUCTS

2.1 General:

- A. Structural Soil Foundation Material: Shall conform with "CU Soil", as patented by Cornell University, patent #5,849,069. The product shall be obtained from a licensed producer and proof of such licensing shall be submitted to the Commissioner prior to delivery. Tri-State licensed providers as of this date are East Coast Mines, Quogue, NY, Evergreen Recycling of Corona, NY, Ascape Landscape, New City, NY or Country View Inc., Somerset, NJ. For further information on licensed providers or licensing requirements and application, contact Fernando Erazo at Amereq, Inc., New City, NY (patentholder rights granted to Amereq, Inc. by Cornell Research Foundation.) Structural Soil components shall be mixed by the licensed producer to the following proportions:

<u>Component</u>	<u>Unit of Weight (Dry)</u>
Crushed Stone	83%
Clay Loam	17%
Hydrogel	1 ounce per 200 pounds of stone

- B. Crushed Stone: Shall be crushed granite or traprock or washed limestone, no sandstone shall be accepted. No recycled material shall be accepted. Stone shall meet the AASHTO/ ASTM C33 requirements for #4 crushed angular stone graded within the following limits:

<u>Passing Sieve (dry analysis)</u>	<u>Percent by Weight</u>
2 inch	100%
1 1/2 inch	90-100%
1 inch	20-55%
3/4 inch	0-15%
3/8 inch	0-5%

Stone shall be clean and certified to meet NYCDOT aggregate soundness requirements for use in road construction. A single sized crushed stone near one-inch (1") will be preferable to a wider size distribution or smaller single size stone fitting the general description.

- C. Clay Loam: Shall be as determined by the USDA Classification System and mechanical analysis, as per ASTM D-422. Clay loam shall be of uniform composition, without admixture of subsoil, and free of stones greater than one-half inch (1/2") diameter, leaves, roots, debris, toxic materials, or lumps or clods over one inch (1") diameter. It shall have been obtained from naturally well drained areas which have never been previously stripped for topsoil and shall have a history of supporting satisfactory vegetative growth. It shall contain not

less than two percent (2%) nor more than five percent (5%) organic matter, as determined by loss on ignition of oven-dried samples, dried to a constant weight at a temperature of 230 degrees Fahrenheit, plus or minus 9 degrees Fahrenheit. Mechanical analysis for clay loam shall be as follows:

<u>Textural Class</u>	<u>Percent of Total Weight (Dry)</u>
Gravel	Less than 5%
Sand	25 - 30%
Silt	20 - 40%
Clay	25 - 40%

Clay loam shall meet or be amended to meet the following chemical analysis criteria:

1. pH between 5.5 and 6.5.
2. Organic matter 2 - 5 percent by dry weight.
3. Nutrient levels as required by the testing laboratory recommendations for the types of plants to be grown in the structural soil.
4. Toxic elements and compounds below the US EPA Standards for Exceptional Quality Sludge, or local standards, whichever are more stringent.
5. Soluble salts less than 1.0 millimho per cm.
6. Cation exchange capacity (CEC) greater than 10.
7. Carbon/ Nitrogen ratio less than 33: 1.

Clay loam shall be the product of a commercial processing facility specializing in production of stripped natural topsoil. No clay loam shall come from USDA classified prime farmland.

D. Slow Release Fertilizer: Commercial fertilizer shall comply with U.S. and N.Y State fertilizer laws. Fertilizer shall be delivered in original unopened containers. The fertilizer shall be 15-2-15 liquid slow release (50%), or approved equal, formulated for mixing into the soil and certified by the manufacturer to provide controlled release of nitrogen continuously for a period of no more than twelve (12) months. Fertilizer shall be delivered in original unopened containers, which shall bear the manufacturer's certificate of compliance covering analysis, and shall be furnished to the Commissioner.

E. pH Adjustment: To lower the clay loam pH to acceptable levels, commercial granular ferrous sulfate, ninety six percent (96%) pure sulfur may be added to lower soil pH above 6.5. To raise pH levels, the manufacturer may add agricultural limestone containing a minimum of eighty five percent (85%) carbonates. Minimum gradation: 100% passing 10 mesh sieve, 98% passing 20 mesh sieve, 55% passing 60 mesh sieve, and 40% passing 100 mesh sieve.

F. Hydrogel: Shall be Gelscape, a potassium propenoate-propenamamide copolymer hydrogel, as manufactured by Amereq, Inc., New City, N.Y., or approved tested equal. Substitution is not recommended, since small changes in the hydrogel structure greatly change the quality of the structural soil.

2.2. STOCKPILING:

- A. General: Stockpiling on-site, off-site and at source should be restricted to no more than the needs of what can be used in a 24 hour period.
- B. Under no circumstances shall on-site or off-site stored material exceed 50 c.y. Stockpiles should be no more than 6 feet in height to prevent anaerobic conditions within the pile(s). Stockpiles shall be sheltered from weather to prevent excessive water absorption and blowing by winds as approved by Owner's Representative.

2.3 SNOW FENCING AND FILTER FABRIC FOR SITE PROTECTION

- A. Snow Fencing: Shall be "Nature Shield" green polypropylene snow fencing as manufactured by Tensar Polytechnologies, Inc. 1210 Citizens Parkway, Morrow Georgia 30260 (770) 966-3255 and distributed by Bruce Fence 1161 New Loudon Road, Cohoes, New York 12047 (518) 783-8792 or approved equal. Metal line posts and plastic ties shall be as per manufacturer's recommendations.
- B. Filter Fabric: Shall be Marafi 40/30 N or approved equal.

PART 3 - EXECUTION

3.1 VERIFICATIONS

- A. For to construction and soil placement operations at planting areas, ascertain the location of all existing and proposed electric cables, conduits, under-drainage systems and utility lines. Take proper precautions so as not to disturb or damage sub-surface elements. Contractor failing to take these precautions shall be responsible for making requisite repairs to damaged utilities at Contractor's own expense.
- B. Verify that required underground utilities are available, in proper location, and ready for use. Coordinate with other trades.
- C. Verify that all work requiring access through or adjacent to areas where plant mixes are to be placed has been completed and not further access (other than Landscape installation) will be required. In the event that access will be required, this must be coordinated with the Owner's Representative.

3.2 PREPARATION OF SUB-GRADE

- A. Prior to dumping and spreading soils, the Contractor shall furnish and install grade stakes on a 15-foot grid in open areas and sufficiently spaced in other areas to insure correct line and grade of sub-grade and finished grade.
- B. Verify as constructed or existing sub-grade elevation and do whatever additional grading is necessary to bring the sub-grade to a true, smooth, slope parallel to the finish grade at all areas to receive transition and structural soil.
- C. Clean up sub-grade and dispose of all debris and garbage prior to inspection.

- D. Spray all vegetation on sub-grade with an emergent weed killer at a rate of application approved by the Architect, and government agencies with jurisdiction.
- E. Any soils polluted by gasoline, oil, plaster, construction debris, unacceptable soils, or other substances which would render sub-grade unsuitable for a proper plant growth shall be removed from the premises whether or not such pollution occurs or exists prior to or during the Contract period. In the event that such material is placed, this material shall be removed and replaced with approved material. All remedial operations associated with soil mixes and controlled fill shall be reviewed and approved by the Owner's Representative.

3.3 EXISTING SOIL CONDITIONS:

- A. Prior to placing soil, lightly scarify the surface of the sub-grade to insure proper blending of the sub-grade to new soil materials.
- B. Place and spread structural soil mix of the type specified over approved sub-grade to a depth sufficiently greater than the depth required for planting areas so that after natural settlement, misting and/or light rolling, as previously approved by the Owner's Representative, the completed work will conform to the lines, grades, and elevations shown or otherwise indicated.
- C. For Plant Bed Areas:
 - 1. Required structural soil depths shall be as indicated on drawings.
 - 2. Place fills lightly in layers of a maximum of six-inch (6") lifts and very carefully settle soils to eliminate air pockets and to minimize future settling. Lightly scarify previously placed surfaces prior to placing subsequent lifts. The Owner's Representative shall as previously approve proposed method of settlement. Method may include, but is not limited to, natural settlement over an approved period of time or light hand tamping and light water misting of each layer.
 - 3. After natural settlement has occurred, add soil to maintain finished grades. If for any reason soil is left exposed for a long duration prior to planting, add soil and regrade as required. Fills shall not be so compacted as to in any way restrict the flow of water or air through the soil.

3.4 GRADING TOLERANCES:

- A. Plant beds shall be fine graded within $\pm 1/24$ (0.04) feet of grades indicated on drawings. Maintain all "flat" areas and slopes to allow free flow of surface drainage without ponding.

END OF SECTION

SECTION 02120 - HARVESTING SYSTEM

PART 1 - GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this and Related Sections includes all labor, materials, equipment and services necessary to complete the harvesting system as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Installation of rainwater harvesting cistern, its fittings, accessories, and appurtenant work, at the location and to the lines and grades indicated on the Drawings.
 2. Installation of cistern-located submersible pump with related mounting sled, fasteners, tank fittings and adapters, water piping, electrical conduit and power cabling from the pump to the Treatment Works located in the building.
 3. Installation of cistern-located electronics with piping, mounting hardware and related fasteners, tank fittings and adapters, conduit piping and low voltage cabling to the Treatment Works located in the building.
 4. Installation of cistern pretreatment manhole and related fittings.
 5. Furnishing and installation of all materials required to connect to drain lines to be installed for building drainage and cistern refill capability.
 6. Installation of piping, valves and plumbing equipment, excluding control and treatment equipment specified in Sections 02130 and 02140, located in the location identified as Treatment Works in the building.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Mechanical and Plumbing requirements in Division 15.

- C. Electrical requirements in Division 16.
- D. Harvesting System Controls – Section 02130.
- E. Harvesting System Filtration and Treatment – Section 02140.
- F. Earthwork – Section 02300.
- G. Erosion Control – Section 02370.
- H. Water Distribution – Section 02510.
- I. Storm Drainage – Section 02630.
- J. Irrigation & Controller System – 02810.

1.4 QUALITY ASSURANCE

- A. **Manufacturer's Qualifications:** Firms regularly engaged in manufacturing of cisterns, harvesting systems, plumbing and storm drain system's products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than three years.
- B. **Installer's Qualifications:** Firms with at least three years of successful installation experience on projects with storm drain work similar to that required for the project.
- C. **Codes and Standards:** In addition to complying with all pertinent codes and regulations, comply with the following:
- D. **Environmental Compliance:** Comply with applicable portions of local Environmental Agency regulations pertaining to storm drain systems.
- E. Cistern is to be leak tested by pressurization to 5 psi for 2 hours with no drop in pressure or in accordance with product manufacturer guidelines, whichever is more stringent. Submit test procedure as noted in Submittals.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.

- 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. HARVESTING SYSTEM

1. Descriptive literature showing pipe and flange dimensions, pipe and joint materials and dimensions, and other details for each class or type of pipe or product to be furnished for this contract. All materials furnished under the contract shall be manufactured in accordance with these Specifications.
2. Product Data: Submit manufacturer's technical product data and installation instructions for cistern and other harvesting system equipment and materials listed in the Product section of this and related specifications.
3. Shop Drawings: The Contractor shall submit for review dimensioned shop drawings for cistern including all connections, appurtenances, striker plates and accessories. A separate shop drawing is required for the pump sled to be located in the cistern. Cistern to be furnished under the Contract shall be manufactured only in accordance with the Specifications and the approved Shop Drawings.
4. Maintenance Data: Submit maintenance requirements, guidelines and or data and

parts lists for water system materials and products. Include this data, product data, shop drawings, and record drawings in a system Maintenance manual in accordance with requirements of Division 1.

5. Test procedure for leak testing of cistern and cistern connections as noted in Quality Assurance.
6. Maintenance procedures for Pretreatment Manhole per manufacturer.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
 1. Components manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
 2. Adhesives or sealants used for work in this section shall meet the requirements of Green Building specifications, where applicable. Certification of these products shall be in accordance with the Submittal Requirements.

1.7 PRODUCT HANDLING

- A. Delivery and Storage
 1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.
 2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.
- B. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Ensure access to cistern is performed in accordance with OSHA and all other relevant codes and guidelines. Protect open access ports from accidental access and ensure access ports are secured whenever not being used for immediate access.

PART 2 - PRODUCTS

2.1 CISTERN

- A. The contractor shall provide a 10,000 Gallon, 8 FT. nominal diameter fiberglass reinforced plastic (FRP) Underwriters Laboratories-labeled underground storage tank manufactured by Containment Solutions Inc. (SWT G-6 (8' 10000)) or approved

equivalent as shown on the drawings. The dimensions, fittings and accessories shall be as shown on the drawings. Note that other tank manufacturers may have different requirements. Cistern shall be installed and connected in accordance with manufacturer's documentation. Where they may differ from these specifications, the manufacturer's guidelines, requirements and instructions shall govern.

- B. Internal tank appurtenances shall include access ladder, pump base, two (2) access ports ("Manways") with cover plate fittings and down-tube (or risers) and striker plates at tank bottom below both manways as shown on the drawings.
- C. Tank accessories shall include concrete deadmen anchoring blocks and stainless steel hold straps for anti-floatation protection. These accessories are to be as specified by the tank manufacturer.
- D. Backfill material and methods shall be per tank manufacturers specifications and guidelines. Note that other tank manufacturers may have different requirements.

2.2 CISTERN PUMP AND VARIABLE FREQUENCY DRIVE (VFD) CONTROLLER

- A. Cistern Pump shall be 4" diameter stainless steel submersible pump and pump end assembly with a 2" discharge orifice and internal check valve, capable of delivering up to 60 gallons per minute at 180 feet total dynamic head and running on either 230 VAC 1-Phase or 208 VAC 3-Phase power via dedicated circuit from a Variable Frequency Drive Controller located in the Treatment Works area of the building. Pump is to be installed and connected in accordance with manufacturer's documentation. Where they may differ from these specifications, the manufacturer's guidelines, requirements and instructions shall govern.
- B. Pump is to be sled mounted on frame made for the pump fabricated from type 304 stainless steel with 6 fastening points for attachment of pump to pump platform on cistern bottom using U-bolts or other approved fasteners. Fastening bolts are to utilize self-locking nuts. Pump is to be mounted at a 22 degree upward angle on the pump platform, with the higher end at the discharge port end of the pump.
- C. Variable Frequency Drive (VFD) Pump Drive Controller shall be mated to the pump motor and pump assembly and provided with the required power and voltage to support the pump motor. VFD is to be wall mounted in the Treatment Works location of the building. VFD shall be supplied with mated Pressure Sensor to be installed in the Treatment Works location as indicated on the drawings. VFD is to be installed and connected in accordance with manufacturer's documentation. Where they may differ from these specifications, the manufacturer's guidelines, requirements and instructions shall govern. VFD is to be provided with two (2) 4-20 mA input/output channels not otherwise used by the Drive and accompanying Pressure Sensor.
- D. Pump discharge pipe to be fitted on the (approximately) horizontal run with 2.0" I.D. braided stainless steel flex connector for pump vibration isolation, F-NPT x 150 lb. flange connector.
- E. Cistern Pump discharge piping shall be Schedule 80 CPVC pipe. Piping shall be provided in 20 ft. lengths for straight runs. Joints are to be fully cleaned, prepared and glued with PVC pipe primer and glue in accordance with these and related Sections.

Required piping is to be provided with bell and socket ends and laid in such a manner that the bell end of the piping is closest to the pump for all bell and socket joints.

2.3 CISTERN PRETREATMENT

- A. A cistern pretreatment manhole shall be provided as specified herein and as shown on the drawings. Manhole shall be a fully-assembled hydrodynamic particle separator, Model STC 450i as manufactured by Stormceptor, or approved equivalent. Filter is available from Amcrete Products of Newburgh, NY, or approved equivalent.
- B. Couplings to connect outlet pipes from filter shall be as recommended by the manufacturer or as specified in Section 02630, Storm Drainage.

2.4 WATER LEVEL SENSOR

- A. Ultrasonic Level Sensor shall be a Flowline EchoSpan Ultrasonic Level Transmitter, Model LU81-5101, available from Burt Process Equipment of Tyngsboro, MA, or approved equivalent.

2.5 PVC and CPVC PIPE

- A. General: Provide pipes of the following materials as indicated herein and on the drawings. Provide pipe fittings and accessories of same materials and class as pipes and with appropriate joining method. The piping shall be manufactured by an established manufacturer of good reputation in the industry and in a permanent plant adapted to meet all the design requirements of the pipe. Note that all plumbing work within the building footprint shall be performed by a licensed plumber.
- B. CPVC pipe shall be used for conveyance of harvested water from the cistern pump, through the Treatment Works and on to the irrigation system Point of Connection (POC). PVC pipe may be used for conveyance of municipal make-up water from the source to the Harvesting System.
- C. PVC and CPVC pipe shall be provided in 20 ft. lengths for straight runs. Joints are to be fully cleaned, prepared and glued with PVC pipe primer and glue in accordance with these and related Sections. Required piping is to be provided with bell and socket ends and laid in such a manner that the bell end of the piping is closest to the source of the water (e.g. upstream).
- D. CPVC Pipe
 - 1. CPVC Schedule 80: Provide CPVC pipe in Schedule 80 where shown on the Contract Drawings unless as specified otherwise herein. Pipe shall comply with ASTM F441/F441M and be manufactured from virgin PVC plastic conforming to ASTM D1784. Pipe shall be Underwriter's Laboratories listed for use in underground installations.
 - 2. PVC Schedule 40: Provide PVC pipe in Schedule 40 where shown on the Contract Drawings unless as specified otherwise herein. PVC pipe shall comply with ASTM D1785 and be manufactured from virgin PVC plastic conforming to ASTM D1784. Pipe shall be Underwriter's Laboratories listed for use in underground installations.

3. PVC and CPVC joints and solvent cements shall conform to ASTM 2564.

2.6 IDENTIFICATION

- A. Detectable Underground Warning Tapes: Acid and alkali-resistant polyethylene plastic film warning tape, 6-inches wide by 4-mils minimum thickness, with continuously printed caption in black letters "CAUTION - xxxxx LINE BURIED BELOW." The text and color of the tape shall be as shown in the table below. The tape shall have a metallic core encased in a protective jacket for corrosion protection and be detectable by a metal detector when the tape is buried up to 2.5-feet deep.

Color	Utility
Safety Red	Electric
High Visibility Safety Yellow	Gas, Oil, Steam
Safety Alert Orange	Telephone, Communications, Cable Television
Safety Precaution Blue	Water System, Irrigation
Safety Green	Sanitary Sewer, Storm Sewer
White	Proposed Excavation

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where equipment is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the required equipment.

3.2 INSTALLATION

- A. General: Install all underground elements in accordance with manufacturer's specifications and guidelines, applicable codes or Related Sections, whichever are more stringent.
- B. Install all equipment associated with Rainwater Harvesting System per manufacturer's specifications and guidelines and all applicable codes or Related Sections, whichever are more stringent.
- C. Install, connect and commission pre-treatment manhole prior to commissioning harvesting system. Once all fit-up of equipment and connections to cistern is complete, and immediately prior to commissioning harvesting system, thoroughly clean cistern and connected piping to ensure inflow pipes and cistern are free of accumulated liquid, mud, dirt, cuttings, trash and any other foreign matter. Cistern is

to be completely empty and free of debris, sediment and other material prior to system start-up.

END OF SECTION

SECTION 02130 - HARVESTING SYSTEM CONTROLS

PART 1 - GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and operating requirements for a control system that controls the functioning of the harvesting system and related equipment.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Mechanical and Plumbing requirements in Division 15.
- C. Electrical requirements in Division 16.
- D. Harvesting System – Section 02120.
- E. Harvesting System Filtration and Treatment – Section 02140.
- F. Water Distribution – Section 02510.
- G. Storm Drainage – Section 02630.
- H. Irrigation & Controller System – 02810.
- I. Building Energy Monitoring And Display –Section 13845.

1.4 SUMMARY

- A. A Harvesting System Control System ("System", "Platform", "Controls", "Controller(s)") shall be provided to monitor and control water management and treatment equipment

at the site and display state and performance status to an internet browser-based application and to one or more fixed displays at the site.

- B. The System is to be comprised of an on-site internet-connected control module and an off-site cloud-based processing environment. The on-site controller will be installed at the location of the Treatment Works.
- C. Provision, final connectivity and commissioning of the Controller shall be by Geosyntec Consultants, Inc. ("Geosyntec"), of Brookline, MA. The remote processing environment shall be the sole responsibility of Geosyntec. All other equipment associated with water management at the site shall be provided by the contractor as described in the Contract Documents.
- D. The Geosyntec-provided control module will be mounted in a NEMA 4X enclosure installed under this contract in the location described above. Provision of all related cabling, conduit, power, relays, internet access and connectivity shall be provided by the Contractor under this contract, including extending cabling through conduits to and into the Controller enclosure, where low voltage cabling is to be left loose for Geosyntec to make final connections. Power cables are to be terminated at disconnect boxes and GFI outlets proximate to the enclosure as shown on the Drawings.
- E. All work in this Section, as shown on Drawings or as specified herein, shall be in accordance with Contract Documents. This specification establishes the connectivity, power, signal, cable requirements and interoperability of the Controller and connected equipment.
- F. The Harvesting System Controller will be connected to the following equipment at the site:
 - 1. Cistern water level sensor;
 - 2. Variable Frequency Drive (VFD) Pump Drive Controller;
 - 3. Water meters (3);
 - 4. Refill solenoid valve;
 - 5. Dye injection pump relay;
 - 6. UV disinfection unit relay;
 - 7. Particle filtration differential pressure gauge;
 - 8. Irrigation system controller;
 - 9. Onsite rain gauge;
 - 10. System status panel with indicator lights;
 - 11. Processor integrated personal computer (PC) flat panel display driver.

1.5 SCOPE OF WORK

- A. The work of this Section includes, but is not limited to, the following:
 - 1. Controller enclosure cabinet;
 - 2. Controller cabling, power and control circuits;

3. Equipment listed in Part 2, Products;
4. Fasteners and Hardware;
5. Coordination with other trades;
6. Clean up.

1.6 REFERENCES

A. Standards: The following referenced standards and standard specifications, referred to thereafter by designation only, form a part of this Section:

1. Code: Comply with all State, Federal and Local ordinances and codes. All materials and work shall meet the requirements of entities listed in this Section and related Sections.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has at least three (3) years experience with projects utilizing similar control equipment, material and design to that indicated for this Project and with a record of successful in-service performance.

B. Testing and Acceptance:

1. System acceptance will be based on the successful testing of all functional requirements described herein. Full acceptance of the complete system is based on release of As-Built Drawings and successful commissioning of the system in accordance with the Operations and Maintenance Manual described in Part 1 of this Section.

C. Inspection for Substantial Completion

1. Contractor shall maintain the Rainwater Harvesting System through Substantial Completion. Maintenance shall include general protection from damage, access into structures by non-Contractor persons and freezing, where applicable, as specified herein.
2. Owner's Representative shall make an inspection of the System at the time of Substantial Completion:
 - a. Contractor shall submit a written request for inspection to the City of New York at least 14 calendar days prior to the day on which the inspection is requested;
 - b. Contractor shall prepare a punch list with status of items to be completed or corrected for review by the City of New York prior to inspection;
 - c. At time of Substantial Completion inspection, the Rainwater Harvesting System will be tested as part of the system-wide functional testing;

- d. Upon completion of the inspection, the City of New York shall amend Contractor's list of items to be completed or corrected as determined necessary and shall indicate the anticipated time period for their completion or correction.
3. The Harvesting System Control system will not be accepted until all items of the work have been completed or corrected. The Commissioner, after Contractor's acceptable completion of outstanding work, will recommend to the City of New York the Substantial Completion of the System work for this and related Sections.
 - a. Contractor's responsibility for maintenance shall terminate only upon issuance of acceptance by City of New York for Substantial Completion of all related Work of which this system may be a part, even if the Contractor chooses or is required to complete related work months in advance of Substantial Completion.

1.8 REFERENCES

- A. ASTM: American Society for Testing and Materials using test criteria as specified or required by other references.
- B. ANSI: American National Standards Institute.
- C. OSHA: Occupational Safety and Health Administration.

1.9 FUNCTIONAL REQUIREMENTS

- A. The Rainwater Harvesting System Control System shall provide monitoring and control of connected sensors and equipment at the site and automatically manage the function of connected equipment as described below.
- B. Specific logical instructions regarding equipment activation and/or de-activation, lead and lag times, control water elevations, seasonal scheduling and overall functionality are to be defined by Geosyntec Consultants as part of detailed control system logic development.
- C. Inputs to the Rainwater Harvesting System controller will be as follows:
 1. Cistern water level sensor;
 2. Variable Frequency Drive (VFD) Pump Drive Controller;
 3. Particulate filter differential pressure switch;
 4. Water meters (3);
 5. Onsite rain gauge;
 6. Weather forecast information made available via NOAA internet feed;
 7. Irrigation controller (state).
- D. Functions managed by the controls platform include (outputs):
 1. Variable Frequency Drive (VFD) Pump Drive Controller;

2. Refill valve operation;
3. Controller status panel indicator lights;
4. Dye injection pump;
5. UV disinfection unit;
6. Alerts associated with filter and disinfection units;
7. Flat panel display via processor integrated PC display driver;
8. Irrigation controller.

1.10 ELECTRICAL REQUIREMENTS

- A. Each control panel shall be powered from a dedicated 20 Amp 120 VAC 1-Phase, 50/60Hz 3-wire power circuit with the neutral conductor connected to ground. The Controller shall require no other power source other than the 120 VAC circuit and shall require no more than one connection to the mains. Required control voltages for contactors, relays and the like shall be developed within the Controller. Power disconnects and suitable fuses for the Controller shall be external to the Controller.
- B. Note that a separate 230 VAC 1-Phase circuit will be required for the cistern pump drive (VFD Pump Drive Controller) as well as a separate 20 Amp 120 VAC 1-Phase circuit to GFI outlets at the Treatment Works location as shown on the Drawings.

1.11 SUBMITTALS

- A. Product Cuts: Submit product cuts for all items listed in Part 2 – Products.
- B. Shop Drawing: Submit drawing showing integration of all components.

1.12 CABLING AND CONDUIT

A. Cable

1. Low Voltage: Low voltage cabling for connecting electronic devices shall be per manufacturer's specification. Unless otherwise specified, cabling shall be shielded 18-gage, 4-wire cables with 4 solid (not braided) conductors each cable.
2. Line Power: Power cabling for electrical circuits shall be as per local code size in accordance with manufacturer's requirements or guidance pertaining to equipment being connected.

B. Conduit – Electrical

1. Conduit used for installing cabling shall be as specified in Related Sections and as required by Code. Unless specified elsewhere, electrical conduit shall be standard metal electrical conduit in and above floor or slab areas and grey Schedule 40 PVC Electrical conduit below floor slabs and for below grade conduit runs as indicated on the Drawings.

PART 2 - PRODUCTS**2.1 CONTROLLER ENCLOSURE**

- A. A NEMA 4X enclosure shall be provided to house the Geosyntec-provided controller as indicated on the Drawings. Enclosure shall have approximate dimension of 24" W x 30" H x 12" D.

2.2 RAIN GAUGE

- A. The Rain Gauge for the project shall be mounted on the roof of the building in a location to be specified by the project Architect. The Rain Gauge shall be a Texas Electronics, Inc. Model TR-525i or approved equivalent, with optional MB-525 Pole Mounting Base and FC-525 Field Calibration Kit. Rain Gauge shall be installed in accordance with manufacturer's instructions.

2.3 PERSONAL COMPUTER (PC) DISPLAY DRIVER

- A. A processor-integrated flat panel display driver PC is required to deliver system information to the in-building flat panel display. Refer to Building Monitor Section for information on the flat panel display.
- B. The PC shall be provided with Microsoft Windows 7 or later operating system, 8 GB of RAM and 120 GB hard drive, and rated for continuous duty operation.

2.4 SYSTEM STATUS PANEL

- A. A system status panel shall be provided as shown on the Drawings with surface mounted LED indicator lights with labeling to indicate the following states:
 - 1. Pump on (green);
 - 2. Refill on (green);
 - 3. Dye injection pump on (green);
 - 4. Differential pressure gauge thresholds reached (intermediate – yellow, upper limit - red);
 - 5. UV disinfection unit maintenance.

PART 3 - EXECUTION

(Not used)

END OF SECTION

SECTION 02140 - HARVESTING SYSTEM FILTRATION AND TREATMENT

PART 1 - GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the harvesting system filtration and treatment system as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Installation of rainwater harvesting system filters, water quality treatment equipment and related valves, piping, tubing, sensors and controls, accessories, and appurtenant work, at the location and to the lines and grades indicated on the Drawings.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Mechanical and Plumbing requirements in Division 15.
- C. Electrical requirements in Division 16.
- D. Harvesting System – Section 02120.
- E. Harvesting System Controls – Section 02130.
- F. Earthwork – Section 02300.
- G. Erosion Control – Section 02370.
- H. Water Distribution – Section 02510.
- I. Storm Drainage – Section 02630.
- J. Irrigation & Controller System – 02810.

1.4 QUALITY ASSURANCE

- A. **Manufacturer's Qualifications:** Firms regularly engaged in manufacturing of filtration and water quality treatment system's products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. **Installer's Qualifications:** Firms with at least three (3) years of successful installation experience on projects with storm drain work similar to that required for the project.
- C. **Codes and Standards:** In addition to complying with all pertinent codes and regulations, comply with the following:
- D. **Environmental Compliance:** Comply with applicable portions of local Environmental Agency regulations pertaining to water quality treatment systems.
- E. **Testing and Acceptance**
 - 1. Pressurized water supply components shall be joined with welds, threaded connections with Teflon tape and pipe thread sealant or other standard plumbing techniques where threaded connections are required, and with glued joints elsewhere (except at pipe Union connections where no joinery is required), and be suitable for static pressure testing to 125 psi or per applicable code, whichever is higher, with no leakage for project acceptance. Any leaks shall be immediately rectified by the Contractor.
 - 2. Full acceptance of the complete system is based on release of As-Built Drawings and successful commissioning of the system in accordance with the Operations and Maintenance Manual described in this Section.
- F. **Inspection for Substantial Completion**
 - 1. Contractor shall have Safety Elements related to the Water Quality Treatment System installed, tested, and approved prior to installation, filling and/or storage of chemical and reagent tanks and System startup. Safety Elements include, but are not limited to, emergency shower/eyewash and ventilation system. Installers shall also ensure that appropriate reagent Material Safety Data Sheets (MSDS) and Personal Protective Equipment (PPE) such as aprons, gloves, and face shield are available and accessible at the Treatment system location. Safety elements shall be in accordance with OSHA standards or local codes, whichever are more restrictive.
 - 2. Contractor shall maintain system until Substantial Completion. Maintenance shall include general protection from damage, access into structures by non-Contractor persons and freezing, where applicable, as specified herein.
 - 3. Owner's Representative shall make an inspection for Substantial Completion of the system at the time of Substantial Completion.

- a. Contractor shall submit a written request for inspection to the Owner's Representative at least 14 calendar days prior to the day on which the inspection is requested;
 - b. Contractor shall prepare a list with status of items to be completed or corrected for review by the Owner's Representative prior to inspection;
 - c. Upon completion of the inspection, Owner's Representative shall amend Contractor's list of items to be completed or corrected as determined necessary and shall indicate the anticipated time period for their completion or correction.
4. Treatment system will not be accepted until all items of the work have been completed or corrected. The Owner's Representative, after Contractor's acceptable completion of outstanding work, will recommend to the City of New York the Substantial Completion of the Treatment System work for this and related Sections.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.

- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. HARVESTING SYSTEM FILTRATION AND TREATMENT SYSTEM

1. Descriptive literature showing pipe and flange dimensions, pipe and joint materials and dimensions, and other details for each class or type of pipe or product to be furnished for this contract. All materials furnished under the contract shall be manufactured in accordance with these Specifications.
2. Product Data: Submit manufacturer's technical product data and installation instructions for filtration and water quality treatment systems and related equipment and materials listed in the Product section of this and related specifications.
3. Shop Drawings: The Contractor shall submit for review dimensioned shop drawings for the filtration and treatment system including all connections, appurtenances and accessories.
4. Maintenance Data: Submit maintenance requirements, guidelines and or data and parts lists for filtration and water quality treatment system materials and products. Include this data, product data, shop drawings, and record drawings in a system Maintenance manual in accordance with requirements of Division 1.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
 1. Components manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
 2. Adhesives or sealants used for work in this section shall meet the requirements of Green Building specifications, where applicable. Certification of these products shall be in accordance with the Submittal Requirements.

1.7 PRODUCT HANDLING

- A. Delivery and Storage

1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.
 2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.
- B. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.
- 1.8 PROJECT CONDITIONS
- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

PART 2 - PRODUCTS

2.1 FINE FILTRATION

- A. Particulate Filtration: Particulate filtration as shown on the Drawings shall include two (2) high-capacity aluminum canister bag filters in series and a single wall-mounted ultra-fine (5 micron) particulate filter.
- B. The two floor-mounted canister filters are to be manufactured by Micron Technologies, Model 66 Aluminum Bag Filter Housing, Part No. H668 GP150 AL2 B CL-2.0 P-P1/4-DPP, or approved equivalent. Filters are to be provided with a bottom drain outlet to facilitate draining for maintenance. Filters are available from Engineered Filtration Inc. of Manchester, CT.

The filter media for the canister filters shall be a 250 micron strainer basket filter (60 Mesh) for the upstream filter and a 50 Micron high-efficiency extended life polyester bag filter for the downstream filter. Filter housing shall be fitted with Differential Pressure gauge and switch assembly to provide visual alarming for filter clogging.

- C. The ultra-fine 5 micron particulate filter shall be a wall-mounted canister filter housing and filter cartridge assembly. Filter cartridge shall be a 20" long Pentek 5 micron 20 gallon-per-minute (gpm) cellulose polyester filter cartridge (Mfg. No. ECP5-20BB) or approved equivalent cartridge. Filter housing shall be a Pentek Big Blue cartridge housing compatible with the above filter cartridge (Mfg. No. 150233-75) or approved equivalent cartridge. Filter and cartridges available from Granger supply.

2.2 ULTRAVIOLET ("UV") DISINFECTION UNIT

- A. UV disinfection unit shall be a model UV Sterilizer 25 gpm as provided by Conservation Technology of Baltimore, MD with 1.5" fittings, or approved equivalent. Unit shall be provided with automatic maintenance and self-cleaning capability.

2.3 ACTIVATED CARBON CHARCOAL FILTER

- A. Activated carbon filter shall be a wall mounted canister filter housing and filter cartridge assembly. Filter cartridge shall be a 20" long Aqua-pure AP817-2 filter or approved equivalent. Filter housing shall be a Pentek Big Blue cartridge housing compatible with the above filter cartridge (Mfg. No. 150233-75) or approved equivalent cartridge. Filter and cartridges available from Granger supply.

2.4 GAGES, METERS AND SENSORS

- A. Pulse Water Meters shall be Omega Model FTB8015B-PR water meter, 1.5" dia. couplings and having analogue dial and pulse indication for Totalizer and Rate monitoring, or approved equivalent.
- B. Differential Pressure Switch
 - 1. Differential Pressure Switch shall be an Orange Research Model 1203PGS-SPST N/C (Normally Closed) pressure switch available from Meridian Cooper of Meridian, CT, or approved equivalent. Switch shall have an analogue dial read-out, relay and transmitter for 24 VDC output signal and be mounted in NEMA 4 enclosure. Switch shall have 1/4" NPT fittings for connection to filter.
 - 2. High pressure port of switch must be plumbed to upstream side (or inlet port) of particulate filter. Refer to manufacturer's installation instructions for proper mounting and configuration.
 - 3. Switch shall be wall-mounted proximate to the particulate filter in a non-metallic NEMA 4 rated enclosure powered by a 120 VAC circuit. Relay contact shall enable a red 110 VAC dome light mounted on the top of the NEMA 4 enclosure.
 - 4. Differential pressure gauge and switch shall have a range of 0 - 30 psi with a warning threshold of 15 psi and a system shut-down pressure of 25 psi.

2.4 HYDRO PNEUMATIC PRESSURE TANK

- A. The pressure tank as shown as part of the Treatment Works on the Drawings shall be an Amtrol Well-X-Trol WX-102 4.4 gallon in-line hydro pneumatic pressure tank or approved equivalent.

2.5 DYE STORAGE AND INJECTION SYSTEM

- A. Dye injection pump and dye storage system shall be an integrated tank and feed pump assembly with 7.5 gallons of storage with diaphragm pump powered by a single 120 VAC 1-Phase circuit and capable of delivering 100 psi line pressure. Tank and feed pump assembly shall be a Mec-O-Matic Model 7P075, or approved equivalent.
- B. Dye solution shall be green colored food-grade dye concentrate available from Escofoods of San Francisco, CA or approved equivalent.

2.6 STATIC MIXER

- A. Static mixer shall be a 1" inline flow mixer model #3/4-80-4-12-2 10 gpm as manufactured by Koflo and available from Atlas Water Systems of Waltham, MA, or approved equivalent.

2.7 CPVC PIPE

- A. General: Provide pipes of the following materials of class indicated. Provide pipe fittings and accessories of same materials and class as pipes with joining method, as indicated. The piping shall be manufactured by an established manufacturer of good reputation in the industry and in a permanent plant adapted to meet all the design requirements of the pipe.
- B. CPVC pipe used for conveying water from the Cistern to the building and from the building to the irrigation system Point of Connection (POC) shall have bell-and-socket ends. Note that all plumbing work within the building footprint shall be performed by a licensed plumber.
- C. CPVC Pipe
1. CPVC Schedule 80: Provide CPVC pipe Schedule 80 where shown on the Contract Drawings unless as specified otherwise herein. Pipe shall comply with ASTM D1785 and be manufactured from virgin PVC plastic conforming to ASTM D1784. Pipe shall be Underwriter's Laboratories listed for use in underground installations.
 - a. Joints and solvent cements shall conform to ASTM 2564.

2.8 IDENTIFICATION

- A. Detectable Underground Warning Tapes: Acid and alkali-resistant polyethylene plastic film warning tape, 6-inches wide by 4-mils minimum thickness, with continuously printed caption in black letters "CAUTION - xxxxx LINE BURIED BELOW." The text and color of the tape shall be as shown in the table below. The tape shall have a metallic core encased in a protective jacket for corrosion protection and be detectable by a metal detector when the tape is buried up to 2.5-feet deep.

Color	Utility
Safety Red	Electric
High Visibility Safety Yellow	Gas, Oil, Steam
Safety Alert Orange	Telephone, Communications, Cable Television
Safety Precaution Blue	Water System, Irrigation
Safety Green	Sanitary Sewer, Storm Sewer
White	Proposed Excavation

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Complete installation in accordance with these specifications and all applicable codes and regulations.
- B. System calibration and start-up shall be included.
- C. Upon completion, the manufacturer shall provide three sets of complete bound Installation, Operation and Maintenance Manuals, including component maintenance instructions and recommended maintenance schedule, system drawings, recommended spare parts, and trouble-shooting guide.

END OF SECTION

SECTION 02205 - PROTECTION, DEMOLITION AND RELOCATION OF EXISTING UTILITIES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents. The Contractor must accept the site as is and shall be deemed to have inspected the site and reviewed all Contract Documents.

1.2 SECTION INCLUDES

- A. Overall work under this Contract shall include all labor, materials, equipment, supervision, coordination efforts, permitting costs, certificate costs, services, filing fees, testing costs, security, insurance and all other associated or related items specified herein that are necessary and are required to complete the Work. Work elements shall include, but not be limited to the following:
 - 1. Identification and field markout of all on-site utility lines to remain in operation and/or be relocated during construction.
 - 2. Submission of procedures to be used to ensure the safety of the utility.
 - 3. Disconnecting and capping or removal of identified utilities and in-service unidentified utilities encountered during demolition.
 - 4. Repair of any damage during construction operations.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Section 02300 – Earthwork
- B. Section 02370 – Erosion Controls
- C. Section 02455 – Timber Piles
- D. Section 02510 – Water Distribution
- E. Section 02521 – Decommission Groundwater Wells
- F. Section 02530 – Sanitary Sewerage
- G. Section 02550 – Natural Gas Distribution
- H. Section 02630 – Storm Drainage
- I. Section 02731 – Sanitary Pump Station
- J. Section 02740 – Asphalt Concrete Pavement
- K. Section 02890 – Traffic Signage
- L. Section 03700 – Cement and Concrete for Exterior Improvements

- M. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.

1.4 ENVIRONMENTAL CONSIDERATIONS

- A. Install erosion control measures as shown on the plans or as directed by the Commissioner or regulatory agencies to protect adjacent properties and water resources from erosion and sediment damage.

1.5 QUALITY ASSURANCE

- A. Perform work specified herein and shown on the Contract Drawings in compliance with applicable requirements of the New York City Building Code and requirements of all state and local authorities, and utility companies having jurisdiction.
- B. The Contractor shall obtain and pay for any permits, bonds, licenses, etc., required to complete the work.
- C. The Contractor shall conduct any work within street or highway right-of-ways in accordance with the requirements of the governmental agencies having jurisdiction and shall not begin until these governing authorities have been notified. The Contractor shall restore to their present conditions any public right-of-way that is disturbed by the work under this section except as noted otherwise in the Contract Documents. All pavement restoration work in public rights-of-way shall be performed to the proper satisfaction of the governmental agencies having jurisdiction.

1.6 SUBMITTALS

- A. Prior to the commencement of work, the Contractor shall submit to the Commissioner record copies of all required permits and certificates obtained for the work in this section. The Contractor shall incur all fees and other requirements associated with obtaining the required permits and certificates.
- B. A pre-construction and post-construction survey of the condition of all utilities to remain in operation during construction shall be performed by the Contractor.
- C. Accurately record actual locations of capped utilities, utilities to remain and utility lines encountered during construction.
- D. Design mix for low slump concrete flowable fill; for use in filling abandoned utility pipes noted to remain in place.

1.7 REGULATORY REQUIREMENTS

- A. Notify affected utility companies and Commissioner before starting work and comply with their requirements.

1.8 PROJECT / SITE CONDITIONS

- A. Variations to conditions or discrepancy in actual conditions as they apply to site preparation operations are to be brought to the attention of the Commissioner prior to the commencement of any site work.

PART 2 - PRODUCTS

2.1 FLOWABLE FILL

- A. Low slump concrete approved by the Commissioner.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is responsible for the disconnection, abandonment, demolition and off-site disposal of utility pipes, duct banks, structures and related appurtenances as directed in the Contract Documents. All utilities to be disconnected shall be demolished and removed in their entirety unless filling and abandonment are specifically noted in the Contract Documents.
 - 1. The Contractor shall arrange for the owning company / agency of each utility to be "abandoned," "demolished," "capped," or "removed" to visit the site and confirm disconnection of the utility service from the main. With written confirmation of the disconnect from the main utility line, the Contractor may commence demolition of the service within the project site, as required by the Contract Documents.
- B. All materials shall be disposed off-site in accordance with all applicable Federal, State, County and Local codes and regulations governing legal transportation and disposal of work.

3.2 VERIFICATION OF CONDITIONS

- A. Verify the existence, limits, size, type and location of all utilities in the area of work.
- B. Compare field-located utility facilities with those shown on the project survey.
- C. Notify the Commissioner in writing prior to commencement of Work of any discrepancies.

3.3 PREPARATION AND PROTECTION

- A. Shoring, designed and permitted by the Contractor's New York State Licensed Professional Engineer, shall be used to protect adjacent street and sidewalk pavements and subgrades, existing underground tanks to remain and other subsurface features not scheduled for demolition, or that require continued use until such time that their demolition and removal is appropriate.
- B. Additional shoring may be installed as part of the Contractor's means-and-methods of construction. The Contractor shall protect existing utilities noted to remain in accordance with utility company requirements and all local regulations. Any damage to existing utilities shall be repaired at the contractor's expense.
- C. Conduct operations with minimum interference to public or private accesses and facilities. Maintain access and egress at all times and clean or sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by the owner, dust control shall be provided with sprinkling systems or equipment provided by the Contractor.

- D. It is the Contractor's responsibility to verify all existing site conditions below the surface, prior to commencing work. Any discrepancies between the information shown on the Contract Drawings shall be brought to the attention of the Commissioner in writing prior to commencing work.
- E. It is mandatory, as per New York State Code Rule 753 (also referred to as Part 753, Industrial Code 53 or Code 53), for the Contractor to notify New York 811 (www.newyork-811.com, Tel. 1-800-272-4480 or 811, Fax 1-800-524-7599), in addition to all underground facility operators in the area who are not one-call members, not less than two full business days and not more than ten full business days before commencing excavation. The Contractor will receive a notification ticket from the one-call center which should be presented to the Commissioner as proof of the call.
- F. Do not interrupt existing utilities during occupied hours, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided. Provide minimum of 48-hour notice to the Commissioner, and receive written notice to proceed before interrupting any utility.
- G. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed it shall be referenced by a Registered Land Surveyor and replaced, as necessary, by Contractor at no cost to the owner.
- H. Flag, barricade or suitably protect existing utilities during construction operations and equipment movement.
- I. At a minimum, Contractor shall provide timber mats at locations where equipment will cross existing utilities. Provide any other safety measures and follow any additional procedures requested by the City of New York and the utility owner.

3.4 EXCAVATION

- A. Contact local utility companies before excavation begins. Cut trench banks for safety and remove stones as necessary.
- B. All trench excavation side walls shall be sloped, shored, sheeted, braced or otherwise supported by means of sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances.
- C. During excavation, stockpile excavated material suitable for backfilling in an orderly manner far enough from the trench to avoid overloading, slides, or cave-ins.
- D. Remove excavated materials from the site which are not suitable for backfill.
- E. Any abandoned structures, utilities, or debris discovered during excavation shall be removed and disposed of, or capped.
- F. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or other acceptable methods. Water shall not be directly pumped to the city sewer system or open waters.

- G. Trench width requirements for relocated pipe, conduit, or cable shall be the minimum practical width that will allow for proper compaction of trench backfill and satisfy safety and utility company regulations.
- H. Refer to the other specification sections in this contract regarding the installation of new / relocated utilities of various types.

3.5 REPAIRS

- A. Any damage to existing, operational utilities by the Contractor or his subcontractors during the on-going construction operation shall be immediately repaired with the least impact to the operational facility to operational standards at the contractor's expense. If the repairs are not immediately addressed by the contractor, the utility owner and/or the City of New York will contract for the repair at the contractor's expense.
- B. Preconstruction and post construction condition surveys shall be conducted by the Contractor. Any damage to the utilities shall be repaired to the condition identified in the preconstruction survey. The utility owner shall determine the acceptability of any repairs.

3.6 DISPOSAL OF MATERIALS

- A. Remove from site debris, rubbish and other materials resulting from underground demolition operations.
- B. No burning of any material, debris or trash on-site or off-site will be allowed.
- C. Legally transport demolition debris with appropriate vehicles, and dispose of off-site to areas approved by governing authorities and the owner.

END OF SECTION

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SECTION 02230 - TREE PROTECTION AND TREE PRUNING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. The Contractor shall retain the services of a licensed arborist to monitor condition of the existing trees throughout the construction process and to provide such services as are required to maintain the health of the existing trees.
- B. Furnish and install temporary snow fence boundary for tree protection.
- C. Protect existing tree roots
1. 6" wood chips protection layer.
 2. Temporary plywood or ground surface protection mats where construction activities are scheduled to take place beneath the drip lines of trees.
- D. Preparatory pruning of trees as directed by the Owner's Representative.
- E. Fertilization of existing trees,

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements.
- B. Section 02316 Pneumatic Excavation
- C. Section 02740 Asphalt Concrete Pavement
- D. Utility Service Distribution Sections.

1.4 SUBMITTALS FOR REVIEW

- A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.5 TREE PROTECTION

- A. Protection and maintenance of existing trees shall be performed by qualified tree specialists at the direction of an Arborist or Tree Surgeon approved by the Owner, henceforth to be referred to as "Arborist." The Arborist shall recommend any treatment, materials and labor required to ensure the good health of the trees. Tree specialists approved by the Arborist and employed by the Contractor shall be responsible for implementing said treatment, materials and labor.
- B. It is the contractor's responsibility to check and verify all site conditions, both above and below the surface, prior to commencing work. Any discrepancies between information shown on the drawings and actual field conditions should be brought to the attention of the Owner in writing, prior to the commencement of work.
- C. Any damage to existing trees during construction shall be the contractor's responsibility. The contractor shall mitigate such damaged trees to the satisfaction of the owner, at the contractor's expense.
- D. Preparatory pruning work shall be performed where required and as directed by the Arborist. This work shall be performed in accordance with ANSI A300 standards.

- E. The temporary tree protection fence boundary shall be maintained in its original location throughout the course of the contract.
- F. The contractor shall take extreme care to protect the root systems of existing trees. Bulk material, equipment, or vehicles shall not be stockpiled or parked within the dripline of any tree, or within 10 ft. of the trunk (whichever is greater) to minimize surface and subsurface root and soil compaction. This applies to all areas within or outside the contract limit line.
- G. Activity within the drip line of existing trees, where deemed necessary, shall be mitigated as follows: the affected root zone of the tree(s) shall be covered with mulch to a depth of at least six (6") inches and/or with plywood in order to protect roots from damage caused by heavy equipment. Such covering shall be maintained during the course of construction and removed by hand at the conclusion of construction activities.
- H. Any excavation within the dripline, or elsewhere on site, as indicated on tree protection plan, shall be done by hand or by pneumatic excavation and in the presence of the Arborist.
- I. Roots over one (1") inch in diameter shall not be cut without the approval by the Arborist.
- J. The contractor shall exercise extreme care in removing concrete or asphalt within the dripline of existing trees - lifting rather than dragging pieces of paving.
- K. The excavation area within the dripline shall be backfilled immediately and/or roots shall be kept constantly moist with burlap covered with white plastic and checked a minimum of two (2) times a day, once in the morning and once in the afternoon, for a maximum of forty-eight (48) hours, until backfill is complete. If directed, soaker hoses shall be installed to facilitate properly moist conditions. No pooling of water or continuous running water shall occur within the drip line of existing trees or within the tree protection zones other than that during the irrigation process.
- L. If roots are to be exposed for a period greater than 48-hours, the exposed area shall be covered with at least 6-inches mulch and maintained during the course of construction until the area can be properly backfilled.

PART 2 PRODUCTS

2.1 TREE PROTECTION – SNOW FENCE

- A. Snow fence shall be 4'-0" in height, constructed of either wood or plastic, as described below.
 - 1. Fabric: Shall be commercially woven wood slats and wire or high-density polyethylene. Color to be bright orange.
 - 2. Line Posts: Shall be two and one-half (2 1/2) inch diameter steel stakes.

3. Tie Wire: For wood fence shall be aluminum or steel ties. For plastic shall be general-purpose heavy plastic ties.

2.2 TREE PROTECTION WITH WOODCHIPS

- A. Wood Chips shall be clean chips free of any deleterious material such as ash or insecticide.
- B. Chips may be of any wood except wood waste generated from an Asian Longhorned beetle infestation. Wood chips produced on the site may also be used for this work. Chips shall be derived from tree material, not from wood waste or by-products like sawdust, shredded palettes, or other debris.

2.3 TREE PROTECTION WITH PLYWOOD OR CONSTRUCTION MATS

- A. Plywood: shall be new or gently used four (4) foot by eight (8) foot sheets with a minimum thickness of one-half ($\frac{1}{2}$) inch. CCA treated lumber is not acceptable for this Work. Hardware to fasten plywood sheets, if necessary, shall be corrosion resistant steel.
- B. Ground surface protection mats: shall be manufactured from high-density polyethylene (HPDE), one-half ($\frac{1}{2}$) inch thick minimum, measure approximately four (4) foot by eight (8) foot, be equipped with a lip on two sides that creates an overlapping joint with an adjoining mat to allow for effective load distribution between mats, have an interlocking mechanism consisting of multiple connection points uniformly spaced along the full length of the overlapping lips of adjacent mats with fixed locking pins, and a potential load bearing capacity of at least 60 tons dependent upon sub-surface properties. Mats shall be similar to "Dura Deck" as manufactured by Signature Fencing & Flooring, NY, NY or "AlturnaMATS" as manufactured by Alturnamats, Inc. Titusville, PA, or approved equal.
 1. Plywood sheets or ground surface protection mats shall be installed as a temporary protection for tree roots during construction operations and shall become the property of the Contractor after they are no longer required on site and be removed from the site at his expense.

2.4 TREE PRUNING AND FERTILIZATION

- A. Fertilizer: Fertilizer shall be Mycor Tree Root Saver, as manufactured by Plant Health Care, Inc., Pittsburgh, PA, or approved equal, and shall have the following composition by weight: Nitrogen - three percent (3%), Phosphate - four percent (4%), and Potassium - three percent (3%)., Calcium – five percent (5%), Sulfur – two and one-half percent (2.5%), Magnesium – one-half percent (0.5%), and Iron – one-third percent (0.33%).
- B. In addition, the fertilizer shall contain a minimum three hundred (300) live spores of Vesicular – Arbuscular (VA) endomycorrhizal fungi per six ounce (6 oz.) scoop, including Entrophosphora columbiana, Glomus etunicatum, Glomus clarum, and Glomus sp. It shall also contain a minimum ten million (10,000,000) live spores of ectomycorrhizal fungi per six ounce (6 oz.) scoop, including

Pisolithus tinctorius. The product shall provide approximately one hundred million per pound of nitrogen fixing, phosphorus solubilizing, and growth promoting beneficial bacteria.

- C. The product shall also provide a minimum thirty percent (30%) by weight of humic acid derived from natural humates, Yucca schidigera extract as a wetting agent, sea kelp extract biostimulants derived from Ascophyllum nodosum, acrylamide gel as a water absorbent.

PART 3 EXECUTION

3.1 TREE PROTECTION – SNOW FENCE

- A. The steel stakes shall be driven into the ground to a depth of two (2) feet. Fabric shall be secured to line stakes with three-sixteenth (3/16) inch aluminum or steel tie wire or plastic ties spaced eighteen (18) inches apart on posts. LINE POST SPACING SHALL NOT EXCEED EIGHT (8) FEET ON CENTER.
- B. The Contractor shall maintain the temporary snow fence boundary during the life of this contract and shall repair or replace all members that are disturbed, damaged, destroyed or vandalized at no extra cost to the City. Upon completion of the work, the fence shall be removed and shall become the property of the Contractor.
- C. RELOCATION: At no extra cost to the City of NY, the City of NY reserves the right to direct the Contractor to remove and reinstall snow fence within the Contract limit line. The Contractor may be asked to relocate the fence a maximum of three (3) times in excess of the initial installation.
- D. Contractor is also responsible for restoration of any lawn or pavement disturbed by fence or in areas adjacent to fencing, after removal of fencing is completed. The cost of the restoration shall be included under this item

3.2 TREE PROTECTION WITH WOODCHIPS

- A. METHOD: Wood Chip Mulch for temporary Tree root Protection during construction shall be applied to the surface of the Tree Protection Area as shown on the plans or as directed by the Commissioner. Mulch shall be applied to a uniform depth of SIX (6") inches over the entire area and shall be so distributed as to create a smooth level cover.
- B. Wood Chips to protect existing roots shall remain in place and not be moved or removed until all work which might cause soil compaction or root damage has been completed
- C. If any wood chips are dislocated or depleted during the course of the work, they shall be immediately replaced, or replaced by a new woodchips at no additional cost to the City of NY. At the completion of the work of this contract the Contractor shall remove the wood chip mulch by hand or as specified by the Arborist. The wood chips shall become the property of the Contractor and disposal shall be his responsibility.

3.3 TREE PROTECTION WITH PLYWOOD OR CONSTRUCTION MATS

- A. The Contractor shall place plywood sheets and/or ground surface protection mats as directed by the Commissioner. The Contractor shall saw cut and fasten plywood sheets if necessary to fit into tree root areas. The Contractor shall place and fasten ground surface protection mats throughout the tree root areas over lapping the perimeter, rather than leaving tree root areas exposed. Plywood/Ground surface protection mats shall remain in place and not be moved or removed without written permission of the Commissioner's representative until all work which might cause compaction or root damage has been completed.
- B. If any plywood/ground surface protection mat is dislocated, damaged, or destroyed during the course of the work, it shall be immediately replaced by new or gently used plywood/ground surface protection mat at no additional expense to the Commissioner. All hardware shall be removed from the site when plywood/ground surface protection mat is relocated or removed. Plywood sheets/ground surface protection mats and all associated hardware shall be removed as necessary to facilitate construction and when they are no longer required on site as determined by the Commissioner. Plywood sheets/Ground surface protection mats shall be the property of the Contractor.

3.4 TREE PRUNING AND FERTILIZATION

- A. Preparatory Tree Pruning: Pruning of tree limbs and roots shall be performed by the Contractor where directed. Pruning shall occur for, but not be limited to, the following situations: interference with new fences, lights or utilities, to achieve the required clearance for pedestrian or vehicular passage, to permit establishment of grass, ground cover, and other plant material, or for aesthetic considerations.
1. All work shall be performed in a professional manner and in accordance with the most current revision of the American National Standards for Tree Care Operations: Tree, Shrub, and Other Woody Plant Maintenance and Standard Practices, A-300-(Part 1)-2001 Pruning, published by the American National Standards Institute (ANSI). ANSI Standards are made part of this contract by this reference.
 2. All work shall be performed by a licensed Arborist.
 3. The Contractor or their authorized representative must be present at the work site at all times while work is being performed. The aforementioned provision shall be obeyed irrespective of whether the work is being performed by the Contractor or a Subcontractor.
 4. No trees shall be pruned except as directed by the Arborist or the Owner's representative. Pruning of the crown shall be performed in such a manner as to maintain the shape of the particular species and the balance and symmetry of the tree in general while retaining as much fine growth as possible. On trees known to be diseased or where there is known danger of transmitting disease, tools are to be disinfected with wood alcohol after each cut and after

completion of each tree.

5. In general, pruning shall consist of cutting back and removal of all dead wood, broken, fungus and insect-infected, superfluous, or intertwining branches, suckers, and removal of all other undesirable growth, as directed by the Arborist or the Owner's representative. All injured areas where healing is not taking place properly shall be bark traced in accordance with accepted horticultural practice. All branches shall be removed to a height sufficient to permit free passage of both pedestrian and vehicular traffic. In lifting the bottom branches of trees for underclearance, care shall be given to maintain symmetrical appearance. At no time shall more than 20% of a tree's canopy be removed.
6. The Contractor shall carefully protect from damage all existing vegetation, site features, and all other property which is to remain. The Contractor shall be liable for any and all damage to the above resulting from tree pruning operations and shall be responsible for the replacement or restoration of same where damaged, at the direction of and to the satisfaction of the Owner's Representative.
7. Debris: If directed by the Arborist or the Owner's Representative, pruned material may be chipped and spread as mulch to be used in protecting tree roots. If fresh material is used the Contractor shall spread supplemental nitrogen over the surface. All other pruned material and debris shall be removed from the site of the contract within twenty four (24) hours and disposed of at the Contractor's expense.

B. EXCAVATION, DECOMPACTION, FERTILIZATION AND WATERING METHOD

1. Excavation: The line of hand excavation shall be routed to minimize damage to roots within the drip line of existing trees. To prevent damage to tree trunks, branches, and the compacting of soil, no material or equipment should be stored or operated over areas within the dripline of trees. Roots over 1" in diameter may only be cut under the supervision of a licensed arborist. Roots under 1" must be cleanly cut and removed. If directed, the root zone of a tree shall be covered with mulch to a depth of at least six (6) inches or with plywood in order to protect roots from damage caused by heavy equipment during construction.
2. Watering: Watering shall be performed regularly according to the recommendations of the licensed arborist. Specifically, where excavations are performed within the "drip line" of trees the excavated area shall be backfilled immediately and/or roots shall be kept constantly moist with burlap covered with white plastic until backfill is complete.
3. Fertilization: If fertilization is considered necessary based on soil test results, it shall be applied according to the levels determined by the Chart below, and as directed by the Landscape Architect. Fertilizer shall be applied directly into the holes or trenches and filled with compost as outlined above.

Tree DBH	Ounces per Tree
0-6	120
6-12"	180
12-18"	240
18-24"	300
24-30"	360
30-36"	480
36-42"	540
42-48"	600
over 48"	660

- C. Arborist Qualifications: The Contractor shall submit for approval, the name and qualifications of the proposed tree care sub/Contractor. The Contractor shall submit the following:
1. Proof of three (3) years of non-utility pruning experience or I.S.A. certification with documented non-utility pruning experience.
 2. Documentation of eight (8) hours of required education or I.S.A. certification.
 3. Name, address, and phone numbers for professional references associated with non-utility pruning work performed within the past three (3) years.
 4. State Certification-The Contractor must submit a copy of a valid Compliance Agreement issued by the State of New York Department of Agriculture and Markets, Division of Plant Industry.
 5. The arborist shall be DDC request licensed.

END OF SECTION

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work governed by this section, as shown or specified shall be in accordance with the requirements of the Contract Documents and the New York City Building Code (latest edition).
- B. Work of this Section, as shown or specified, shall be in accordance with the Erosion and Sediment Control Plan, site-specific Stormwater Pollution Prevention Plan, and Section 02370.
- C. Work of this Section, as shown or specified, shall be in accordance with the Construction Waste Management Plan.

1.2 WORK INCLUDED

- A. Provide all labor, materials, equipment and services and perform all operations required of this Section, included but not limited to the following:
 - 1. Removal of existing pavements, curbs, tanks, abandoned pipes, utilities, former foundation structures, and other structures encountered which require removal for successful completion of the Work.
 - 2. Pre-excavation for removal of obstructions identified within the footprint of the proposed structure including backfilling, grading, and compacting of said areas after removal of obstructions or other deleterious materials.
 - 3. General excavation to levels established within the Contract Drawings and as described herein.
 - 4. Local excavation for the pile caps, slabs, walls, and other foundation elements indicated on the Contract Drawings and as directed by the Commissioner.
 - 5. Excavation, fill placement, grading and compaction to required elevations for appurtenances and general site work as shown on the Contract Drawings.
 - 6. Excavation and trenching for utilities as shown or as required; backfilling same with approved fill; compaction, and rough grading.
 - 7. Removal of unsuitable subgrade soils, replacement with approved fills, and compaction as dictated by site conditions or as directed by the Commissioner.
 - 8. Improvement of subgrade conditions via compaction, installation of geotextiles, or placement of approved fill as directed by the Commissioner.
 - 9. Providing additional approved suitable material for filling and rough grading.
 - 10. Legal off-site disposal of surplus excavated materials, unsuitable for use as fill or

backfill.

11. Subgrade preparation for all pile caps and floor slabs.
12. Protection of adjacent structures, utilities and pavements.
13. Temporary groundwater control as required for execution of the Work of this Section and for all other related foundation Work.
14. All other labor, equipment, and materials as may be reasonably inferred to be required to make the work under this Section complete.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Section 02205 – Protection, Demolition, and Relocation of Existing Utilities
- B. Section 02370 – Erosion Controls
- C. Section 02455 – Timber Piles
- D. Section 02510 – Water Distribution
- E. Section 02521 – Decommission Groundwater Wells
- F. Section 02530 – Sanitary Sewerage
- G. Section 02550 – Natural Gas Distribution
- H. Section 02630 – Storm Drainage
- I. Section 02731 – Sanitary Pump Station
- J. Section 02740 – Asphalt Concrete Pavement
- K. Section 02890 – Traffic Signage
- L. Section 03700 – Cement and Concrete for Exterior Improvements
- M. Contract Drawings

1.4 STANDARDS AND REFERENCES

- A. American Society for Testing and Materials (ASTM) standards, latest edition.
 1. ASTM C 33 Standard Specifications for Concrete Aggregates.
 2. ASTM D 422 Standard Test Method for Particle Size Analysis of Soils (sieve only).
 3. ASTM D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 4. ASTM D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Rock and Soil.

5. ASTM D 2487 Test Method for Classification of Soils for Engineering Purposes.
 6. ASTM D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 7. ASTM D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of
- B. ACI-318 latest edition – Building Code Requirements for Structural Concrete, latest edition
- C. ACI-299R – Controlled Low Strength Materials, latest edition
- D. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.
- E. Site Information:
1. Geotechnical Engineering Report prepared by Langan Engineering and Environmental Services, Inc, P.C. dated 9 May 2012.
 2. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.
- F. Regulatory Requirements and Reference Standards
1. The Contractor shall comply with all the laws, ordinances, codes, rules and regulations of the Federal, State and Local authorities having jurisdiction over any of the work specified herein. The Contractor shall meet NYCDEP Limitations for Effluent, NYSDEC and EPA limitations for discharge into any surface water bodies, federal EPA and State Department of Transportation regulations for shipping of regulated substances to off-site disposal facilities, and meet all regulatory requirements imposed by the Treatment, Storage and Disposal Facility. Regulations pertaining to the transport and disposal of regulated substances/materials include, but are not limited to the following:
 - a. Department of Transportation 49 CFR 172 through 179
 - b. Department of Transportation 49 CFR 387 (46 FR 30974)
 - c. Department of Transportation DOT-E 8876
 - d. Environmental Protection Agency 40 CFR 136 (41 FR 52779)
 - e. Environmental Protection Agency 40 CFR 262 and 761
 - f. Resource Conservation and Recovery Act (RCRA)
 - g. NYCDEP, Rules of the City of New York (RCNY), Title 15, Chapter 19, Use of the Public Sewers.
 - h. NYCDEP, Limitations for Effluent to Sanitary or Combined Sewers.

- i) NYCDEP, Dewatering Sampling and Testing Requirements.
 - 2. Any transporter of contaminated/hazardous materials shall be licensed in the state in which handling and transportation shall take place in accordance with all applicable regulations.
 - 3. Comply with OSHA (Occupational Safety and Health Administration) Standards and Regulations contained in Title 29 CFR Part 1910.120 "Hazardous Waste Operations and Emergency Response."
 - 4. Where reference is made to one of the above standards the revision in effect at the time of the bid opening shall apply.
- G. All work shall comply with requirements of the Building Code of the City of New York, requirements of the New York State Department of Labor, requirements of Occupational Safety and Health Administration (OSHA), requirements of New York State Department of Health (NYSDOH), requirements of the New York State Department of Environmental Conservation (NYSDEC), requirements of the New York City Department of Environmental Protection (NYCDEP), requirements of the New York State Department of Transportation (NYSDOT), requirements of New York City Department of Transportation (NYCDOT), and with applicable requirements of all other authorities having jurisdiction.
- H. In case of conflict between regulations and specifications, the Contractor shall comply with the most stringent applicable codes, regulations or specifications.

1.5 SUBMITTALS

- A. Test Reports: Submit the following information for each source of each material submitted for review and approval of the Commissioner:
- 1. Test reports for all proposed fill materials (either from borrow sources or on-site) as follows:
 - a. Particle size analysis in accordance with ASTM D 422 (sieve only).
 - b. Soil classification in accordance with ASTM D 2487
 - c. Moisture content in accordance with ASTM D 2216
 - d. Modified Compaction Curve in accordance with ASTM D 1557.
 - 2. Include data for all samples indicating the exact location and methods of transportation and placement of all materials.
- B. Samples:
- 1. Submit a 5-lb (minimum) sample of each material proposed for use as general fill, drainage fill, structural fill, pavement sub-base course, etc.
- C. Shop Drawings: Submit detailed shop drawings and calculations to be reviewed by the Commissioner. The drawings and calculations shall be prepared by a Professional Engineer registered in the State of New York. The submittals shall include but not

limited to following:

- a. Earth excavation procedures
 - b. Temporary excavation support.
 - c. Backfilling and compacting material, equipment and procedures.
- D. Catalog Cuts: Submit catalog cuts and manufacturer's literature for compaction equipment, vapor barrier, and all geotextile and drainage materials.
- E. Samples: Submit a 12 inch by 12 inch sample of each geotextile filter fabric, geogrid, and drainage panel proposed for use. Submit a 12-inch long sample of the proposed drainage pipe.
- F. All required certifications and permits pertaining to the work of this Section.
- G. Certification for Examination of Site and Records: Before proceeding with the Work, submit certification in an acceptable form, signed by the Contractor, stating that careful examination has been made of the site, existing structures, existing adjacent structures, records of utility lines, test boring records, soil samples, subsurface exploration reports, the Contract Drawings, and all other Contract Documents.

1.6 DEFINITIONS

- A. Wherever the word "excavating", "excavate", "excavation", "carried down", "remove", etc., are used, they shall be taken to include the removal of all existing work, including rubble, former foundation remnants, rubbish, earth, as well as rock, boulders, concrete and all other materials and obstructions encountered; they shall also be taken to include all temporary excavation support, bracing, groundwater control, and all other operations and items needed for the proper execution of the Work. Excavation is considered unclassified.
- B. Where the words "finished grades", "finished grade lines", or "future finished grades", appear in these specifications, they shall be taken to mean the finished elevations as indicated on the Contract Drawings.
- C. Rough grading consists of cutting or filling to the elevation herein established with a permissible tolerance of plus or minus 1 inch. This tolerance shall be so used within any area of 100 ft that it will not be necessary to remove excess or bring in additional fill to meet the required elevations.
- D. Pre-excavation consists of excavation within the building footprint to remove obstructions. Pre-excavation shall include all necessary backfilling and compaction to provide a suitable working surface for slurry wall construction.

1.7 PROTECTION

- A. The work shall be executed so that no damage or injury will occur to the existing public and adjoining or adjacent structures, streets, paving, sewers, gas, water, electric or any other pipes. Should any damage or injury caused by the Contractor, or anyone in Contractor's employ, or by the work under this Contract occur, the Contractor shall repair such damage and shall assume all responsibility for such injury.

- B. The above shall also include the protection of all existing utilities (including sewers, water lines, electrical lines and telecommunication lines) to remain in use within and adjacent to the area affected by the work of this project..
- C. Monuments, bench marks and other reference features shall be protected. Should these be disturbed in any manner, the Contractor shall have them replaced.
- D. Excavation sides and adjacent structures, foundations shall be protected by means of adequate bracing, shoring and anchoring at all times. Excavation shall not proceed until adequate support for excavation sides is provided. Contractor is solely responsible for the stability, safety and protection of excavation sides.
- E. Provide barricades and warning lights, barriers, to prevent accidents, to avoid all necessary hazards and protect the public, the work and property at all times, including Saturdays, Sundays and Holidays.
- F. Erosion and sediment control and dust control shall be in accordance with Section 02370.
- G. The Contractor shall maintain the cleanliness of paved streets immediately adjacent to the site through regular sweeping and moistening as required to remove any excess mud, dirt, or rocks tracked from the site. Dump trucks hauling material from the site will be covered with a tarpaulin.

1.8 ERRORS IN DEPTH

- A. In the event that any part of the excavation be carried, through error, beyond the depth and the dimensions indicated on the drawings, called for in the specifications, or directed by the Commissioner, then the Contractor, at own expense, shall furnish and install approved backfill materials with which to fill to the required level without additional cost to the City of New York.

1.9 QUALITY ASSURANCE

- A. Contractor Qualifications: The Contractor performing the work of this Section shall be a qualified excavation contractor with at least 3 years of relevant field experience on projects of similar size, scope, and complexity.
- B. All work shall comply with the project's Construction Waste Management Plan.
- C. All work shall comply with the requirements of the project's Sediment and Erosion Control Plan.
- D. Codes and Permits:
 - 1. Comply with New York City Building Code, and any other Federal, State, or local codes having jurisdiction.
 - 2. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided without additional cost to the City of New York.
 - 3. The Contractor shall procure and pay for all permits and licenses required for the

completion of the work of this Section.

E. Quality Control Tests and Inspection:

1. Before commencing work of this section, meet with representatives of the governing authorities, Construction Manager, Owner, Architect, Structural Engineer, Geotechnical Engineer, Special Inspector, and other concerned entities. Review the earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
2. All work of this Section shall be subject to quality control tests and Special Inspection, which will be performed by the City of New York. In addition, the Special Inspector will review the aspects of construction as follows:
 - a. Review the Contractor's submittals related to temporary and permanent support of excavations, excavation procedures, dewatering, and materials.
 - b. Inspect foundation subgrades.
 - c. Inspect the in-place backfill for compaction. In-place density tests shall be performed in accordance with ASTM D2922, or as approved by the Commissioner for specific fill materials.
3. It is the Contractor's responsibility to perform all work in accordance with these Specifications and all applicable Federal, State, and City codes and standards. The Commissioner will not be responsible for giving notice of deviations from specifications whenever such deviations occur. The Contractor shall cooperate with the Commissioner in performing all the work.

1.10 PROJECT CONDITIONS

- A. Refer to the Engineering Report prepared and associated boring and test data for information pertaining to the general subsurface conditions within the project site.
- B. Boring and other in situ test logs are made available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between borings.
 1. The Contractor, by careful examination, shall inform himself as to the nature and location of the work; the conformation of the ground, the nature of the subsurface conditions; the locations of the groundwater table; the character, quality and quantity of the materials to be encountered; the character of the equipment and facilities needed preliminary to and during the execution of the work; and all other matters which can be in any way effect the work.
 2. The Contractor shall be held to have visited the site and to have familiarized himself with the existing conditions of adjoining properties, utilities and buildings.
 3. The Contractor shall investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions, and other limitations

affecting transportation to, ingress and egress of the site of the work. The Contractor shall conform to all New York City and State, and Federal regulations in regard to the transportation of materials to and from and at the job site and shall secure in advance such permits as may be required.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Sand: Cushion sand shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances. When dry, 100% shall pass a 1/4" sieve, 0-35% shall pass a No. 50 sieve, and 0-10% shall pass a No. 100 sieve. The sand may be determined to be unacceptable for cushion sand if it contains more than 10 percent by volume of loam or silt.
- B. Structural Fill: Well graded granular soil containing not more than 30% of the material by weight shall be retained on a 3/4" sieve. Of the material passing the No. 4 sieve, no more than 10% shall pass the No. 200 sieve by weight. Structural fill shall contain no particles exceeding 2 inches in any dimension.
- C. Drainage Fill: Clean 3/4-inch gravel / broken virgin stone meeting the gradation requirements of AASHTO #57.
- D. General Fill: Shall have no more than 20% by weight of stones or masonry debris, containing no stones or other materials greater than 4 inches in any dimension and contain less than 20% by weight materials finer than No. 200 mesh sieve.
- E. Pavement Subbase Fill: Subbase materials below asphalt and concrete pavements shall consist of clean granular soils, crushed stone, or recycled concrete aggregate conforming to the requirements of NYSDOT Item No. 304.14, Subbase Course, Type 4.
- F. Fill for utility trenches shall meet the criteria given for structural fill and shall not contain sharp, angular pieces and pieces larger than 2 inches in any dimension.
- G. Before bringing any fill to the site, the Contractor shall submit the source for approval by the Commissioner.
- H. All fill materials shall be free from wood, debris, combustible materials, vegetable matter or any material subject to decay or disintegration.
- I. The use of recycled concrete aggregate as structural or general fill is not permitted.
- J. The use of crushed Mica Schist, locally known as "Mole Rock", shall be limited to exterior pavement subbases.

2.2 GEOTEXTILES

- A. Drainage Geotextile
 - 1. Nonwoven geotextiles consisting of polypropylene stable fibers having an apparent opening size (AOS) of U.S. Sieve size 70, and a minimum Grab Tensile Strength of 120 pounds. Mirafi 140N or approved equal.

B. Separation Geotextile

1. Woven geotextiles consisting of UV Stabilized polypropylene slit film having an apparent opening size (AOS) of U.S. Sieve size 30, and a minimum Grab Tensile Strength of 124 pounds. Mirafi 100X or approved equal.

C. Stabilization Geotextile

1. Woven geotextiles consisting of high tenacity polypropylene having an apparent opening size (AOS) of U.S. Sieve size 40, and an ultimate strength of 4,200 pounds per ft. Mirafi HP 565 or approved equal.

2.3 CONCRETE MATERIALS

- A. Lean Concrete shall conform to ACI 301.
- B. Controlled low strength material (CLSM) shall conform to ACI 299R.

PART 3 - EXECUTION**3.1 GENERAL SITE PREPARATION**

- A. The Contractor shall furnish all labor, equipment and materials required to prepare site and to excavate all materials of whatever type encountered to the lines and grades shown on the Contract Drawings and as specified.
- B. The Contractor shall give 48 hours advance notice to the Commissioner of the impending completion of excavations so as to allow the Commissioner to inspect the condition of the exposed surface for footings, pile caps, slabs and pads and review the ground water conditions in accordance with the NYC Building Code requirements for Special Inspection.
- C. The Contractor is to obtain and pay for all necessary permits to perform the work from the appropriate authorities and agencies prior to start of such work. Obey all applicable local and federal work safety rules and regulations.
- D. Install all necessary protection equipment, structures such as fences, signs, scaffolding etc. prior to start of work.
- E. Remove all existing structures, utilities, pavement in accordance with the Contract Documents.
- F. Protect all utility lines which are not to be abandoned. The Contractor shall be responsible for any damage to utilities resulting from the Contractor's actions.
- G. Provide all necessary erosion and sediment control in accordance with Section 02370.

3.2 GROUNDWATER AND SURFACE WATER CONTROL

- A. The Contractor shall be responsible for maintaining groundwater levels at least 2 ft below the levels of any excavation.
- B. Where required, the Contractor shall be responsible for obtaining all necessary

discharge permits, including water quality testing, volume calculations, and system design, as required.

- C. The Contractor's groundwater control system shall consider methods and measures necessary to reduce inflow through soils including, but not limited to, grouting and installation of sumps or pumping wells in an effort to minimize daily discharge quantities.
- D. Any water encountered (groundwater, water perched on a localized impervious layer, or from a recent precipitation event) within excavations and cleaning water for construction vehicles and equipment shall be diverted to:
 - 1. Bronx River (with appropriate NYS DEC permits, by contractor)
 - 2. Existing combined sewer on-site (with appropriate NYC DEP permits, by contractor)
 - 3. Storage tank, for off-site disposal
- E. All pumping and dewatering shall be performed in such a manner as to avoid the movement of fines or loss of ground from below the bearing level and shall not influence the stability of surrounding areas.
- F. The Contractor shall be responsible for controlling surface water on-site. Excavations shall be protected from deleterious effects of surface water accumulation. The Contractor shall grade accordingly to minimize run-off from entering and accumulating excavations.

3.3 EXCAVATION

A. General

- 1. The excavation shall be unclassified and shall comprise and include the satisfactory removal and legal disposal of all materials encountered regardless of the nature of the materials and shall be understood to include, boulders, earth, hardpan, miscellaneous fill, foundations, structures, slabs, walls, utilities, pavements, curbs, piping and debris.
- 2. All excavation shall extend to the depths of the form and size required for the installation of the work as indicated on the Contract Drawings. When excavations for foundations have reached the required depths, the Special Inspector shall make an inspection of the conditions.
- 3. Excavation shall be made to a depth that will allow installation of full depth of concrete slabs, sub-base, waterproofing as shown on drawings and 1 inch tolerance. Excavation lines shall provide sufficient clearance for the proper execution of all concrete work including allowances for form work, shoring and inspection.
- 4. Materials that, in the opinion of the Special Inspector, are not suitable for reuse as fill, any surplus earth and all rock shall be removed from the site and legally disposed of.

5. The bottom of excavations shall be leveled off, free of standing water and loose materials and graded to receive foundations, slabs, pits, pile caps, trenches, grade beams, etc.
6. Subgrades of pile caps, slabs, and other foundation elements shall be level and free of loose soil, standing water and frost prior to acceptance for placing concrete. Hand-excavate to achieve final subgrade elevation as directed by the Special Inspector.
7. Approved subgrades for pile caps, slabs, footings shall be sealed with a 3-inch-cover of lean concrete to provide a sealed stabilization of the subgrade.

3.4 SUBGRADE PREPARATION

- A. Proofrolling shall be performed for all subgrade within and outside the limits of the proposed building including all adjacent site work and pavements.
- B. Proofrolling of subgrades shall conform to the following requirements:
 1. All subgrades shall be proofrolled in the presence of the Special Inspector.
 2. Proofrolling shall be accomplished with a minimum of six (6) overlapping cross-rolled coverages of a smooth drum roller having a static weight of at least 10-tons. A vibratory trench roller having a static weight of at least 1.5 tons shall be in confined areas as approved by the Special Inspector. Areas inaccessible to the heavy equipment shall be compacted using a vibratory plate or jumping jack compactor as directed by the Special Inspector. The maximum travel speed of rollers should not exceed 1.5 mph. Disking, harrowing, or other methods of drying the soils should be performed as necessary to facilitate drying and subsequent proofrolling.
 3. Vibratory or impact compaction shall not be performed on soils which are not within 2 % of the optimum moisture content as determined by ASTM D1557.
 4. Fill shall not be placed until the subgrade is approved by the Special Inspector.
 5. Soft Areas during Compaction: Areas deemed unsatisfactory due to "pumping or heaving" shall be undercut within the limits and extent ordered by the Special Inspector. These areas shall be replaced with an approved fill, and compacted to the requirements of this Section or as directed by the Special Inspector.

3.5 FILL PLACEMENT, GRADING, AND COMPACTION

- A. Filling and backfilling shall not be performed until related work has been inspected by the Special Inspector.
- B. All subgrades shall be free of wood, organics, or other deleterious materials prior to placement of any fill.
- C. Fill shall be placed such that there are no void spaces below floors, bottoms of pits, trenches, pipe haunches, pavements, etc.
- D. Fill shall not be placed against concrete elements until the concrete has obtained its

specified compressive strength, unless otherwise directed by the Commissioner. Where fill is required on both sides of a wall, said fill shall be brought up simultaneously and evenly on both sides.

- E. Fill voids caused by the removal of boulders, and/or below grade improvements, with lean concrete, CLSM, or structural fill.
- F. The Contractor to supply and install all fill materials necessary to bring the ground surfaces to the required levels as shown on the Contract Drawings and as necessary to make the work complete.
- G. All surplus materials shall be removed from site and legally disposed of. Should additional material be required for the placing of backfill, other than material obtained from the site, the Contractor shall obtain, deliver, and place accepted backfill material as required.
- H. Fill Placement:
 - 1. Begin placement of fill and backfill at the lowest section of the area. Spread material evenly by mechanical equipment or by manual means above the approved compacted subgrade in loose lifts not exceeding 8-inches for material compacted by heavy machinery and 4-inches for material compacted by hand tamping.
 - 2. Build layers as horizontally as practical to prevent thickness of lift from exceeding that specified but provide with sufficient longitudinal and transverse slope to provide for runoff of surface water from every point.
- I. Moisture Control: The moisture-density curve for the fill used shall be supplied by the Contractor as a guide in controlling moisture to achieve the required degree of compaction. If, in the opinion of the Commissioner, fill material becomes too wet for the required compaction, the fill shall be dried by a method approved by the Commissioner prior to commencing or continuing compaction operations. Likewise, if, in the opinion of the Special Inspector, the fill material becomes too dry for the required compaction, the fill shall be moistened by a method approved by the Commissioner prior to commencing or continuing compaction operations.
- J. Compaction:
 - 1. Pile Supported Structures:
 - a. Compact each lift to 92% of the maximum dry laboratory density as determined by ASTM D1557.
 - 2. Footings, slabs-on-grade, pavement, and utilities:
 - a. Compact each lift to 95% of the maximum dry laboratory density as determined by ASTM D1557.
 - 3. The degree of compaction shall be checked by the Special Inspector and each successive lift shall not be placed or compacted until the previous lift is inspected and approved by the Special Inspector. Compact all fill to elevations and limits

shown on Contract Drawings.

- K. Frost: Do not place fill materials when either the fill materials or the previous lift (or subgrade) on which it is placed is frozen. In the event that any fill which has already been placed on the surface shall become frozen, it shall be scarified and recompacted, or removed, to the approval of the Special Inspector before the next lift is placed. Remove or recompact any soft spots resulting from frost to the satisfaction of the Special Inspector before new fill is placed.

3.6 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.7 FIELD QUALITY CONTROL

- A. Special Inspection: All special inspections shall comply with the requirements of the New York City Building Code.
- B. The City of New York will retain, under separate contract and at its own expense, a testing laboratory ("Owner's Testing Laboratory") for testing and analysis of various materials.
- C. The City of New York will employ, at its own expense, a Special Inspector to review all laboratory test results and submitted reports specified in this Section.
- D. The Special Inspector will interpret the tests, state in each report whether or not the test specimens and results comply with all requirements of the Contract Documents and note any deviations.
- E. The Special Inspector will identify when and where samples are to be obtained. Contractor shall collect samples and forward them to the Owner's Testing Laboratory for testing. The Owner's Testing Laboratory shall submit the following laboratory test reports to the Special Inspector for review:
 - 1. Gradation Analysis - ASTM D 422.
 - 2. Atterberg limits - ASTM D 4318.
 - 3. Modified Moisture-density curve determination - ASTM D1557.
- F. The Special Inspector will determine the conformance of materials to be used for fills.
- G. Proofrolling: Proofrolling shall be inspected by Special Inspector.
- H. Backfilling and Compaction: Backfilling and compaction below foundations, building

slabs, behind foundation walls, and any other backfilling and compaction work shall be inspected by the Special Inspector. No fill shall be placed unless the previous lift is approved by the Special Inspector. The Special Inspector will take field density tests of the subgrade for every 2000 sq- ft, but not less than 3 tests in each compacted fill layer. Field density tests in shall be performed in accordance with ASTM D2922.

- I. The Contractor shall cooperate with the Special Inspector in the performance of the required tests and inspections.

3.8 MAINTENANCE

- A. Protect newly graded areas and membrane waterproofing from erosion and traffic. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Where completed or compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to any further construction.
- D. Where settling is measurable or observable at excavated areas during general project warrantee period, remove surface (pavement, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.9 CLEAN-UP

- A. All excess material including, earth, rock, fill, shall be removed from site and legally disposed of. Material handling and disposal shall be in accordance with the Waste Management Plan.
- B. All lumber, forms and metal work shall be removed immediately after completion of local areas. The Contractor shall be responsible for removal of all debris produced by work to this section from the site.
- C. Sidewalk and streets adjoining the property shall be broom cleaned and free of debris, rubbish, trash and obstructions of any kind caused by the work of this Section.

END OF SECTION

SECTION 02316 - PNEUMATIC EXCAVATION

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. The Contractor shall utilize pneumatic excavation for the installation of utilities, pavements, curbs and site furnishings within the critical rootzones of existing trees as shown on the drawings..

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements.
- B. Section 02065 Structural Soil
- C. Section 02230 Tree Protection, Pruning and Fertilization
- D. Section 02060 Aggregate Materials
- E. Section 02721 Aggregate Base Course
- F. Section 02740 Asphalt Concrete Pavement
- G. Section 02750 Concrete As Pavement

1.4 SUBMITTALS FOR REVIEW

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
- 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
- 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
- 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.5 QUALITY ASSURANCE

- A. Qualifications of Installer: Installation shall be by a contractor and crew with at least three (3) years of experience in excavation within the driplines of trees.
- B. The Contractor shall conform to all local, state/provincial licensing and bonding requirements.
- C. Arborist Services: Contractor shall arrange for the presence of a licensed Arborist, per Section 02230, during pneumatic excavation activities within the dripline of existing trees.

PART 2 PRODUCTS

- 2.1 Trenching/Excavation shall be accomplished either by hand or with a pneumatic device such as an Air-Spade CGP System, as manufactured by Concept Engineering Group, Inc. Verona, PA, or approved equal. The Contractor shall provide a compressor unit for operating the pneumatic excavator rated at one hundred fifty standard cubic feet per minute (150 scfm) at ninety pounds per square foot gauge (90 psfg).

PART 3 EXECUTION

- 3.1 Preparation: Prior to beginning work, the area to be trenched/excavated shall be thoroughly wetted, 24 hours in advance, to minimize dust to the greatest extent possible.
- 3.2 Excavation: All pneumatic excavation shall be as minimal as possible in width and depth, thereby minimizing the impact on tree roots and other areas where the Commissioner determines that conventional machine excavation may be detrimental. Different nozzles may be used on the air spade to expedite the work or minimize the amount of airborne material.
- A. Depth shall be as indicated on Contract Drawings or as directed by the Commissioner. Depths greater than 18" shall require removal of soil by hand shovel, or other appropriate means.
- 3.3 Safety:
- A. Shield adjacent areas from small rocks and debris scattered by pneumatic excavation. Operators must be equipped with adequate protective clothing and gear, in accordance with manufacturers recommendations.
- 3.4 Tree Care:
- A. No excavation shall take place within the absolute critical root zone (ACRZ) without the express approval of the Commissioner. ACRZ shall be defined by a ratio of the tree diameter at breast height (dbh) as follows: five (5) inch disturbance free area for every one (1) inch of tree dbh.
- B. All tree roots exposed by the pneumatic or hand excavation operation must be kept constantly moist with burlap covered with white plastic and checked a minimum of two (2) times a day, once in the morning and once in the afternoon, for a maximum of forty-eight (48) hours, until backfill is complete as directed by the Commissioner, or his designated representative. If directed, soaker hoses shall be installed to facilitate properly moist conditions.
- C. In cases where roots must be cut, they shall be cut cleanly with pruning shears, loppers, or pruning saws under the supervision of a licensed arborist. All root cuts must be approved by the Commissioner prior to backfilling.
- 3.5 Utility Placement
- A. Necessary inspections of piping shall be scheduled in advance, especially those involving inspections performed by outside Agencies.
- B. Backfill at Utilities:

1. After inspection and approval of work which is to be covered by backfill, the excavated voids around the work shall be filled with clean excavated material, puddled and rammed solid every six inches 6" of depth.
2. Backfilling inside of sheeting shall be placed before sheeting is removed.
3. After areas and trenches have been excavated and piping lain and structures constructed therein, the spaces around and above them shall be carefully backfilled with acceptable material. Backfill shall be placed on both sides of utility lines and structures to approximately the same elevation at the same time. All backfill shall be thoroughly tamped and rammed in place in layers not over six (6) inches in depth, using rammers of a weight acceptable to the Commissioner. If directed by the Commissioner, the backfill shall be thoroughly saturated with water as it is placed.
4. Backfill adjacent to foundation walls shall be pneumatically compacted
5. Backfill at Tree Roots: Backfill Material at excavation within the critical root zone of trees as indicated on the plans shall be with structural soil, installed as per manufacturer's recommendations, to within 6 inches of existing grade. Final 6 inches shall be backfilled with topsoil compacted as is typical. Backfill shall be placed so that settling within the first year shall not be noticeable.

END OF SECTION

SECTION 02370 - EROSION CONTROLS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall provide erosion and sediment control in accordance with the requirements of the contract documents and the Stormwater Pollution Prevention Plan (SWPPP). The Contractor must accept the site as is and shall be deemed to have inspected the site and reviewed all Contract Documents prior to submitting a bid.
- B. Pursuant to Section 402 of the Clean Water Act (CWA), stormwater discharges from certain construction activities to waters of the United States are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York State Department of Environmental Conservation's (NYS DEC) State Pollutant Discharge Elimination System (SPDES) is a NPDES-approved program which issues permits in accordance with the Environmental Conservation Law (ECL). Discharges of pollutants to all other "Waters of New York State" such as groundwaters are also unlawful unless they are authorized by SPDES permit.
- C. A SWPPP has been prepared for this project site. The Contractor and all sub-contractors are subject to all terms and conditions of the Notice of Intent, SWPPP, and SPDES regulations. The Contractor is responsible for the day-to-day implementation of the SWPPP on-site in accordance with NYS DEC SPDES General Permit for Stormwater Discharges from Construction Activity GP-0-10-001.
- D. A SWPPP is a plan for controlling runoff and pollutants from a site during and after construction activities. The principle objective of a SWPPP is to comply with the NYS DEC SPDES General Permit for construction activities by planning and implementing the following practices:
 - 1. Reduction or elimination of erosion and sediment loading to waterbodies during construction.
 - 2. Control of the impact of stormwater runoff on the water quality of the receiving waters.
 - 3. Control of the increased volume and peak rate of runoff during and after construction.
 - 4. Maintenance of stormwater controls during and after completion of construction.
- E. NYS DEC technical standards for erosion and sediment control are contained in the document, "New York Standards and Specifications for Erosion and Sediment Control" published by the Empire State Chapter of the Soil and Water Conservation Society. For the design of water quantity and water quality controls (post-construction stormwater control practices), the Department's technical standards are detailed in the "New York State Stormwater Management Design Manual." Both of these documents are available on NYS DEC's website.

1.2 SUMMARY

- A. Overall work under this Contract shall include all labor, materials, equipment, supervision, coordination efforts, permitting costs, certificate costs, services, filing fees, testing costs, and all other associated or related items specified herein that are necessary and are required to complete the Work. Work elements shall include, but not be limited to the following:
 - 1. Installing and maintaining temporary erosion control systems.
- B. Erosion and Sediment Control measures shall comply with the requirements of the Erosion and Sedimentation Control Plan and SWPPP. Additional control measures are described in the Contract Documents.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Section 02205 – Protection, Demolition, and Relocation of Existing Utilities
- B. Section 02300 – Earthwork
- C. Section 02510 – Water Distribution
- D. Section 02521 – Decommission Groundwater Wells
- E. Section 02530 – Sanitary Sewerage
- F. Section 02550 – Natural Gas Distribution
- G. Section 02630 – Storm Drainage
- H. Section 02731 – Sanitary Pump Station

1.4 REFERENCES

- A. Project-specific SWPPP prepared by Langan Engineering & Environmental Services.
- B. NYS DEC Standards and Specifications for Erosion and Sediment Control, Latest Revision
- C. United States Environmental Protection Agency (EPA), 832-R-92-005, "Storm Water Management for Construction Activities", latest revision.
- D. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.

1.5 FEES

- A. The contractor is responsible for any and all fees and penalties required or imposed by NYS DEC or by law with regards to the SPDES Requirements including, but not limited to, annual fees for permits and fees for non-compliance violations.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall protect adjacent properties, including previously built work, and water resources from erosion and sediment damage throughout construction in accordance with the New York City Department of Environmental Protection (NYC DEP), NYS DEC, and the United States Environmental Protection Agency (US EPA) 2010 Construction General Permit.
- B. Trained Contractor:
 - 1. Each contractor and subcontractor shall identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the trained contractor (as defined in SPDES regulations). The contractor shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed, and maintain a daily log of this individual's presence on-site.
- C. Discharge from dewatering operations, groundwater, or surface water, shall not be directed to public sewers or Waters of New York State without prior approval from NYC DEP or NYS DEC, respectively. The contractor is responsible for obtaining these approvals, if required. If pursued, the Contractor shall provide the Commissioner with copies of application and approval documentation.

1.7 SUBMITTALS

- A. Prior to the commencement of work, the Contractor shall submit to the Commissioner record copies of all required permits and certificates obtained for the work in this section.
- B. Submit to the Commissioner, material specifications and shop drawings for all materials and equipment furnished under this Section.
- C. Provide Commissioner with copies of all product data, including maintenance instructions, if applicable.

1.8 QUALITY ASSURANCE

- A. Perform work specified herein and shown on the Contract Drawings in compliance with applicable requirements of the New York City Building Code and requirements of all state and local authorities, and utility companies having jurisdiction.
- B. Contractor shall be responsible for the timely installation and/or maintenance of all sedimentation control devices throughout the life of the contract necessary to prevent the erosion of soil or movement of sediment from construction activities to sensitive on-site areas, or any off site areas. Measures in addition to those shown on the drawings necessary to prevent the movement of sediment of site shall be installed, maintained, removed, and cleaned up at the expense of Contractor. Contractor shall immediately abate any siltation, sedimentation, erosion or pollution of all waters and underground water systems.

PART 2 - PRODUCTS

2.1 INLET FILTER FABRIC PROTECTION

- A. Drainage geotextile material shall meet or exceed requirements for subsurface drainage geotextile as defined by AASHTO M-288.

2.2 SILT FENCE

- A. Posts: Posts shall be wood, steel, or an approved synthetic material, with a minimum length of four (4') feet. Hardwood posts shall have a minimum cross sectional area of 1.25" x 1.25" and steel posts of U, T, L, or C shape shall weigh 600 grams per 300mm.
- B. Geotextile: Fabric for silt fence shall meet or exceed requirements for supported temporary silt fence as defined by AASHTO M-288.

2.3 STABILIZED CONSTRUCTION ACCESS

1. Stone aggregate: Clean virgin stone meeting AASHTO #1 gradation requirements. Recycled concrete aggregate is not acceptable.
2. Geotextile: woven or non-woven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties shown:
 - a. Light duty roads: Areas that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trivera Spunbound 1115, Mirafi 100X, Typar 3401, or equivalent.
 - b. Heavy duty roads: Areas with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbound 1135, Mirafi 600X or equivalent.

2.4 CATCH BASIN SILT SACK

- A. The silt sack shall be an open-top geotextile bag that can be suspended from round, square, or rectangular catch basin grates. The suspended solids are allowed to settle out of the slowed flow and are captured by the sack prior to entering the inlet. There shall be two dump straps attached at the bottom of the sack to facilitate the emptying and cleaning of the sack and there shall be two lifting hoops as an integral part of the system to be used to lift the sack from the catch basin.
- B. The geotextile sack shall be constructed with high-tenacity, monofilament, polypropylene yarns which are woven into a stable network such that the yarns retain their relative position. The geotextile shall be resistant to ultraviolet degradation and to biological and chemical environments normally found in soils. Acceptable materials are Dandy Products, "Silt Sack" The BMP Store, or "StormSok" Fabco or equivalent.

PART 3 - EXECUTION

3.1 GENERAL OPERATIONS

- A. The trained contractor is responsible for the day-to-day implementation of the SWPPP. For any changes to the SWPPP resulting from Contractor material substitutions or changes, the Contractor shall be responsible for updating the SWPPP accordingly.

The SWPPP field copy will be kept on-site by the Commissioner from the date of initiation of construction activities to the date of final stabilization. The Contractor shall not commence any earth disturbance until the SWPPP is on-site and required practices have been installed and an initial inspection has been performed by the Qualified Inspector.

3.2 INSPECTIONS

- A. The City of New York shall retain a qualified inspector and qualified professional to perform inspections and prepare reports in accordance with the SWPPP and GP-0-10-001 requirements. The contractor is responsible to implement any remedies for deficient aspects of the SWPPP as documented by the Commissioner. Timelines for inspections, notification, and repair shall be in accordance with the SWPPP and SPDES requirements.

3.3 PREPARATION

- A. Review site conditions and Contract Drawings prior to the commencement of earth moving activities/excavation.
- B. Notify the Commissioner prior to the commencement of Work. Any proposed deviations from the specifications must be submitted to the Commissioner in writing 72 hours prior to commencing work.
- C. By beginning Work, the site conditions are accepted and corrections to encountered unsatisfactory conditions will occur at no additional cost to the City of New York.
- D. All erosion and sediment controls shall be installed prior to land disturbing activities or as necessary to control erosion from land disturbing activities. Comply with all applicable standards for Soil Erosion and Sediment Control in New York State.

3.4 STABILIZED CONSTRUCTION ACCESS – INSTALLATION AND MAINTENANCE

- A. Install stabilized construction entrances at any point where traffic will be entering or leaving a construction site to or from a public-right-of-way, street, alley, sidewalk, or parking area.
- B. Stabilized construction entrance stone thickness shall be a minimum of 6 inches in "light duty" locations and 10 inches in "heavy duty" locations.
- C. The stabilized construction access shall be twelve feet minimum but not less than the full width of points of where ingress or egress occurs. The stabilized construction access shall be a minimum of 24 feet wide if there is only one entrance to the site.
- D. The length of the stabilized construction access shall be 50 feet minimum.
- E. Geotextile shall be placed over the entire area to be covered with aggregate.
- F. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.
- G. The entrance shall be maintained in a condition which will prevent tracking of sediment onto public-right-of-way or streets. This may require periodic raking, replacement, or

top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public right-of-way must be removed immediately.

- H. When necessary, wheels must be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches and watercourses.

3.5 CATCH BASIN SILT SACK- INSTALLATION AND MAINTENANCE

- A. Silt sacks shall be installed prior to start of construction activity on site and shall not be removed until final acceptance of work, unless otherwise directed by the Commissioner. The Contractor shall remove the grate of the catch basin and install the sack in accordance with the Manufacturer's written instruction. The grate shall be set back into place after the sack is installed with the lifting straps outside or on top of the grate.
- B. The contractor shall remove all accumulated sediment and debris from the vicinity of the catch basin after each storm event and as directed by the Commissioner. Where the sack is more than one-third (1/3) full of sediment, the sack shall be cleaned by lifting the unit out of the catch basin and emptying the contents to an on-site area as directed by the Commissioner.
- C. The silt sack shall be maintained in working condition for the life of the project. If the sack breaks, is damaged, or ceases to function during the construction period, the Contractor shall remove and replace it with a new one at no additional cost.

3.6 GENERAL EROSION CONTROL IMPLEMENTATION

- A. The Contractor will be responsible for the proper construction, stabilization, and maintenance of all temporary and permanent erosion and sedimentation control measures and related items.
- B. All erosion and sediment controls shall remain in place until the tributary area to the control is completely stabilized. All controls shall be checked daily and after storm events (by the trained contractor) to ensure they are in proper working order.
- C. The Contractor shall replace at no extra payment any control device that is not functioning properly as directed by the Commissioner or authorized regulatory personnel.
- D. The Contractor shall implement dust control measures during construction. Contractor to minimize dust clouds by watering down construction area or other approved methods as required.
- E. All construction vehicles hauling materials either into or out of the construction area shall have a secured tarp over materials to prevent sediment pollution of public roadways.
- F. Any storm water or ground water that must be disposed of off-site, shall be done so to either the combined sewer with a NYC DEP permit (contractor to obtain permit), Bronx River with a NYS DEC permit (contractor to obtain permit), or placed in a holding tank

for disposal. Contractor is prohibited from discharging dewatering devices to City sewers or Water of New York State without prior approval from NYC DEP or NYS DEC, respectively.

3.7 MAINTENANCE AND REMOVALS

- A. Maintenance (including repair and replacement as required) of all erosion and sediment control measures shall be deemed included in the price bid, and shall be performed as directed by the Commissioner and at no additional cost to the City of New York.
- B. The Contractor is required to correct any deficient control measures as documented by the qualified inspector in accordance with the NYS DEC 2010 Construction General Permit requirements.
- C. Soil sediment removed from any temporary control measure during regular maintenance shall be treated as site earthwork and returned to site or disposed of per contract documents.
- D. Erosion and sediment controls shall not be removed until the site has been adequately stabilized, or as otherwise directed by the Commissioner.
- E. Stabilization shall be defined as a uniform, 80% vegetative cover for landscaped areas. Stabilization shall be defined as installation of stone subbase in pavement and slab areas.

3.8 TERMINATION OF COVERAGE

- A. When the project is completed and the site is stabilized, the coverage will be terminated by the qualified professional.

END OF SECTION

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SECTION 02371 – GABION RETAINING WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Welded Wire Mesh Gabions.
 - 2. Fill Stone.
 - 3. Geotextile
 - 4. Recycled Plastic Lumber Header.
- B. Related Sections include the following:
 - 1. Division 1 Specifications for Green Building Requirements
 - 2. Section 02060 – Aggregate Materials
 - 3. Section 02300 – Earthwork
 - 4. Section 03300 – Cast in Place Concrete
 - 5. Section 03700 – Cement and Concrete for Exterior Improvements

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include manufacturer's literature for approval.
 - 2. Include one (1) sample of the gabion cage material for approval by the Landscape Architect. All cages used on the work shall conform to the approved samples. All samples shall be clearly labeled with Contract No., manufacturer, color, and finish.
 - 3. Stone: Include sufficient stone to convey full range of colors and facing conditions.
 - 4. Shop Drawings indicating basket size, coursing, top and bottom of wall elevations and fastening type.
 - 5. Calculations: Provide professionally prepared stamped calculations by a registered engineer and certification of performance of this Work. Show how design load requirements and other performance criteria have been satisfied.

1.4 MOCKUP:

- A. After approval of the wire cage and accessories, fill stone, the Contractor shall execute a mockup of filled gabions, six (6) feet in length and three (3) feet in height, on site, using the approved specified materials and construction techniques, for review by the Landscape Architect. The mockup shall not be considered part of the finish work and shall be removed at the completion of the project. All Gabions subsequently installed

shall match the approved mockup in every respect.

1.5 QUALITY ASSURANCE

- A. Gabion cages shall comply with the American Society for Testing and Materials Standard Specification for Welded Wire Fabric Gabions and A974-97.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Gabion cages shall be delivered flat and assembled on site. Protect cages from damage prior and during construction.

PART 2 - PRODUCTS

2.1 GABION CAGES

- A. Gabion cages shall be as manufactured by MidWest Construction Products Corp., or approved equal.
- B. The gabion cages shall be produced from galvanized metallic-coated welded wire fabric, metallic-coated wire for spiral binders, lacing wire, and stiffeners used to assemble the product. The welded wire fabric shall be made from uncoated wire, zinc-coated after fabrication. Spiral binders, lacing wire, and stiffeners shall be produced from zinc-coated wire. The cages shall be partially pre-assembled by the manufacturer and fully assembled on site.
- C. Gabions shall be of a single unit construction. The base, ends, sides, and lid shall be either welded into a single unit or shall be connected in such a manner that strength and flexibility at the connection are at least equal to that of the wire mesh. The gabions shall be fabricated in such a manner that they can be assembled at the construction site with Spiral Binders and pre-formed stiffeners into rectangular baskets of the specified size.
 - 1. The height, length, and width of the gabions shall not vary more than 5 percent from the dimensions shown on the plans. Gabions shall be divided into cells of equal length, not more than 3 feet long, by diaphragms made of the same wire mesh as used for the gabion body. Each gabion shall be fabricated with the necessary diaphragm or diaphragms secured in proper position on the base in such a manner that no additional tying at the base will be necessary.
- D. Wire for the manufacture and assembly of gabions shall *meet or exceed* any combination of the following requirements:

<u>DESCRIPTION</u>	<u>REQUIREMENT</u>
3"x3" (7.62 cm x 7.62 cm), 9 Ga. – 0.144 in. min. (3.66 mm) Welded Wire Fabric	ASTM A185, A370 <i>Exception: Weld Shear at 800 lbf min.</i>
Galvanization: (9 Ga. 0.90 oz/SF) 9 Ga.	ASTM A641, A90
Galvanized Pre-Formed Stiffener 9 Ga.	N/A
Galvanized Spiral Binder - min. 0.144 in. (3.66 mm)	

13.5 Ga. Tie Wire –
min. 0.086 in. (2.2 mm) Galvanized 0.70 oz/SF

ASTM A641, A90

ASTM A641, A90

E. Gabion Baskets shall be fabricated in the following sizes:

1. 3'-0" x 1'-6" x 1'-6"
2. 1'-6" x 1'-6" x 1'-6"

F. Stone

1. Stone filling the gabion boxes shall be Summit Granite, Thin Wall Stone, as supplied by Champlain Stone, Ltd., Warrensburg, NY, or approved equal.
 - a. Thickness: 1"+/- to 3"+/-
 - b. Length 6"+/- - 12"+/-
 - c. Width 4"+/- - 8"+/-

2.2 GEOTEXTILE

A. Geotextile shall be a separation fabric as specified in Section 02300 Earthwork.

2.3 RECYCLED PLASTIC LUMBER

A. The 3" x 8" edging is used to contain aggregate materials adjacent to a stone filled gabion wall. 3" x 4" material shall be used as stakes to secure the edging at the desired grade.

B. Materials:

1. Recycled Plastic Lumber shall be fabricated from one hundred percent (100%) High Density Polyethylene (HDPE) and Low Density Polyethylene (LDPE) recycled polyethylene, including UV-inhibiting pigment, such as Ecoboard® as manufactured by Trelleborg Engineered Products, Inc., Clearbrook, VA, Structural Grade Plastic Lumber as manufactured by Plastic Lumber Yard, Norristown, PA, or Lumber Products as manufactured by The Plastic Lumber Company, Akron, OH, or approved equal. Composition and mechanical properties shall be as follows:

Minimum High Density Polyethylene:	70%
Tensile Strength (ASTM D638):	2500 psi
Compressive Strength (ASTM D6108):	2500 psi
Flexural Modulus of Elasticity (ASTM D6109):	150,000 psi

2. The Bulk Density and Specific Gravity of the recycled plastic lumber shall conform to the acceptable standards determined by the standard test method in ASTM D6111. Recycled Plastic Lumber shall not absorb moisture, corrode, rot, warp, splinter, or crack and the surface shall not be slippery when wet. The Recycled Plastic Lumber shall not contain any material that will be irritating when in contact with skin. Cross sections shall not show wide deep gaps or holes and the surface shall have a wood-like grain texture and appearance. Plastic lumber shall remain unpainted. The color shall be Slate Gray or Brown, to be determined by the Engineer, unless otherwise indicated on the plans.

3. Fasteners shall be stainless steel and of sufficient length and gauge to secure the edging to the stakes.

PART 3 - EXECUTION

3.1 GABION INSTALLATION – GENERAL

- A. Gabion Assembly: Gabions shall first be assembled individually as empty units. Each gabion shall be manufactured with the necessary panels, properly spaced and secured, so they can be rotated into position at the construction site with no additional tying of the rotation joint. The panels and diaphragms shall be rotated into position and joined along vertical edges.
- B. Bent or deformed cages, and cages damaged during installation and filling with stone shall not be accepted, and shall be replaced at no expense to the City.
- C. Joint Material: When 13.5-gauge tie wire is used as the joint material, all vertical edges of each gabion panel shall first be constructed to form individual empty gabions. Simple spiraling (looping without locking) of 13.5-gauge tie wire is not permitted. For welded-mesh, the joint shall be constructed using alternating single and double half hitches (locked loops) in every mesh opening along the joint.
- D. When 9-gauge spiral binders are used, the spiral shall be screwed into position such that it passes through each mesh opening along the joint. Both ends of all 9-gauge spiral binders shall be crimped to secure the spiral in place.
- E. Temporary fasteners may be used to hold panels wherever gabions-to-gabion joints will be constructed. Temporary fasteners may remain in place.
- F. Finish: Ensure that ends of tie wire and spiral binders are crimped and turned into the interior of the gabion and that exposed corners of the welded wire mesh are ground smooth and painted with zinc paint.
- G. The gabion cages will be placed empty on foundation material. Foundation material and subgrade shall be well compacted. The bottom cages will be laid at least two (2)' below the swale finished grade.
- H. Geotextile shall be placed beneath and behind the wire mesh cage.
- I. Gabion-to-Gabion Joints: Empty gabions shall be set in place. Individually constructed empty gabions shall be joined successively to the next empty gabion with 13.5-gauge tie wire or 9-gauge spirals, before filling with rock begins. The 13.5-gauge tie wire or 9-gauge spiral binders shall secure, in one pass, all selvage or end wires of panels of all the adjacent gabions along the joint.
 1. All exposed joints shall be securely joined using 13.5-gauge tie wire. Ends shall be folded and unexposed.
 2. Unexposed joints shall be securely joined using 13.5-gauge tie wire or 9-gauge spiral binders.
- J. Multiple Layered Gabions: Multi-layered gabion configurations shall be stepped and staggered as shown on the plans or as directed by the Commissioner. The exposed face of the wall shall be uniform. When constructing multi-layered gabion configurations, each layer of gabions shall be joined to the underlying layer along the front, back, and ends, with tie wire through every mesh space. Ends of wire shall be tied off and

tucked into the gabion to avoid snagging passersby.

- K. Modified Geometry: To match the geometry of the planned gabion configuration, or to meet specific end conditions at paths and boulders, panels shall be folded, cut, and/or re-tied to meet the adjacent condition in a consistent line.

3.2 RECYCLED PLASTIC LUMBER INSTALLATION

- A. Edging shall be installed as indicated on the plans, true to lines and grades shown on the plans or as directed by the Engineer. Recycled plastic lumber stakes shall be set 3'-0" on center to support the edging. Secure edging to stakes using stainless steel fasteners, four (4) per stake.

3.3 GEOTEXTILE

- A. Geotextile shall be installed as shown on the drawings.

3.4 GABION INSTALLATION – FILLING WITH STONE

- A. Thin Wall Stone shall be placed in gabions by hand in a horizontal stacked fashion. Avoid bulges and provide a minimum of voids. Face stone shall present a clean, neat, dry laid appearance. No sharp edges shall project through the wire mesh.
- B. Pre-formed stiffeners shall be used to produce a flat, smooth external surface. Stiffeners shall be installed on the exposed face of the gabion prior to rock placement, two rows at 1/3 points on 3' high gabions, one row at 1/2 point in 1.5' high gabions.
- C. The last layer of rock shall slightly overfill the gabions such that the lid will rest on rock when it is closed.
- D. Closure of Lids: Lids shall be tied along the front, ends, and diaphragms of individual gabions and to successive gabions in the same manner as specified elsewhere in this specification.

3.5 PROTECTION

- A. Protect completed and installed gabion boxes from subsequent damage from adjacent work.

END OF SECTION

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SECTION 02375 - BOULDERS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Furnish and place boulders in accordance with the plans and specifications, and directions of the Commissioner.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements.
B. Section 02060 Aggregate Materials – Landscape
C. Section 02300 Earthwork
D. Section 02721 Aggregate Base Courses

1.4 DELIVERY, STORAGE, AND HANDLING - BOULDERS

- A. Stockpile salvaged boulders in accordance as directed by the Commissioner.

1.5 SUBMITTALS FOR REVIEW

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

PART 2 PRODUCTS

2.1 BOULDERS

- A. Boulders: The boulders shall be site salvaged or locally procured stones in the sizes indicated on the plans and shall be hard, resistant to water infiltration and frost, with the highest density possible. Boulders shall be irregularly shaped and bearing few signs of quarrying. No sawn sides shall be permitted. Size shall be as shown on the drawings.
- B. Site Salvaged Boulders may be used if they meet with the approval of the Landscape Architect.

2.2 SUBMITTALS

- A. Samples: The Contractor shall submit samples showing the color gradation and texture of the proposed stone. All samples shall be clearly labeled with Contract No. and source.

- B. Photos: The Contractor shall submit photos of the boulders taken at the quarry or proposed source showing the typical range in size and shape. A person or other object shall be included in the photos to provide scale.
- C. All stones used on the work shall conform to the approved samples. Boulders delivered to the site and not confirming to the samples and photos shall be rejected and removed at the Contractor's expense.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions under provisions of Earthwork Section 02300.
- B. Verify that substrate is capable of supporting boulders, logs or stumps and ready to receive work of this section.
- C. Verify layout with the Commissioner.
- D. Verify gradients and elevations of substrate are correct.

3.2 PLACING BOULDERS

- A. Perform this work only under the direct supervision of the Commissioner.
- B. Lift boulders set into place using straps or chains suspended from the appropriate heavy machinery.
- C. The boulders shall be furnished and placed as shown on the drawings and as directed in the field by the Commissioner. The boulders shall be placed one by one on well compacted soil or broken stone. Boulders shall be lifted and set by use of fabric slings to avoid damage to the surface of the boulders to the satisfaction of the Commissioner. Boulders shall be set with striations and bedding planes laid horizontal. Boulders shall be placed in clustered arrangements as shown on the plans and designated by the Commissioner. Boulders shall be set in earth with one-third of boulder buried and two-thirds exposed unless otherwise directed. The Contractor shall perform any fine grading required to properly set the boulders, including placing and compacting backfill.
- C. Place boulders in clusters in arrangements designated by the Commissioner. Set boulders in earth with one-third of boulder buried and two-thirds exposed unless otherwise directed.

END OF SECTION

Bronx River House

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Boulders

02375-4

SECTION 02455 – TIMBER PILES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide timber piles in accordance with the requirements of the Contract Documents.
- B. Work includes the installation of timber piles, including pre-excitation, spudding or pre-augering, excavation, preservative treatment, pile driving, pile cutoff, pile trimming, cutting and pile fitting, location survey and pile identification plan, and including driving test piles as specified herein.
- C. Work of this Section, as shown or specified shall be in accordance with the requirements of the Contract Documents.
- D. The provisions of the 2008 New York City Building Code relating to pile foundations shall govern the work of this section.
- E. Install timber piles having a design axial compressive capacity of 20 tons at the locations shown on the Contract Drawings and as directed.

1.2 RELATED SECTIONS AND DOCUMENTS

- A. Green Building Requirements –Division 1
- B. Section 02300 – Earthwork
- C. Contract Drawings

1.3 REFERENCES

- A. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.
- B. Geotechnical Engineering Report prepared by Langan Engineering and Environmental Services, Inc, P.C. dated 9 May 2012.

1.4 STANDARD SPECIFICATIONS:

- A. AWPCA C1: All Timber Products-Preservative treatment by Pressure Processes.
- B. AWPCA C3: Piles-Preservative Treatment by Pressure Processing.
- C. AWPCA M4: Standard for the Care of Preservative Treated Wood Products
- D. ASTM D 25: Standard Specification for Round Timber Piles.
- E. ASTM D1143 Standard Test Methods for Deep Foundations Under Static Axial Compression Load.
- F. 2008 New York City Building Code

1.5 SUBMITTALS

- A. Independent Laboratory and/or Professional Engineer Certifications: The Contractor shall submit Independent Laboratory and/or Professional Engineer Certifications for approval of the Resident Engineer prior to start of work.
- B. Product Data: The Contractor shall submit manufacturer's product data on Preservative Treatment Material, Pile Heads & Bolt Holes Treatment Material, and Pile Tips.
- C. Affidavit: A sworn affidavit shall be furnished by the creosoting plant certifying that the grade, species and size of the material treated, the grade and quality of the creosote oil used, and the net final retention in pounds per cubic foot of wood impregnated into the piles all conform to the requirements of these specifications.
- D. Pile Driving Record: The Contractor shall submit the Pile Driving Record prepared by the Engineer of Record.
- E. Schedule: The Contractor shall submit a schedule of pile delivery and pile driving operations for coordination with the Engineer of Record.
- F. Pile Location Survey Reports: The Contractor shall submit the pile location survey reports in accordance with the Building Code of the City of New York.
- G. Pile Cap Concrete Work Submittals: The Contractor shall submit the following and secure approval before proceeding with Pile Cap Concrete Work:
 - 1. As-built Survey Drawings: The Contractor shall submit an as-built survey in duplicate sets simultaneously to the Design Engineer and to the Commissioner. This as-built survey shall include as-driven location of piles in reference to the building column lines and deviation from vertical.
 - 2. Analysis: The Designing Engineer will make an analysis of conditions at each pile cap location and will make a determination of corrective measures required, if any, to drop pile loads within the allowable limits.
 - 3. Supplemental Drawings: If corrective measures involve the driving of additional piles and/or the modification of pile cap details, details for splicing of timber piles, additional struts or braces or similar, Supplemental Drawings showing the details of the required corrective work shall be prepared by the Design Engineer.

1.6 QUALITY ASSURANCE

- A. Qualifications
 - 1. The pile installer shall specialize in performing the work of this Section and shall have a minimum of 3 years' experience and five projects of similar scope.
- B. Regulatory Requirements
 - 1. Work of this Section shall conform to all requirements of the 2008 New York City Building Code and all applicable regulations and governing authorities having jurisdiction, including safety, health, noise, and anti-pollution regulations. Where more severe requirements than those contained in the Building Code are given in

this Section, the requirements of this Section shall govern.

C. Certification

1. Timber piles shall conform to the material acceptance, certification, and inspection required by ASTM D25 and the 2008 New York City Building Code.
2. There is no requirement for Certified Wood on this project.

D. Contractor's Responsibilities:

1. The Contractor performing the work specified herein shall have at least three years' experience in installing timber piles and performing the required static load testing. Also at least three projects of equivalent size and complexity as this Contract. The Contractor's Professional Engineer and Professional Land Surveyor shall be licensed in good standing in the State of New York.
2. The Contractor shall accurately mark 1 ft intervals on each pile and shall number these marks at 5 ft intervals starting from the pile tip. The upper portion of the pile or a sufficient portion of the leads shall be marked at 1-inch intervals as necessary to determine the final driving resistance.
3. The Contractor shall cooperate with the Geotechnical Engineer to facilitate the progress of the work.

E. Special Inspections:

1. All pile installation shall be performed under full time supervision and quality control inspection by a New York State licensed Professional Engineer ("Special Inspector") engaged by the City of New York.
2. The Special Inspector will log the driving of each pile and determine when the pile has reached the required depth and specified driving resistance.
3. The Special Inspector shall have the authority to direct the Contractor to continue driving beyond the specified driving resistance based on specific field conditions.
4. Contractor shall notify the Commissioner a minimum of 72 hours prior to start of Work subject to controlled inspection.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the project site in such quantities and at such times to assure the continuity of pile driving/drilling operations, and to maintain the project schedule. Carefully handle piles by means of rope slings or other means so as not to damage piles; do not use peavies, cant hooks or other sharp tools.
- B. Piles shall be stored in orderly groups above ground sufficiently blocked to minimize bending stresses. Piles exhibiting variations beyond specified limits will be considered distorted and shall not be used in the work.
- C. Concentrated loads, which occur during stacking or lifting, shall be kept below the level that would produce permanent deformation or overstress of the material. Damaged

piles will be rejected from use in the performance of the work and shall be removed from the site.

- D. Delivered piles are subject to the inspection and approval by the Commissioner and Special Inspector prior to installation.

1.8 PROJECT CONDITIONS

- A. Refer to the Geotechnical Engineering Report prepared and associated boring and test data for information pertaining to the general subsurface conditions within the project site.
- B. Boring and other in situ test logs are made available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between borings. The City of New York, Langan Engineering & Environmental Services, and the Commissioner will not be responsible for interpretation conclusions drawn from this data by the Contractor.
 - 1. The Contractor, by careful examination, shall inform himself as to the nature and location of the work; the conformation of the ground, the nature of the subsurface conditions; the locations of the groundwater table; the character, quality and quantity of the materials to be encountered; the character of the equipment and facilities needed preliminary to and during the execution of the work; and all other matters which can be in any way effect the work.
 - 2. The Contractor shall be held to have visited the site and to have familiarized himself with the existing conditions of adjoining properties, utilities and buildings.
 - 3. The Contractor shall investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions, and other limitations affecting transportation to, ingress and egress of the site of the work. The Contractor shall conform to all New York City and State, and Federal regulations in regard to the transportation of materials to and from and at the job site and shall secure in advance Site Information:

PART 2 - PRODUCTS

2.1 TIMBER PILES

- A. Shall be 12 inch diameter Southern Pine or Douglas Fir, conforming to ASTM D-25, Class B requirements. The piles shall have a circular cross-section, a minimum diameter of 8 inches at the tip with uniform taper, and the corresponding butt diameter specified in Table 2 of ASTM D 25. Timber piles shall conform to and be installed in accordance with the latest edition of the New York City Building Code, and as required herein. Timber piles shall be as manufactured by MCM Forest Products, Hoboken, NJ, or approved equal. Timber piles shall be fitted with steel pile tips.

2.2 PILE TIPS

- A. Shall be "Arrow Head" Model T-9168, 5" to 10"- as manufactured by Associated Pile and Fitting Corp., Clifton, NJ, or approved equal. Pile Tips shall be fabricated from Hot Rolled Commercial Quality Steel conforming to Federal Specification, GSA RR-S-

331C.

2.3 PRESERVATIVE TREATMENT

- A. All wood components shall be pressure preservation treated in strict accordance with the provisions of the AWPA standards. Wood shall be seasoned, either by air-drying or kiln drying, and the moisture content prior to treatment shall be not more than 25%. Wood shall be treated to a net retention of .40 pounds per cubic foot with ACQ (ammoniacal copper quaternary), Copper Azole preservation, or approved equal. The preservative shall penetrate 2.5 inches or 85% of the sapwood. All details of treatment methods, quality, control and product testing shall be in accordance with the appropriate AWPA standards. In accordance with New York State law, Bills A102 and S7167, CCA (chromated copper arsenate) treatment is prohibited as a wood preservative treatment material.
- B. If any other preservative treatment is proposed, the Contractor shall submit documentation that such treatment conforms to the AWPA Standards for treatment of the wood for the intended use.

2.4 QUALITY MARK

- A. Timber piles shall bear the AWPB quality mark, certifying conformance with this specification.

2.5 SITE INSPECTION OF PILES

- A. The piles shall be subject to inspection by the Resident Engineer after arrival at the site. Previous inspection at the plant shall not bar rejection in the field due to injury, breakage, or other defects. Piles shall be free from heat checks, water bursts, excessive checking, or from other damage or defects which would impair their durability, usefulness for the intended purpose. The use of 'S' irons for repairing or preventing checks, splits, or other defects will not be permitted.

2.6 STORAGE & HANDLING OF PILES

- A. Piles shall be stored and handled in a manner which will avoid damage to the piles. Special care shall be taken to avoid breaks in the surface of the piles. Tools such as cant hooks, dogs and pike poles shall not be used. Field treatment of cut or damaged surfaces shall conform to AWPA M4.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Treatment Of Pile Heads: The heads of piles shall be cut square, dried and covered with two (2) applications of a mixture of hot creosote.
- B. Preparation For Driving: Piles shall be fitted with pile driving caps, as required to prevent damage to the head of the pile. Provide collars or bands, if needed, to prevent splitting and brooming of the tops of piles. Piles shall be fitted with pile driving shoes, installed in accordance with the manufacturer's recommendations.
- C. Pile Driving: Piles shall be driven with a piling hammer of suitable energy to install the

piles to the required penetrations and capacities, without damage.

1. Sufficient air capacity shall be provided at all times to maintain the rated speed of hammer during the full driving time. The valve mechanism and other parts of the hammer shall be maintained in first class condition, to obtain the required length of stroke for a single acting hammer and the number of blows per minute for a double acting hammer. Any double-acting hammer not operating at the manufacturer's rated speed shall be deemed unsatisfactory, and shall be removed from the site.
 2. Pile driver leads shall be constructed in a manner as to afford freedom of movement of the hammer, and shall be held in position by guys or stiff braces to insure lateral support to the pile during driving. Followers shall not be used. Jetting shall not be used unless permitted in writing by the Resident Engineer. If jetting is permitted, piles shall be driven for at least the final five feet (5') of penetration.
- D. Defective Piles: Piles that are broken during driving, or are otherwise impaired, as determined by the Resident Engineer, shall be replaced at the Contractor's expense.
- E. Cutting & Trimming: Piles shall be sawn to true planes. Surfaces shall be trimmed to provide level bearing areas. Boltholes shall be drilled after the piles are installed, and bolts shall have a driving bit.
- F. Pile Driving Criteria: Piles shall meet both minimum penetration and minimum capacity requirements, as follows:
1. Minimum Tip Elevation: EL (-)10ft Bronx Borough Datum
 2. Maximum safe allowable bearing capacity (By Code): 20 Tons (plus 5 tons for drag-down) for piles bearing on top of rock
- G. Determination of Bearing Value
1. The safe bearing values for Timber Piles shall be determined by the following formulas:
 - a. For Single Acting Hammers: $P = (2 WH)/(S+0.1)$
 - b. For Double Acting Hammers: $P = (2E)/(S+0.1)$
 - c. Where P = Safe Bearing Capacity (Pounds)
 - d. W = Weight of Hammer (Pounds)
 - e. H = Fall Height for Hammer (Ft.)
 - f. S = Average Penetration for the Last 15 Blows (Inches/Blow)
 - g. E = Energy Delivered by Hammer (Ft-Pounds)
 2. The above formulas are applicable only when:

- a. The hammer has free fall.
 - b. The head of the pile is not broomed or crushed.
 - c. The penetration is reasonably quick and uniform.
 - d. There is no visible bounce after the blow.
3. Piles shall be driven to develop the safe bearing capacity specified. However, the Resident Engineer reserves the right to reject the pile, if its capacity is considered unreliable, in view of the length of the pile relative to other piles, the driving conditions encountered, or other factors which indicate that its capacity or support is questionable.
- H. Obstructions: Potential obstructions to pile driving exist in the fill. Contractor shall pre-excavate, spud or pre-auger to remove any obstruction that may interfere with driving operation or may cause damage to the pile. All pre-excavation, spudding or pre-augering shall be done at no additional cost to the City of New York. Pre-drilling equipment and/or spudding equipment, if used, shall be adequate to pass the specified pile through all obstructions encountered within the fill, but not more than 2 inches greater in diameter than the outside diameter of the pile.
- I. Length Of Piles
1. It is the intent of this Contract that the Contractor assume full responsibility in ordering piles of lengths which will be sufficient to achieve required capacities. It is preferred that piles be single lengths, without splices. Details for splicing of timber piles may be submitted to the Commissioner for approval.
 2. To aid in evaluating pile length requirements, the Contractor may elect to drive test piles. If Test Piles meet all requirements of this specification and are installed at a required location, as shown on the plans, they will be paid for under this Item.
- J. Inspection of Pile Driving Operations: All pile driving operations shall be subject to Special Inspections by the Engineer of Record in accordance with the Building Code of the City of New York as amended to date.
- K. Pile Driving Record: The Engineer of Record shall maintain the Pile Driving Record during the entire pile driving operation. The Pile Driving Record for each pile shall include the number of blows per foot, the tip elevation, the pile cut-off height, and the type of hammer used.
- L. Pile Location Survey: A foundation survey, including pile locations, will be provided by an independent Licensed Surveyor in accordance with the Building Code of the City of New York. See "Submittals" section of this Specification. The tolerance in pile head locations shall be $\pm 3"$.
- M. Pile Location Survey Reports: The Contractor shall file and distribute the pile location survey reports in accordance with the Building Code of the City of New York. See "Submittals" section of this Specification
- N. Pile Analysis And Redesign: It is the intent to secure such conditions that the load on

any pile will not exceed the maximum load allowed by the Building Code of the City of New York. Any excessive lateral force at the level of the pile cap due to lean in the pile caps themselves will be resisted by properly designed concrete members. No concrete for any pile cap will be placed until the survey affecting the pile cap has been analyzed and approval to process with the concrete work is given to the Contractor.

- O. The Contractor shall engage the services of a Licensed Professional Engineer, designated by the Commissioner as the "Designing Engineer", for the performance of the structural engineering work called for herein. The Contractor may submit the name of an Engineer of their own choice to the Commissioner for consideration, who will be designated, if found acceptable, as the Designing Engineer.
- P. Cost of Analysis and Redesign: It is the intent of the Contract that the cost of the entire analysis, whether or not it results in the determination of the necessity for corrective measures, shall be borne by the Contractor. The Contractor shall also bear the cost of redesign necessitated by damaged piles and piles installed in misdriven locations. The analysis and redesign shall be performed by the Designing Engineer.

3.2 CLEAN-UP

- A. All debris resulting from excavation of objectionable material, removal of obstruction, cut-off butts, and any material not to remain as part of the construction is to be removed and disposed of by the Contractor in a legal manner at no additional cost to the City of New York.
- B. The site shall be cleaned at frequent intervals and no material shall be stored on the site in a manner, which would obstruct the easy access of equipment and personnel.

END OF SECTION

SECTION 02510 - WATER DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish labor, materials, services, equipment, and other necessary items required for accompanying the construction of the water systems. This shall include, but not be limited to the following: pipe and fittings for site water line including domestic water line and fire water line, valves, flexible connections. Set lines, elevations, and grades for water distribution system work for duration of work including careful maintenance of benchmarks, property corners, monuments, or other reference points.
- B. Prepare and file permits as required for the installation of fire hydrant and water main work.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Green Building requirements –Division 1.
- B. Section 02205 – Protection, Demolition, and Relocation of Existing Utilities
- C. Section 02300 – Earthwork
- D. Section 02370 – Erosion Controls
- E. Section 03700 – Cement and Concrete for Exterior Improvements
- F. Contract Drawings
- G. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.

1.4 REFERENCES

- A. ANSI/ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- B. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- C. ASTM B88 - Seamless Copper Water Tube.
- D. ANSI/AWS A5.8 - Brazing Filler Metal.
- E. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

- F. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
- G. ANSI/AWWA C111- Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.
- H. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- I. ANSI/AWWA C500 - Gate Valves, 3 through 48 inches NPS, for Water and Sewage Systems.
- J. ANSI/AWWA C502 - Dry Barrel Fire Hydrants.
- K. ANSI/AWWA C504 - Rubber Seated Butterfly Valves.
- L. ANSI/AWWA C508 - Swing-Check Valves for Waterworks Service, 2 inches through 24 inches NPS.
- M. ANSI/AWWA C509 - Resilient Seated Gate Valves 3 inches through 12 inches NPS, for Water and Sewage Systems.
- N. ANSI/AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.
- O. ANSI/AWWA C606 - Grooved and Shouldered Type Joints.
- P. UL 246 - Hydrants for Fire - Protection Service.
- Q. New York City Department of Environmental Protection Bureau of Water and Sewer Operations – Standard Water Main Specifications

1.5 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Submit Catalog Cuts of the DCV, water meter, meter reading system, control valve, and all connected piping for approval prior to installation.
- B. Manufacturer's Certificate: Certify that products meet or exceed state and local requirements.
- C. Shop Drawings: A shop drawing is required showing installation of the complete DCV assembly, water meter, piping, pie supports, and the precast concrete structures.

1.6 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of piping mains, valves, connections, and invert elevations. Provide Commissioner with as-built documents within 30 days of project completion.
- B. Identify and describe unexpected variations to subsoil conditions and discovery of uncharted utilities.

1.7 QUALITY ASSURANCE

- A. Perform work in accordance with utility company and municipality requirements.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

PART 2 - PRODUCTS

2.1 DUCTILE IRON WATER PIPE

A. Industry Standards

1. Ductile Iron Pipe: Cement-Lined, ANSI/AWWA C151/A21.51 Class 56 for pipe 6 inch diameter and larger; Class 55 for smaller than 6 inch diameter:
2. Fittings: Ductile iron, standard thickness.
3. Joint connecting hardware to ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
4. Cement mortar lining to ANSI/AWWA C104/A21.4, except the cement mortar lining shall be double the minimum thickness specified in the ANSI/AWWA Standard and a seal coat shall be applied.
5. Flanged pipe to ANSI/AWWA C115/A21.15, Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges to ASME B16.1 Class 125.

B. The pipe shall be push-on-joint with restrained rubber gaskets, mechanical joint with rubber gasket, or flanged joints.

C. Pipe with push-on joint or mechanical joint shall be ductile iron to ASTM A536 Grade 60-42-10 or approved equal, and shall comply with the following Class requirements of AWWA/ANSI C151/A21.51:

1. 3, 4, 6, 8, 10, and 12-inch nominal pipe diameters to Class 56
2. 14, 16, 20, 24, 30, 36, 42, and 48-inch nominal pipe diameters to Class 55

D. Push-on gasket joint shall be to the following industry standards:

1. Fastite
2. Tyton
3. Super-Lok
4. TR Flex with gripper rings
5. Snap-Lock
6. Flex-ring
7. Field Lok 350 – 4-inch through 24-inch
8. Field Lok 30-inch through 36-inch

9. Fast Grip 4-inch through 20-inch

E. Mechanical joints shall use the following Mechanical Wedge Restraints:

1. Megalug Series 1100, up to 48-inch diameter, from EBBA Iron Works
2. One-Lok Model SLD, up to 36-inch diameter, from Sigma Company
3. Ford Meter Box Model 1400, up to 24-inch diameter
4. Romac Industries RomaGrip Pipe Restraint, 3-inch through 12-inch diameters

F. Flanged Pipe shall be to ANSI/AWWA C115/A21.15 with Solid Ductile Iron threaded flanges to table 2, except the bolthole diameter shall be larger as indicated elsewhere in this specification, if insulating joint is specified. The pipe thickness shall be as specified for the push-on or mechanical joint joints as listed in this specification.

2.2 COPPER TUBING WATER PIPE (1/2" TO 3" DIAMETER)

- A. The water service pipe shall be rigid hard temper type "k" copper tubing in straight lengths meeting the specification for ASTM designation No. B88.
- B. Fittings shall be approved wrought copper and bronze solder - joint pressure fittings (ANSI B 16.22), Di-Electric fittings as required.
- C. Joints shall be made by soldering, using 95-5 tin antimony solder. From the curb valve to the water tap, joints shall be of the "flared" type.

2.3 GLOBE VALVES - LESS THAN 3 INCHES (75 MM)

- A. Valves two inches one half inches (2½") and under shall be all bronze, renewable composition disc, rising stem, screwed ends, or solder ends, with a one inch (1") operating nut, Stockham No. B-22 or B-20, or approved equal.
- B. An approved operating key of proper size for each valve shall be furnished by the Contractor, except that the Contractor need not furnish more than two (2) keys for each size or kind of valve regardless of the quantity of valves called for in the contract.

2.4 GATE VALVES - 3 INCHES (75 MM) AND OVER

- A. Manually operated, inside non-rising stem, ductile iron body/bonnet/seal plate, non-packing, bronze seated, double disc, seating wedge mechanism gate valve; model and manufacturer as approved by the NYCDEP Bureau of Water and Sewer.
- B. An approved operating key of proper size for each valve shall be furnished by the Contractor, except that the Contractor need not furnish more than two (2) keys for each size or kind of valve regardless of the quantity of valves called for in the contract.

2.5 JOINT RESTRAINT

- A. Concrete for Thrust Blocks: Place thrust blocking consisting of 3,000 psi concrete to provide sufficient bearing area to transmit unbalanced thrust from bends, tees, caps, restrained mechanical joints, or plugs to undisturbed soil.

2.6 REDUCED PRESSURE ZONE ASSEMBLY

- A. Spray shower backflow prevention device shall be 3-inch Watts 909 RPZ or approved equal.
- B. RPZ assembly shall be located above-ground in a 70-inch x 26-inch Watts box, or approved equal.

2.7 DOUBLE CHECK VALVE ASSEMBLY

- A. Property line backflow prevention device shall be 8-inch Wilkins 350A in accordance with NYC DEP BWSO Backflow Prevention Device approval number 11034088. If the Contractor installs equipment Other than that approved by the Cross Connection Control Unit of D.E.P., it will be the Contractors responsibility to re-file and obtain the required approvals at his/her own expense and at no additional cost to the City of New York.
- B. Shall consist of two (2) independently operated, center guided, spring loaded check valves, two (2) threaded inlet and outlet, full port ball valve, shut-off valves and four (4) test cocks as manufactured by FEBCO, Watts, or approved equal.
- C. Water Meter
 - 1. Water Meters shall be the BadgerMeter 8" Fire Service Application Assembly, (Model FSAA-01), or approved equal. All water meters furnished shall conform to the "Standard Specifications for Cold Water Meters", AWWA Standard C700 latest revision.
 - 2. Water meters shall consist of a bronze maincase with the serial number stamped on the maincase. Only displacement meters of the flat nutating disc type will be accepted for improved operation. The size, capacity and meter lengths shall be as specified in AWWA Standard C700, latest revision. The maximum number of disc nutations is not to exceed those specified in AWWA C700 latest revision to minimize premature wear.
 - 3. Meter Maincase: All one (1") inch meter maincase shall be the removable bottom cap type with the bottom cap secured by six (6) bolts. Bottom caps shall be interchangeable, size for size, between frost-protected synthetic polymer or cast iron and non-frost protected (bronze) models. No meters utilizing frost plugs will be accepted. Non-frost protected meters shall have bronze or synthetic polymer bottom caps. The cross section of the bottom shall break clean when subjected to freezing pressure of 600-850 psi. All maincase bolts shall be of 300 series stainless steel to prevent corrosion. Bottom cap bolt lugs shall be enclosed in the maincase and shall not have externally exposed, threaded through holes. All one and one-half (1-1/2") inch and two (2") inch meters shall have a split design secured by bronze or stainless steel bolts.
 - 4. Register: The register shall be of the straight reading sealed magnetic drive type and shall contain six (6) numeral wheels. Registers must be sealed and dry. All direct reading register lenses shall be flat, of high strength, and impact resistant glass to prevent breakage. The dial shall be of the center sweep pointer type and shall contain 100 equally divided graduations at its periphery. The register must

- contain a low flow indicator with a 1:1 disc nutating ratio to provide leak detection. Register boxes shall be bronze.
5. All meters must be adaptable to digital encoder register without interruption of the customer's service for the purpose of pit, remote, or central meter reading. The registers shall be secured to the maincase by means of a plastic tamperproof seal pin to allow for in-line service replacement. Seal screws are not acceptable.
 6. Register retainer rings shall have an impact resistant design which absorbs register glass lens impact. All registers shall have the size, model, and date of manufacture stamped on the dial plate.
 7. Measuring Chamber: The measuring chamber shall be a nutating disc type, the flat nutating disc shall be molded of a non-hydrolyzing hard rubber or synthetic polymer and shall contain a type 316 stainless steel spindle. The nutating disc shall be equipped with a synthetic polymer thrust roller with a stainless steel shaft located within the disc slot. The roller head shall roll on the buttressed track provided by the diaphragm in the measuring chamber. The measuring chamber shall be of a 2-piece snap-joint type. The measuring chamber shall be made of non-hydrolyzing synthetic polymer, shall be smoothly and accurately machined and shall contain a removable molded diaphragm of the same material as that of the chamber. No screws shall be used to secure the chamber together. The control block shall be the same material as the measuring chamber and be mounted on the chamber top to provide sand ring protection. The control block assembly shall be removable to facilitate repairing. Control block assemblies shall be designed to allow no magnetic slippage which would result in a loss of revenue. The measuring chamber outlet port shall be sealed to the maincase outlet port by means of an "O" Ring gasket to eliminate chamber leak paths.
 8. Guarantee: Manufacturer of registers must be guarantee products for at least ten years. All meters will be guaranteed for one year on material and workmanship. To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by AWWA C700 (low, intermediate, and full flow). All meters shall be warranted as adaptable to the Badger ADE Meter Reading System.
 9. Strainer: All meters shall contain removable polypropylene plastic strainer screens. The strainer shall be located near the inlet maincase port, before the measuring chamber and control block assembly.
 10. Remote Reader: The Remote Reader shall be the ADE (Absolute Digital Encoder) by Badgermeter, or the Neptune Proread ARB System as manufactured by Schlumberger Industries Water Division, or approved equal. The Remote Reader shall be a self-contained encoder register metering system designed to obtain remote simultaneous water meter registration directly from the register odometer. The metering information shall be obtained through a remotely located receptacle using a compatible data capture system. The system shall consist of the Encoder Meter Register and Remotely Mounted Receptacle.
 11. Encoder Meter Register: Shall be direct mounted with encoded odometer wheels and digital data stream. Batteries or pulses are not allowed.

12. **Registration:** The register shall provide a six digit visual registration at the meter. The unit shall, in a digital format, simultaneously encode the four or six most significant digits of the meter reading for transmission through the remotely located receptacle. (The most significant meter registration digits are defined as those digits on the register number wheels that denote the highest recorded values of water consumption.) A quick indexing mechanism shall be employed which shall prevent ambiguous reading. The register shall have a full test sweepband or dial divided into gradients of down to 1/100th of the units of registration. Register test rings shall be available for shop testing. The units of registration shall be in U.S. gallons. These units shall be clearly designated on the face of the register. The month and year of manufacture and other identification information shall appear on the face of the register. The register shall employ a leak detection indicator on the dial face. Registers using pulse generation or conversion of pulses to digital output is not permitted. Batteries shall not be required.
13. **Mechanical Construction:** Materials used in the construction of the register shall be compatible with the normal water meter environment and with each other. The unit shall possess a copper bottom and incorporate a rubber O-ring seal. Where indicated, pit set registers must be provided with moisture protection for all internal components when operating under flooded pit conditions. The register and mounting base shall be integral components and should not allow for disassembly. The register shall be attached to the meter case by a bayonet attachment. Fastening screws or nuts shall not be required. A tamperproof plastic seal pin shall be used to secure the register to the main case. No special tools shall be required to remove the register. The register head must swivel 360 degrees without removing the seal pin to facilitate visual reading and ease of wiring. The register shall be removable from the meter without disassembling the meter body and shall permit field installation and/or removal without taking the meter out of service. Provision shall be made in the register for the use of seal wires to further secure the register. Terminal screws must be accessible on the register for transmission wire connection to the remote receptacle or future connections to a telephone system.
14. **Electrical Construction:** The materials employed for contacts and connectors shall inhibit corrosion and shall suffer minimal effect from environmental conditions to which they are exposed. The number wheels used in the register assembly shall be provided with spring-type bifurcated metal contacts to insure a high probability of information transmission.
15. **Connection** shall be made to the register by three screw-type terminals, sonically inserted into the register top. Access to the terminals shall be available to all models of register. A port cover shall be provided to cover the terminals after they have been wired. Digitally formatted data transmitted from the register shall incorporate a check sum character to verify correct information transmission and integrity. Data errors shall be indicated by the reading equipment.
16. **Meter Reading Information:** The encoder register shall provide up to six digits of information to the reading equipment. A ten digit identification number shall also be provided with each reading. The utility shall have the option to reprogram the internal register identification number an unlimited number of times. The encoder

register must have the capability to provide additional custom information to the reader. This information shall be programmed (and reprogrammed at any time) by the utility. Information on programming the register, equipment needed, and encoder meter reading output shall be provided with each proposal.

17. Remote Mounted Receptacle: The remote mounted receptacle shall be the Badgermeter BadgerTouch automated Meter Reading System, or approved equal. Remote receptacle shall provide a communication link for the transmission of information from the register.
18. Mechanical Construction: Where indicated, a remote receptacle must be provided for attachment to a pit meter lid with another unit also designed for attachment by wall mounting. The materials employed shall be corrosion resistant, resist ultraviolet degradation, unaffected by rain or condensation, and compatible with rugged service and long life. The pit mounted receptacle shall be mounted to the water service vault access door of the water service vault concrete structure. The hole size to be drilled in the access door shall not exceed 3/8" each and shall be gasketed. The pit mounted receptacle shall be provided with a minimum length of ten feet of wire connected and sealed at the receptacle without terminal exposure.
19. Electrical Construction: The receptacle construction shall incorporate the function of a cable clamp or strain relief. Design of the unit shall be such that it provides for mechanical and electrical connection between the receptacle and interrogation equipment.
20. Cable: The connecting cable shall be of the two-wire conductor type in a sheath which shall be abrasion and moisture resistant. Each conductor shall be color coded.

D. Vault

1. Concrete: 4,000 psi concrete reinforced for H20 loading in accordance with ASTM C478 of size, shape and depth as indicated on the Contract Drawings. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
2. All precast concrete shall have a honed finish. The precast concrete shall be well cured, shall be dense and shall have good edges. The cement and aggregate shall be thoroughly mixed in a proportion of one (1) part Portland cement to not over six (6) or less than four (4) parts of aggregate. The aggregate fine and course shall conform to ASTM C-33. Aggregate shall be free of all deleterious substances which cause reactivity with oxidized hydrogen sulfides. Aggregate shall be graded to produce a homogeneous concrete mix.
3. Mortar: The mortar shall be composed of one (1) part of Portland cement and a maximum of two (2) parts fine aggregate, with not more than five percent (5%) of the cement content of hydrated lime putty.
4. Reinforcement: Grade 60 deformed steel rebars with galvanized finish. Reinforcing shall conform to the latest revised edition of the AISC code. Reinforcement is to be designed by the Manufacturer to meet H-20 loading and shall take into account all openings, sleeves, hatches and doors etc. within that

precast concrete structure.

5. Ladder Installations: Ladder installations for each precast concrete structure including the water service vaults structure shall comply with OSHA standard 1910.27. Ladders to be constructed of copolymer polypropylene plastic, as manufactured by M.A. Industries, Peachtree City, Ga., or approved equal.
6. Access door shall be 48" x 48" size, heavy duty (H20 loading) painted silver gray (color to be approved by the landscape architect) anodized aluminum access doors such as JD-H20 double leaf door, as manufactured by Bilco or STH4848D "Just Set" double leaf doors, as manufactured by Pennsylvania Insert Corp. or approved equal. Frame shall have integral drain channel, anchor flanges, and neoprene gasket. A one-and-one half inch drain (1 1/2") coupling shall be located on the corner of the frame. Operation shall be spring assisted for easy operation. A hold open arm shall automatically lock the door in the 90° position. Hinge shall be heavy forged brass with a stainless steel pin. Door shall be provided with two locks. Locks shall be "Ford" lifter worm lock with waterworks bronze pentagonal bolt type "LL". All hardware shall be zinc or cadmium plated.
7. Security bolts shall be two (2) pentahead security bolts. Special Design Criteria for Security Bolts:
 - a. Bolt must be made from alloy steel, heat treated to 150,000 psi tensile strength.
 - b. Head of bolt must be selectively hardened to Rc 60 min. to prevent the use of files, hacksaws, and chisels.
 - c. Bolt is to be made with either a flat or 120o cone seat as required.
 - d. Bolt will be torqued by means of a recessed curvilinear ("Daisy") groove in the top face of bolt head. A special mating key is required to operate in groove for installation and removal of bolt.
 - e. Bolts are to be zinc nickel plated in order to meet an ASTM B-368 C.A.S.S. test for 22 hours.
 - f. Bolt lengths are to be held to +/- .01".
 - g. Bolt threads are to be class UNC-2A.
8. Construction Accessories: Frames shall be 3/16" x 2" x 2" angle welded with joints ground smooth, after fabrication. Hinges shall be heavy duty and welded to door and frame.
9. Railing: Railing shall be constructed of 2" dia. steel tubes and 3/8" anchor plates, welded and hot dipped galvanized.

E. Extra materials

1. The Contractor shall furnish one major DCVA Repair Kit (furnish only, not install) and deliver to the appropriate NYC DPR Maintenance and Operations Borough Shop. The repair kit shall consist of new materials obtained from the RPZ

manufacturer. Repair kit shall include all consumable or replacement items including rv and check seat disc, bushings, washers, o-rings, bolts, etc. All furnished material shall be properly identified with the DCVA size and installation location.

2.8 HYDRANT

- A. Hydrant: "A.P. Smith Hydrant" as manufactured by US Pipe and Foundry, "Dresser 500 Style" as manufactured by M&H Valve, or as approved by NYCDEP Bureau of Water. Any models not pre-approved by NYC DEP will not be acceptable.
- B. Hydrant Extensions: Fabricate in multiples of 6 inches with rod and coupling to increase barrel length.
- C. Hose and Streamer Connection: Match sizes with NYC Fire Department, two hose nozzles, and one pumper nozzle.
- D. Finish: Paint for standpipe shall be heavy-duty enamel paint VOC-complying, color shall be black. Paint for hydrant dome and steel fenders shall be heavy-duty rust resistant aluminum paint, such as "Silver-Brite Heavy Duty Rust Resistant Aluminum Paint" as manufactured by The Sherwin-Williams Company, Woodside, NY, or approved equal.
- E. Gate Valve: Shut-off valve shall be U.S. Pipe, model No. 5460, or approved equal, with mechanical joint pipe ends, cast iron body, bronze mounted, non-rising stem, 200 psi with two inch (2") valve operating nut.
- F. Valve Box: 5 1/4" diameter valve boxes shall be Bingham & Taylor Fig. No. 4908 with a Fig No. 4904-L locking cover, or approved equal. The cover shall have the designation "WATER" cast thereon. The boxes shall extend within the limits called for on the plans.
- G. Hydrant Fenders: Fenders shall be extra heavy galvanized steel pipe, 5.6" O.D. and shall conform to ASTM Serial Designation A-120, Schedule 80, except that pipe shall be unthreaded and untested for water pressure. A malleable iron or cast iron screw cap shall be tack welded to cap the fenders after the pipes are filled with concrete.
- H. Hydrant Drain: As shown on construction drawings in accordance with requirements of NYCDEP.

2.9 SPRAY SHOWER EQUIPMENT

- A. NYC DPR will provide the contractor with the appropriate Spray Pad Control Panel and Spray Pad Water Supply Manifold. The contractor shall install and test the equipment under this item, to the satisfaction of NYC DPR. For additional information, refer to the appropriate addendum to the General Conditions of this contract.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions.
- B. Verify building service connection points with architectural plans.

- C. Verify that existing water main size and location are as indicated on the drawings.

3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 02300 Earthwork.
- B. Form and place concrete for pipe thrust restraints at any change of pipe direction.
- C. Place bedding material at trench bottom.
- D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact in accordance with Section 02300.
- E. Refer to NYC DEP Drawing 44292-B-Z for bedding and filter fabric installation requirements for ductile iron pipes.

3.4 INSTALLATION - PIPE

- A. Maintain separation of water main from sanitary and storm sewer piping in accordance with state and local code. Unless otherwise approved, water mains shall be separated from sanitary sewer pipes a minimum distance of 10 feet horizontal and 18 inches vertical.
- B. Install ductile iron piping and fittings to ANSI/AWWA C600.
- C. Route pipe in straight line.
- D. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- E. Install access fittings to permit disinfection of water system performed under this section.
- F. Form and place concrete for thrust restraints in accordance with the Contract Drawings at each elbow or change of direction of pipe main.
- G. Establish elevations of buried piping to ensure not less than 4 ft of cover over the top of pipe under proposed grading.
- H. Backfill trench in accordance with Section 02300.
- I. Connections with Existing Pipelines: Where connections are made between new work and existing piping, make connection using suitable fittings for conditions encountered. Make each on-site wet tap connection under conditions which least interfere with operation of existing pipeline. NYCDEP will install wet tap to their main in public roadways.

3.5 INSTALLATION - VALVES AND HYDRANTS

- A. Each hydrant shall be installed and connected to the existing water main as shown on BWS Standard Drawing No. 18581-B-Z, "Standard Hydrant Connection for Steel and Ductile Cast Iron Water Mains". Installation of hydrant and all related plumbing work shall be performed by a licensed plumber.
- B. Install gate valves as indicated on Drawings, supported on concrete pads with the valve stem vertical. Install valve boxes in a manner that will not transmit loads, stress, or shock to valve body. Center valve box over operating nut of valve vertical and plumb. Securely fit valve box together leaving cover flush with finished grade.
- C. Hydrant shall be placed so that centerline of hydrant is approximately two (2'-0") feet back of the face of curb. The pumper nozzle shall face the road. Hydrants shall be set plumb and installed to proper height.
- D. Each fire hydrant shall be installed on a concrete pad not less than six (6") inches thick and have a minimum area of three (3') feet by five (5') feet. Concrete pad shall have a broom finish. The backside of the hydrant, opposite the pipe connection shall be firmly blocked against the vertical face of the trench to prevent the hydrant from blowing off the line. If the character of the soil is such that the hydrant cannot be securely blocked, then bridle rods and rod collars shall be used. Bridle rods and rod collars shall be less than three-fourths (3/4") inch stock, and shall be thoroughly protected by painting with acid resisting paint.
- E. Around the base of each hydrant shall be placed not less than seven (7) cubic feet of broken stone to insure the complete drainage of the hydrant when closed. All backfill around hydrants and valves shall be thoroughly and carefully compacted after correct positioning.
- F. Before installing any hydrant, care shall be taken to see that all foreign material is removed from the interior of the barrel. When hydrant is ready for service, the hydrant and valve shall be opened and closed to see that all parts are in working condition. After closing the main valve, a nozzle cap shall be removed and the standpipe interior inspected to make sure of proper drainage.
- G. Fenders: Two (2) steel pipe hydrant fenders must be installed with the hydrant, in accordance with BWS Standard Detail No. 45161-Z-A. Posts shall be set in average concrete footings and, once installed, the steel pipe shall be filled with average concrete. Post caps shall be tack welded to the fender pipe. All fenders shall be set plumb and true to line and grade. The distance between the fenders shall be 4'-6", with the hydrant in the center.
- H. Painting: After the hydrant has been installed, the standpipe above the ground line shall be thoroughly cleaned and, with the exception of the dome, shall be given one heavy coat of quick drying black enamel paint. The dome and hydrant fenders shall receive one heavy coat of bright aluminum paint, as specified above. On the standpipe, just below the nozzles, on the roadway face of the hydrant, shall be stenciled, in white numerals five (5") inches high, the size of the water main to which the hydrant is connected. Paint for white numerals shall be an oil type paint, designed for exterior use. It shall cover solidly in one coat and dry to a satisfactory gloss.

3.6 INSTALLATION – REDUCED PRESSURE ZONE ASSEMBLY

- A. Set or cast concrete slab, constructed minimum 6-inches beyond Watts box extents, on minimum 12-inches broken stone. If unsatisfactory bearing material is encountered, increase stone depth as ordered by the Commissioner.
- B. Install reduced pressure zone assembly as per manufacturer's requirements, and in accordance with all requirements of the NYC Building Code and NYC DEP.

3.7 INSTALLATION – DOUBLE CHECK VALVE ASSEMBLY

- A. Set double check valve assembly vault on minimum 12-inches broken stone. If unsatisfactory bearing material is encountered at this depth, increase stone depth as ordered by the Commissioner.
- B. Install the DCVs, Water Meters and all piping, fittings, valves, test tee, test tee valve, and supports as shown on the on the Contract Drawings. The meter shall be set so that the dial faces upward and is horizontal. The dial shall not be more than three (3) feet above the floor. The encoder register shall be installed on meter as per manufacturer's instructions. The remote reader receptacle shall be installed in the pit cover as per the manufacturer's directions and recommendations, allowing reading of the meter from above ground level. The Contractor shall allow sufficient Water Meter Remote Reader cable slack for vault door opening. The DCVs shall be installed as shown on the Contract Drawings and per manufacturer's instructions. The Contractor shall comply with all rules, regulations, and requirements of all regulatory agencies having jurisdiction.
- C. Connections: Connect the water piping as shown on the Contract Drawings for complete and satisfactory operating unit to the satisfaction of the Commissioner. Connections shall be made to The Water Meter by coupling union or flange union on both inlet and outlet ends of the meter and bored for sealing with holes not less than one-eighth (1/8) of an inch in diameter - solder connections are not permitted. Connections to the DCV shall be as shown on the Contract Drawings and per manufacturer's instructions.

3.8 DISINFECTION OF WATER PIPING SYSTEM

- A. Disinfect line in accordance with NYC Building Code Rules and Regulations.
- B. After sterilization, test water for bacterium in accordance with AWWA and NYC Building Code regulations. Do not place distribution system in service until approval is obtained from NYC Department of Buildings.

3.9 SERVICE CONNECTIONS

- A. Construct water service lines to within 5 feet of the building entry point.

3.10 FIELD QUALITY CONTROL

- A. Water line installation and testing shall be certified to the NYCBC by a licensed plumber. The Contractor shall cooperate with the Commissioner as required to facilitate testing and inspection of the work.

- B. Test water distribution system installed below grade and outside the building in accordance with NYCBC and the following procedures:
1. Ductile Iron pipework shall be tested at a hydrostatic pressure equal to 150 psi. The pipe work shall maintain said pressure for not less than two hours.
 2. Type K copper tubing shall be tested to 100 psi for thirty minutes.
 3. Furnish, install, and operate the necessary connections, pumps, meters, and gauges. Leakage shall not exceed that permitted by AWWA Specifications C600-64 for mechanical joint and push-on joint pipe. Prior to running any field test, a meter shall be tested, sealed, and approved by applicable governing authority at Contractor's expense.
 4. Locate and repair any leaks. Repeat testing until process results are satisfactory and in compliance with this section.
 5. Furnish a copy of the results of the meter test and the hydrostatic pressure test to the Commissioner upon completion of water distribution system backfilling operations.
- C. Contractor shall call for NYCDEP inspection of all waterline work and shall be responsible for obtaining all NYCDEP signoffs, including but not limited to tap release letters and meter release letters.
- D. The Contractor shall be responsible for obtaining all certifications and permits necessary to comply with the NYC Bureau of Water Supply & Wastewater Collection, Bureau of Customer Service, Cross Connection Control Unit, the NYS Dept. of Health regulations, and any other regulatory body required, to install and commission the water meters, water service vault, double check valve and reduced pressure zone assemblies. This will include Certification by Backflow Prevention Device Tester; Certification of Master Plumber responsible for the installation, and a Professional Engineer's or Registered Architect's Certification that the installation is in accordance with the approved Plans. The Contractor shall prepare and submit copies of N.Y.S.D.O.H. Form Gen. 215B to the NYS Dept. of Health & NYC Cross Connection Control Unit of the Bureau of Water Supply & Wastewater Collection. The Commissioner shall receive copies in triplicate of all such submittals. The DPR Design Division; Environmental Engineering Section shall be copied on all such submittals. In summation, the Contractor shall be held completely responsible to ensure that all Work is in compliance with N.Y.S. D.O.H., Form Gen. 215B.
- E. All waterline work, including but not limited to meters, taps, and backflow prevention devices shall be constructed in accordance with RCNY Title 15 Chapter 20 Rules Governing and Restricting the Use and Supply of Water, last revised June 22, 2009.

END OF SECTION

SECTION 02521 – DECOMMISSION GROUNDWATER WELLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Decommission existing groundwater wells in accordance with the requirements of the Contract Documents. Work includes:
 - 1. Pulling of well casing,
 - 2. Grouting of wells,
 - 3. Sampling and containerized storage of wastes, and
 - 4. Disposal of wastes.

1.2 RELATED SECTIONS

- A. Section 02205 – Protection, Demolition and Relocation of Existing Utilities
- B. Section 02300 – Earthwork
- C. Section 02370 – Erosion Controls
- D. Contract Documents

1.3 REFERENCES

- A. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.

1.4 REGULATORY REQUIREMENTS

- A. The Contractor shall comply with all the laws, ordinances, codes, rules and regulations of the local, state, and federal authorities having jurisdiction over any of the work specified herein. The Contractor shall meet federal EPA and state Department of Transportation (DOT) regulations for shipping of regulated substances, if any, to off-site disposal facilities and meet all regulatory requirements imposed by the Treatment, Storage, and Disposal Facility (TSDF). Regulations pertaining to the transport and disposal of regulated substances/materials include, but are not limited to the following:
 - 1. Department of Transportation 49 CFR 172 through 179
 - 2. Department of Transportation 49 CFR 387 (46 FR 30974)
 - 3. Department of Transportation DOT-E 8876
 - 4. Environmental Protection Agency 40 CFR 136 (41 FR 52779)
 - 5. Environmental Protection Agency 40 CFR 262 and 761
 - 6. Resource Conservation and Recovery Act

- B. Where reference is made to one of the above standards the revision in effect at the time of the bid opening shall apply.

PART 2 - PRODUCTS

- A. Proper equipment for the pulling of well casing (e.g., drill rig, backhoe, etc.) and overdrilling, if necessary (e.g., drill rig equipped with hollow stem auger and fitted with a plug or outward facing carbide cutting teeth having diameter two to four inches larger than the casing).
- B. Proper equipment for the grouting of wells, including, but not limited to, Portland cement grout, high grade granular bentonite, high grade chipped bentonite, and potable water.
- C. Sufficient containerized storage for generated wastes associated with decommissioning activities (e.g., 55-gallon drums).
- D. The Contractor shall be responsible for collection and analysis of samples for disposal, in accordance with and to the satisfaction of, all permit and facility requirements, and all applicable local, state, and federal laws, rules, and regulations.

PART 3 - EXECUTION

3.1 WELL DECOMMISSIONING

- A. All well decommissioning activities shall be performed under the on-site supervision of the Commissioner.
- B. Plastic sheeting shall be placed around the well surface to contain potentially contaminated materials displaced during removal of the well.
- C. To properly decommission wells, the casing should be pulled, if possible, and then tremie-grouted. Case pulling procedures are as follows: puncture the bottom of the casing; flush with water to remove sand (if necessary, to mitigate lock up of the casing during pulling); tremie grout starting from the bottom of the well; and, using jacks to free casing from the hole, lift the casing out by using a drill rig, backhoe, crane, or other suitable equipment. Additional grout must be added, via tremie pipe, to the casing as it is withdrawn. As the casing and grout/cement column are extracted, the casing will be cut to allow the addition of wet grout. In wells in which the bottom cannot be punctured, the casing or screened interval will be perforated prior to being filled with grout.
- D. If pulling is attempted and fails (i.e., a portion of the riser breaks) the remaining portion of the well will be removed by conventional excavation or augering. The conventional augering procedure is as follows:
 - 1. Prior to overdrilling, an expandable J plug or other suitable well cap will be used to prevent the introduction of soil or cuttings into the well.
 - 2. Using conventional augering methods (e.g., hollow stem auger fitted with a plug, hollow stem auger with outward facing carbide cutting teeth having a diameter two to four inches larger than the casing, hollow stem auger with a steel guide pipe,

etc.), a borehole will be created of the same or greater diameter than the original boring. All of the well construction materials shall be removed during overdrilling. Overdrilling shall advance beyond the original bore depth by a distance of 6 inches.

3. Subsequent to overdrilling at flush mount well locations, a 1 to 2-foot deep area shall be excavated by hand around the flush mount well to facilitate a conventional well removal while tremie grouting inside the well. Alternatively, the soil within the annular space may be removed by raising the augers to allow the soil to fall out and re advance the augers to the original target depth.
 4. Grout shall be tremied within the annular space between the augers and well casings. The grout level in the borehole should be maintained as the drilling equipment and well materials are sequentially removed.
- E. Grout used for decommissioning purposes shall be mixed manually or with a mechanized mixer until a smooth, homogenous mixture is achieved (i.e., no lumps or dry clots are present in the mix).
- F. Grout will be placed in the borehole from the bottom to the top using a tremie pipe of not less than 1 inch diameter. Grout will be pumped into the borehole until the grout appears at the land surface. Additional grout will be added as settlement occurs. At the completion of grouting, the grout level shall be at approximately 5 ft bgs. Embed a ferrous metal marker (e.g. well cover or equivalent) at the top of grout to indicate the location of the former monitoring well.
- G. The uppermost 5 feet will be filled with a material appropriate to the existing conditions and/or intended use. The materials will be physically similar to the natural soils. A fabric "utility" marking shall be placed one foot above the grout (approximately 4 feet bgs) so an excavator can see it clearly. The surface of the borehole will be restored to the existing conditions and/or intended use (e.g., grassed areas will be seeded, etc.).
- H. Any groundwater displaced during grout placement will be pumped via suction lift to a 55 gallon drum for proper disposal.
- I. All solid waste materials generated during the decommissioning process will be containerized and disposed of properly.

3.2 DISPOSAL OF MATERIALS

- A. The Contractor shall be responsible for proper disposal of all waste materials generated, if any, during decommissioning activities including, but not limited to, spent well casing, soils, and groundwater.

3.3 SITE RESTORATION

- A. The sealed site must be restored to a safe condition. The site must be inspected periodically after sealing for settlement or other conditions which require remediation. The cost of any such remediation shall be included in the price bid for this item.

3.4 MAINTENANCE AND PROTECTION

- A. Institute appropriate procedures and security measures to ensure the protection of site personnel, equipment, and the public from potentially contaminated materials as required by all applicable local, state, and federal laws, rules, and regulations.

END OF SECTION

SECTION 02530 – SANITARY SEWERAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide sanitary sewer system in accordance with the requirements of the Contract Documents. Work includes:
 - 1. Installation of sanitary sewerage drainage piping, fittings and accessories.
 - 2. Installation of sanitary sewerage structures including manholes and cleanouts.

1.2 RELATED SECTIONS

- A. Green Building requirements – Division 1.
- B. Section 02205 – Protection, Demolition, and Relocation of Existing Utilities
- C. Section 02300 – Earthwork
- D. Section 02370 – Erosion Controls
- E. Section 02731 – Sanitary Pump Station
- F. Section 03700 – Cement and Concrete for Exterior Improvements
- G. Contract Documents

1.3 REFERENCES

- A. New York City Department of Environmental Protection Bureau of Water and Sewer rules and specifications
- B. New York City Department of Buildings (DOB) rules, regulations and building codes (BC)
- C. Certified Site Connection Proposal SCX-082/11.
- D. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate locations, elevations, invert elevations, piping, sizes and elevation penetrations of sanitary system piping and all appurtenant structures.
- B. Product Data: Provide component construction, features, configurations and dimensions.

1.5 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of pipe runs, connections, and invert elevations.

- B. Identify and describe unexpected variations to subsoil conditions and the discovery of uncharted utilities.

1.6 QUALITY CONTROL INSPECTION

- A. Special inspections shall be performed by the Commissioner in accordance with the NYC BC. The Contractor shall be responsible for coordinating the schedule of work with the Commissioner to confirm inspector availability.
- B. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Commissioner. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Commissioner's acceptance level, if permitted, or removed and replaced, entirely at the Contractor's expense.
- C. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface of all concrete shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.
- D. Concrete imperfections may be repaired, subject to the acceptance of the Commissioner, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final acceptance. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days when tested in 3 inch diameter by 6 inch long cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs.

PART 2 - PRODUCTS

2.1 PIPING

- A. Ductile Iron: Provide sizes as specified on the Contract Documents. Piping and fittings shall comply with the requirements of ANSI/AWWA C151/A21A, Ductile Iron Pipe – Centrifugally Cast; ANSI/AWWA C104/A21.4, Cement-Mortar Lining for Ductile Iron Pipe and Fittings; and ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

2.2 MANHOLES

- A. Manhole Sections: Reinforced precast concrete
 - 1. 4,000 psi concrete reinforced for H20 loading or greater in accordance with ASTM C478, with self-sealing butyl gaskets in accordance with ASTM C923. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
 - 2. Construct manholes of precast concrete sections as required by the Contract

Drawings to size, shape, and depth indicated.

- B. Alternate Manhole Sections: Reinforced cast-in-place concrete.
1. Construct cast-in-place manholes of 4,000 psi concrete reinforced for H20 loading or greater. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
 2. Accurately make forms of steel sheets and shapes of sufficient strength to form dense watertight walls to true dimensions.
 3. Deposit concrete in evenly distributed layers of about 18 inches, with each layer vibrated to bond it to the preceding layer.
- C. Mortar and Grout:
1. Conform to the requirements of ASTM C91 for masonry cement used for laying up dimension masonry.
 2. Grouting material for use in grouting anchor bolts, franges, dowels and other miscellaneous items in concrete shall be a non-metallic, non-shrink grout which when mixed with water, will harden rapidly to produce a permanent anchoring bond. It shall be free of any corrosion promoting agents.
- D. Reinforcement: Grade 60 deformed steel rebars with galvanized finish. Reinforcing shall conform to the latest revised edition of the AISC code.
- E. Lid and Frame: Cast Iron lid and frame shall be rated for H-20 loading, and shall comply with the requirements of NYC DPR standards for manhole lids and frames, except that lids shall have "SANITARY" cast into the surface. All lids shall include two locking bolts in accordance with NYC DPR requirements.
- F. Steps: Steps are required in all manholes. Steps shall be in accordance with NYC DEP requirements.
- G. Base Pad: Precast reinforced concrete or Cast-in-place concrete leveled top surface. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
- H. Configuration:
1. Shaft Construction: Concentric with top slab; lipped male/female dry joints; sleeve to receive pipe sections.
 2. Shape: Cylindrical.
 3. Clear Inside Dimensions: 48 inch diameter unless noted otherwise on Contract Drawings.
 4. Design Depth: As indicated on Contract Drawings.
 5. Clear Lid Opening: 24 inches diameter minimum.

6. Pipe Entry: Provide openings as indicated.
7. Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls, and point up irregularities and rough edges with nonshrink grout.

2.3 CLEANOUTS

- A. Lid and Frame: Heavy duty cast iron construction with H20 design loading and closed locking lid design.
- B. Shaft Construction: Shaft diameter and material shall match sewer line. Provide square 4,000 psi concrete collar for cleanouts located in paved areas; minimum dimension of cleanout diameter plus 12 in.
- C. Base Pad: Cast in place concrete, 4,000 psi leveled top surface to receive cast iron shaft sections, sleeved to receive sewer pipe sections. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify the trench cut and excavation base to be hard, smooth, and dry.
- B. Verify excavation location, dimensions and elevation with contract drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations and thoroughly compact as per Section 02300.
- B. Remove large stones or other hard matter which may damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 02300 for work of this section.
- B. Place and compact bedding aggregate at trench bottom. Hand trim bedding for accurate placement of pipe to elevations indicated.
- C. Maintain moisture content of bedding aggregate between 1% below and 3% above the optimum.

3.4 INSTALLATION - PIPE

- A. Place pipe on minimum 6-inch deep bed of compacted bedding aggregate.
- B. Install pipe, fittings, and accessories in accordance with ASTM C12, ASTM D2321, manufacturer's instructions and/or state or local requirements. Seal joints to be watertight.

- C. Lay pipe to slope gradients noted on Contract Drawings; with maximum variation from true slope of 1/8 inch in 20 feet.
- D. Place and compact bedding aggregate at sides and to the springline of the pipe as per Section 02300.
- E. Refer to Section 02300 for trenching and backfill requirements. Do not displace or damage pipe when compacting.

3.5 INTERFACE WITH EXISTING FACILITIES

- A. Compliance with Facility Owner Requirements: Connections made into existing drainage facilities shall be performed in accordance with the requirements of the NYCDEP. The Contractor will be required to comply with all such requirements, including securing of all required permits, and paying the costs thereof. The cost of making the connections in accordance with the requirements of the Owner of the existing facility shall be included in the Contract Sum.

3.6 MODIFICATIONS OF EXISTING STRUCTURES

- A. General: The Contractor shall alter, reconstruct and/or convert existing structures where and as shown on the Drawings, and/or as approved by the Commissioner. In general, alterations shall be performed with the same type of material used in the original construction unless otherwise indicated on the Drawings or approved by the Commissioner.
- B. Damage to Existing Installations: The Contractor shall exercise extreme care during such alteration, reconstruction and/or conversions so as not to damage any portions of the structure and/or pipe shown to remain. Any such damage shall be repaired by the Contractor at his own expense and to the satisfaction of the Commissioner.

3.7 CLEANING AND REPAIR

- A. The Contractor shall clean the entire sewer system of all debris and obstructions. This shall include, but not be limited to, removal of all formwork from structures, concrete and mortar droppings, construction tools, debris and dirt. The system shall be thoroughly flushed clean and the Contractor shall furnish all necessary hose, pumps, pipe and other equipment that may be required for this purpose. No debris shall be flushed into existing storm drains or streams; all debris shall be removed from the system.
- B. After the system has been cleaned, the Contractor shall thoroughly inspect the system and all repairs shown to be necessary shall be promptly made by the Contractor.
- C. All Work of cleaning and repair as specified herein shall be performed at the Contractor's expense and to the complete satisfaction of the Commissioner.

3.8 FINAL INSPECTION

Upon completion of the Work and before backfill is placed and final acceptance by the Commissioner, the entire drainage system shall be subject to a final inspection in the presence of the Commissioner. The Work shall not be considered as complete until all

requirements for line, grade, cleanliness, and workmanship have been completed to the satisfaction of the Commissioner.

END OF SECTION

SECTION 02550 - NATURAL GAS DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Green Building requirements –Divison 1.
- B. Earthwork: Section 02300.
- C. Cement and Concrete for Exterior Improvements – Section 03700.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's specifications and catalog literature for the plastic gas piping including:
 - a. Table of pipe dimensions.
 - b. Physical properties of the pipe.
 - c. Design strengths of the pipe.
 - d. Brochure of available pipefittings and appurtenances.
 - 2. Manufacturer's specifications and catalog literature for the following appurtenances:
 - a. Plastic gas valves.
 - b. Plastic gas valve service boxes.
 - c. Mechanical link seals.
 - d. Steel pipe sleeves.
 - d. Underground marking tape.
- B. Verification of compliance with the rules and regulations of the gas utility company and approval of worker's qualifications by the gas utility company.

1.3 QUALITY ASSURANCE

- A. Provide gas pipe and gas valve products manufactured to Title 49 of the Code of Federal Regulations, Part 192, "Transportation of Natural and Other Gas by Pipeline, Minimum Federal Safety Standards", issued by the Office of Pipeline Safety Operations, Materials Transportation Bureau, Department of Transportation.
- B. Workers' Qualifications:
 - 1. Employ only workers experienced and skilled in actually making fused joints in plastic gas piping and appurtenances.
 - 2. Submit credentials of the workers to be engaged in fusing and/or welding the plastic gas piping and appurtenances to the gas utility company for its review. Obtain the gas utility company's approval of those individuals for performing such work.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Plastic Gas Piping: Performance Pipe Div. of Chevron Phillips Chemical Co., Richardson, TX 75083.
- B. Plastic Gas Valves: Nordstrom Valves, Inc., Sulphur Springs, TX 75482.
- C. Plastic Valve Service Boxes: Handley Industries, Inc., Jackson, MI 49203.
- D. Mechanical Link Seals: Thunderline/Link Seal, Div. of PSI, Houston, TX 77021.
- E. Or approved equal.

2.2 PLASTIC GAS PIPE

- A. Pipe:
 - 1. Extra High Molecular Weight (EHMW), High Density Polyethylene pipe meeting the requirements of ASTM D 2513.
 - 2. Standard Dimension Ratio - 11.
 - 3. Plastic Pipe Institute (PPI) Material Designation - PE 3408.
 - 4. Long-term hydrostatic strength of 1600 psi at 73.4 degrees F.
 - 5. Sizes as indicated on the Drawings.
- B. Butt Fusion Fittings:
 - 1. Match pipe size and pipe SDR rating.
 - 2. Molded of EHMW, High Density Polyethylene resin and meeting the requirements of ASTM D 3261, as required by ASTM D 2513.
 - 3. PPI Material Designation - PE 3408.
 - 4. Design pressure rating of 102.4 psi at 73.4 degrees F.

2.3 PLASTIC GAS VALVES

- A. Nordstrom 86111 Poly-Gas Ball Valve (or approved equal):
 - 1. Full opening, SDR pipe ends.
 - 2. Phillips TR-480 resin (ASTM Material Designation PE 3408) polyethylene body.
 - 3. Polypropylene ball, High Nitrile Buna N seat seals, dual elastomeric stem seals.
 - 4. Sizes: Same size as piping in which each is installed.

2.4 PLASTIC VALVE BOXES

- A. Handley Industries Heavy Duty GHA-2/VVS (or approved equal) to accept specified gas valve:
 - 1. High-grade ABS Polymer construction.
 - 2. Plastic Valve support designed to fit size and type of specified gas valve.
 - 3. Heavy-duty cast iron top collar with built-in magnet.

2.5 STEEL PIPE SLEEVES

- A. API 5L Grade B seamless or electrically welded steel pipe: ASTM A 53.
 - 1. Wall thickness: Standard Weight (Sch. 40).
- B. Size: Carrier pipe size plus 4 inches in diameter.

2.6 MECHANICAL LINK SEALS

- A. Thunderline Pipe Line (PL) Model:
 - 1. Interlocking links of solid synthetic rubber connected by rubber-coated corrosion resistant bolts and nuts to form a sealing belt in an annular pipe space.
 - 2. Thunderline 400 series.
 - 3. Model LS-425-C for use with Sch. 40, steel pipe sleeves.
 - 4. Or approved equal.

2.7 WOOD SKIDS

- A. Pressure Treated (AWPB LP-22) Southern Yellow Pine lumber trimmed and shaped as required.

2.8 SAND FILL

- A. No. 1B Crushed Stone as specified in DOT Section 703 - Aggregates.

2.9 CAST-IN-PLACE CONCRETE (GAS VALVE SERVICE BOX APRONS)

- A. Concrete: Normal weight, air-entrained concrete having a minimum compressive strength of 3000 psi at the end of 28 days.

2.10 PRECAST CONCRETE BLOCKS (GAS VALVE SUPPORTS)

- A. Comply with DOT Section 704-04.

2.11 UNDERGROUND MARKING TAPE

- A. Detectable Marking Tape: 6-inch width, yellow color-coding, wording - "CAUTION: BURIED GAS LINE BELOW".

PART 3 - EXECUTION

3.1 GENERAL

- A. Except for the transitions between plastic pipe and steel pipe, join the plastic piping including the plastic gas valves into homogenous union by butt fusion using equipment employing temperature and pressure to complete the fused joints.
- B. Employ only workers experienced and skilled in actually making the fused joints.

- C. Use only molded plastic pipefittings for tee and elbow connections. Fittings formed of fused mitered pipe sections will not be acceptable.
- D. Support plastic gas valves on precast concrete blocks and provide a cast-in-place concrete apron at the top of each valve box as indicated on the Drawings.

3.2 INSTALLATION

- A. Install piping in accordance with the trenching detail and layout indicated on the Drawings. Avoid interference with existing utilities.
- B. Install the plastic gas valves as indicated on the Drawings. As part of each installation, provide the specially molded and formed valve support for the specified gas valve.
- C. Connect the new gas service to the gas utility company's system, or metering and pressure regulating station in accordance with the gas utility company's requirements.
- D. Make transitions to steel piping with molded plastic flange adapters equipped with steel slip-on flanges. Butt fuse adapters to the plastic gas line terminal ends and connect to the flanged ends of the steel lines with Type 317 stainless steel bolts and nuts.

3.3 STREET CROSSINGS

- A. Install the plastic pipe in steel sleeves at the locations indicated on the Drawings.
- B. Blow sand fill into the annular space within the sleeves to firmly cushion the plastic gas pipe. Close both ends of the sleeves with mechanical link seals.

3.4 TESTING

- A. Ascertain requirements, procedures, etc. of the gas utility company for air testing the plastic gas piping and appurtenances following their installation.
- B. Perform tests as required by and to the satisfaction and approval of the gas utility company.
- C. Provide necessary labor, materials and equipment for the tests.

3.5 BACKFILL

- A. Backfill trenches for the gas piping in accordance with Section 02300.
- B. Install underground marking tape as indicated on the Drawing.

END OF SECTION

SECTION 02580 - ELECTRICAL SITE WORK

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.
- B. Work under this section is considered Electrical work and not subject to LEED MR credits.

1.2 ELECTRICAL SERVICE

- A. Power for the DOT DSL walkway lighting system and DPR site service shall be obtained from an existing Con-Edison service at three phase, four wire, 60 Hertz, 120/208 volt power source as indicated on the drawings. The Contractor is responsible to fully coordinate his work with Con-Edison.

PART 2 - PRODUCTS

2.1 RACEWAYS, FITTINGS AND ACCESSORIES

- A. Rigid Ferrous Metal Conduit: Steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
- B. PVC Schedule 40 Conduit: Type 40 Conduit for applications in underground, direct burial applications in accordance with the National Electrical Code (Article 347). The pipe, under this item, shall be furnished and installed with couplings, elbows, bends, etc., as required.
 - 1. Conduit shall be 90°C, UL rated, manufactured by Carlon, Cantex, Prime Conduit or approved equal. Material shall comply to NEMA Specification TC-2 (Conduit), TC-3 fittings (UL-514), and UL-651 (Standard FOR rigid non-metallic conduit). The conduit and fittings shall carry a UL label (on each 10 foot length of conduit and stamped molded on every fitting).
 - 2. The conduit shall be made from polyvinyl chloride compound which includes inert modifiers to improve weatherability, heat distortion. Clean rework material, generated by the manufacturer's own conduit production, may be used by the same manufacturer, provided the end products meet the requirements of this specification.
 - 3. The conduit and fittings shall be homogeneous plastic material free from visible cracks, holes or foreign inclusions. The conduit bore shall be smooth and free of blisters, nicks or other imperfections, which could harm conductors or cables.
 - 4. Conduit, fittings and cement shall be supplied by the same manufacturer to assure system integrity.

- D. Types:
1. Electric Light and Power Wiring:
 - a. USE, USE-2: Dual rated heat and moisture resistant insulation rated 600 V with XLP jacket or dual purpose insulation / protective covering conforming to UL requirements for type USE service entrance cables.
- E. Connectors:
1. General: Connectors specified are part of a system. Furnish connectors and components, and use specific tools and methods as recommended by connector manufacturer to form complete connector system.
 2. Splices:
 - a. Indent Type with Insulating Jacket:
 - 1) Rated 105° C, 600V; Buchanan/Ideal Industries Inc.'s Crimp Connectors, Ideal Industries Inc.'s Crimp Connectors, Penn-Union Corp.'s Penn-Crimps, or Thomas & Betts Corp.'s STA-KON.
 - b. Resin Splice Kits: Electrical Products Div./3M's Scotchcast Brand Kit Nos. 82A Series, 82-B1 or 90-B1, or Scotchcast Brand Resin Pressure Splicing Method.
 - c. Heat Shrinkable Splices: Electrical Products Div./3M's ITCSN, Raychem Corp.'s Thermofit Type WCS, or Thomas & Betts Corp.'s SHRINK-KON Insulators.
 - d. Cold Shrink Splices: Electrical Products Div./3M's 8420 Series.
 3. Gutter Taps: Anderson/Hubbell's GP/GT with GTC Series Covers, Blackburn/T&B Corp.'s H-Tap Type CF with Type C Covers, Framatome Connectors/Burndy's Polytap KPU-AC, H-Crimpit Type YH with CF-FR Series Covers, ILSCO's GTA Series with GTC Series Covers, Ideal Industries Inc.'s Power-Connect GP, GT Series with GIC covers, NSI Industries Inc.'s Polaris System, OZ/Gedney Co.'s PMX or PT with PMXC, PTC Covers, Penn-Union Corp.'s CDT Series, or Thomas & Betts Corp.'s Color-Keyed H Tap CHT with HTC Covers.
 4. Terminals: Nylon insulated pressure terminal connectors by Amp-Tyco/Electronics, Electrical Products Div./3M, Framatome Connectors/Burndy, Ideal Industries Inc., Panduit Corp., Penn-Union Corp., Thomas & Betts Corp., or Wiremold Co.
 5. Lugs:
 - a. Single Cable (Compression Type Lugs): Copper, one or 2 hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, NSI Industries Inc.'s L, LN Series, Penn-Union Corp.'s BBLU Series, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.
 - b. Single Cable (Mechanical Type Lugs): Copper, one or 2 hole style (to suit conditions); Blackburn/T&B Corp.'s Color-Keyed Locktite Series, Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Locktite Series.

- c. Multiple Cable (Mechanical Type Lugs): Copper, configuration to suit conditions; Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Color-Keyed Locktite Series.
- F. Tapes:
- 1. Insulation Tapes:
 - a. Plastic Tape: Electrical Products Div./3M's Scotch Super 33+ or Scotch 88, Plymouth Rubber Co.'s Plymouth/ Bishop Premium 85CW.
 - b. Rubber Tape: Electrical Products Div./3M's Scotch 130C, or Plymouth Rubber Co.'s Plymouth/Bishop W963 Plysafe.
 - 2. Moisture Sealing Tape: Electrical Products Div./3M's Scotch 2200 or 2210, or Plymouth Rubber Co.'s Plymouth/Bishop 4000 Plyseal-V.
 - 3. Electrical Filler Tape: Electrical Products Div./3M's Scotchfil, or Plymouth Rubber Co.'s Plymouth/Bishop 125 Electrical Filler Tape.
 - 4. Color Coding Tape: Electrical Products Div./3M's Scotch 35, or Plymouth Rubber Co.'s Plymouth/Bishop Premium 37 Color Coding.
 - 5. Arc Proofing Tapes:
 - a. Arc Proofing Tape: Electrical Products Div./3M's Scotch 77, Mac Products Inc.'s AP Series, or Plymouth Rubber Co.'s Plymouth/Bishop 53 Plyarc.
 - b. Glass Cloth Tape: Electrical Products Div./3M's Scotch 27/Scotch 69, Mac Products Inc.'s TAPGLA 5066, or Plymouth Rubber Co.'s Plymouth/Bishop 77 Plyglas.
 - c. Glass-Fiber Cord: Mac Products Inc.'s MAC 0527.
- G. Wire-Pulling Compounds: To suit type of insulation; American Polywater Corp.'s Polywater Series, Electric Products Div./3M's WL, WLX, or WLW, Greenlee Textron Inc.'s Y-ER-EAS, Cable Cream, Cable Gel, Winter Gel, Ideal Industries Inc.'s Yellow 77, Aqua-Gel II, Agua-Gel CW, or Thomas & Betts Corp.'s Series 15-230 Cable Pulling Lubricants, or Series 15-631 Wire Slick.
- H. Wire Management Products: Cable clamps and clips, cable ties, spiral wraps, etc., by Catamount/T&B Corp., or Ideal Industries Inc.

2.4 CIRCUIT BREAKERS

- A. Branch disconnecting devices shall consist of circuit breakers, built in molded composition, of type, voltage, capacity and trip element ratings and number of poles as indicated on the panel schedule. The branch circuit breaker units shall be quick-break, trip-free toggle-mechanism type with distinct Off and On indications and clearly numbered with circuit numbers and trip ratings. They shall be interchangeable and operable in any position, and removable from the front of the panel without disturbing adjacent units. Circuit breaker interrupting capacity shall be 22,000 symmetrical amps (R.M.S.). Circuit breakers shall be bolt on type, Cutler Hammer type adjustable trip Series C or approved equal.

2.5 SUPPORTING DEVICES

- A. Fasteners: Furnish all fasteners and hardware compatible with the materials and methods required for attachment of supporting devices.
1. Slotted Type Concrete Inserts: Galvanized pressed steel plate complying with ASTM A 283; box-type welded construction with slot designed to receive steel nut and with knockout cover, hot-dipped galvanized in compliance with ASTM A 123.
 2. Masonry Anchorage Devices: Expansion shields complying with FS FF-S-325, as follows:
 - a. Furnish lead expansion shields for machine screws and bolts 1/4 inch and smaller; head-out embedded nut type, single unit class, Group I, Type I, Class 1.
 - b. Furnish lead expansion shields for machine screws and bolts larger than 1/4 inch in size; head-out embedded nut type, multiple unit class, Group I, Type 1, Class 2.
 - c. Furnish bolt anchor expansion shields for lag bolts, zinc alloy, long-shield anchors class, Group II, Type 1, Class 1.
 - d. Furnish bolt anchor expansion shields for bolts, closed-end bottom bearing class, Group II, Type 2, Class 1.
 3. Toggle Bolts: Tumble-wing type, complying with FS FF-B-588C, Type, class and style as required.
 4. Nuts, Bolts, Screws, Washers:
 - a. General: Furnish zinc-coated fasteners, with galvanizing complying with ASTM A 153 for exterior use or where built into exterior walls. Furnish fasteners for the type, grade and class required for the particular installation.
 - b. Standard Nuts and Bolts: Regular hexagon head type, complying with ASTM A 307, Grade A.
 - c. Lag Bolts: Square head type, complying with FS FF-B-561C.
 - d. Machine Screws: Cadmium plated steel, complying with FS FF-S-92.
 - e. Wood Screws: Flat head carbon steel, complying with FS FF-S-111.
 - f. Plain Washers: Round, general assembly grade carbon steel, complying with FS FF-W-92.
 - g. Lock Washers: Helical spring type carbon steel, complying with FS FF-W-84.
- B. "C" Beam Clamps:
1. For 1 inch Conduit Maximum: B-Line Systems Inc.'s BG-8-C2, BP-8-C1 Series, or Caddy Fastener Div./Erico Products Inc.'s BC-8P and BC-8PSM Series.
 2. For 3 inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50WB Series hangers, Kindorf/T&B Corp.'s 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWBS Series hanger.
 3. For 4 inch Conduit Maximum: Kindorf/T&B Corp.'s E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger, or Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
 4. For Threaded Rods (100 lbs. load max.): Caddy Fastener Div./Erico Products Inc.'s BC-4A.

5. For Threaded Rods (200 lbs. load max.): Appleton Electric Co.'s BH-500 Series, Kindorf/T&B Corp.'s 500 Series, or OZ/Gedney Co.'s IS-500 Series.
 6. For Threaded Rods (300 lbs. load max.): Kindorf/T&B Corp.'s E-231 beam clamp and E-234 anchor clip, or Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip.
- C. Fastener Fittings for Wood and Existing Masonry: Kindorf/T&B Corp.'s E-243, E-244, E-245, E-170, or Versabar Corp.'s VX-4310, VX-2308, VX-4308, VX-4309.
- D. Pipe Straps: Two hole steel conduit straps; Kindorf/T&B Corp.'s C-144 or C-280 Series.
- E. Pipe Clamps: One-hole malleable iron type clamps; Kindorf/T&B Corp.'s HS-400 Series, or OZ/Gedney Co.'s 14-50 Series.
- F. Channel Support System and Accessories: 12 gage galvanized steel channel and accessories; B-Line System Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches), Kindorf/T&B Corp.'s B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches), Unistrut Corp.'s, P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5500 (1-5/8 x 3-1/4 inches), or Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).
- G. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erico Products Inc.

2.6 SAFETY SWITCHES (SINGLE THROW)

- A. NEMA 3R: Cutler-Hammer Inc.'s DH, Federal Pacific Electric Co.'s Class 1240, General Electric Co.'s Type TH, Square D Co.'s Heavy Duty Series, or Westinghouse Electric Corp.'s H-600; having:
1. Heavy duty switch with fuses as indicated on drawings.
 2. Fused switches equipped with fuseholders to accept only the fuses specified (UL Class RK-1, RK-5, or L).
 3. 240 V rating for 120 V, 208 V, or 240 V circuits.
 4. Solid neutral bus with removable neutral link when used as a service switch.
 5. Ground bus when equipment grounding conductor is included with circuit.
 6. Current rating and number of poles as indicated on drawings.

2.7 GROUNDING AND BONDING

- A. Ground Clamps (Cable to Pipe): Blackburn/T&B Corp.'s GUV, Framatome Connectors/Burndy Corp.'s GAR, GD, GP, GK, or OZ/Gedney Co.'s ABG, CG.
- B. Ground Lugs: Copper, one or 2 hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.

- C. Exothermic Type Weld: Erico Inc.'s Cadweld Process, or Furseweld/T&B Corp.'s Exothermic Welding System.
- D. Compression Connectors: Amp Inc.'s Ampact Copper Grounding System, or Burndy Corp.'s Hyground System.
- E. Rod Electrodes: Copper clad (minimum .010 jacket) ground rods minimum 3/4 inches diameter by 10'-0" long.
- F. Grounding Electrode Conductors and Bonding Conductors: Copper conductors, bare or insulated with THW, THW-2, XHHW, XHHW-2, THWN, THWN-2 or THHN insulation.
- G. Hardware: Silicon-bronze bolts, nuts, flat and lock washers etc. by Dossert Corp., Framatome Connectors/Burndy Corp., or OZ/Gedney Co.
- H. Ground bushing per NYC DOT DSL requirements to be OZ/Gedney IBC-L-BC series or approved equal.

2.8 NAMEPLATES AND TAGS

- A. General: Precision engraved letters and numbers with uniform margins, character size minimum 3/16 inch high.
 - 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 - 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
 - 3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

- 2.9 NYC DOT Division of Street Lighting (DSL) standard to be followed for all site lighting work. Contractor to comply with all DOT DSL requirements and standards. Final installation to be inspected and approved by NYC DOT DSL.

PART 3 - EXECUTION

3.1 RACEWAY INSTALLATION

- A. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings.
 - 1. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.
- B. Raceway Schedule:
 - 1. Rigid Ferrous Metal Conduit: Install in all locations unless otherwise specified or indicated on the drawings.
 - 2. PVC Conduit: Install for telephone conduit only:

C. Fittings and Accessories Schedule:

1. General:
 - a. Use fittings and accessories that have a temperature rating equal to, or higher than the temperature rating of the conductors to be installed within the raceway.
 - b. Use malleable iron or cast iron alloy fittings and accessories having hot dipped/mechanically galvanized finish or other specified corrosion resistant finish in conjunction with ferrous raceways in wet locations, unless otherwise specified or indicated on the drawings.
 - c. Use insulated grounding bushings or grounding wedges on ends of conduit for terminating and bonding equipment grounding conductors (when required) if cabinet or boxes are not equipped with grounding/bonding screws or lugs.
 - d. Use caps or plugs to seal ends of conduits until wiring is installed (to exclude foreign material).
 - e. Use insulated grounding bushings on the ends of conduits that are not directly connected to the enclosure (such as stub-ups under equipment, etc.), and bond between bushings and enclosure with equipment grounding conductor.
2. For Rigid: Use threaded fittings and accessories. Use 3 piece conduit coupling where neither piece of conduit can be rotated.
3. PVC Conduit: All conduit and fittings shall be solvent cemented in applications in accordance with instructions from the manufacturer.
 - a. In installing the conduit, particular care must be taken in cutting it to the proper length so that the ends will fit exactly into the outlet boxes. Where conduits terminate in cabinets they shall be neatly arranged and all ends shall be at the same level. The ends of all conduits shall be carefully plugged with a bushette so as to avoid the entrance of foreign materials or moisture and kept so until the telephone service feeder is installed. The ends of the conduit in boxes and similar apparatus and devices shall be furnished with end bushings to avoid the damage during pulling the cable
 - b. The PVC pipe shall be installed underground minimum twenty-four (24) inches below grade on 6" inches layer of sand bed. All necessary couplings, elbows, bends T fittings or any other fitting and hardware required shall be installed. The pipes shall not be installed without proper soil bearing. The pipes joints shall be slip-in type with cementing material as described in previous paragraph.
4. Warning tape: shall be installed six inches below finished grade minimum to cover full width throughout the length of the trench. The warning tape shall be Model "Terra Tape Extra Stretch" as manufactured by Reef Industries, or approved equal.
5. Drag Line: All empty pipes/conduits shall be installed with a three-eighths (3/8") inch nylon drag rope.

3.2 OUTLET, JUNCTION AND PULLBOX INSTALLATION

- A. Mounting Position of Wall Outlets For Wiring Devices: Unless otherwise indicated, install boxes so that the long axis of each wiring device will be vertical.

3.3 CONDUCTOR INSTALLATION

- A. Install conductors in raceways after the raceway system is completed.
- B. Do not change, group or combine circuits other than as indicated on the drawings.
- C. Common Neutral Conductor:
1. A common neutral may be used for 2 or 3 branch circuits where the circuits are indicated on the drawings to be enclosed within the same raceway, provided each branch circuit is connected to a different phase in the panelboard.
- D. Conductor Size: Install conductors of size shown on drawings.
- E. Color Coding:
1. Color Coding for 120/208 Volt Electric Light and Power Wiring:
 - a. Color Code:
 - 1) 2 wire circuit - black, white.
 - 2) 3 wire circuit - black, red, white.
 - 3) 4 wire circuit - black, red, blue, white.
 - b. White to be used only for an insulated grounded conductor (neutral). If neutral is not required use black and red, or black, red and blue for phase to phase circuits.
 - 1) "White" for Sizes No. 6 AWG or Smaller:
 - a) Continuous white outer finish, or:
 - b) Three continuous white stripes on other than green insulation along its continuous length.
 - 2) "White" for Sizes Larger Than No. 6 AWG:
 - a) Continuous white outer finish, or:
 - b) Three continuous white stripes on other than green insulation along its continuous length, or:
 - c) Distinctive white markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install white color coding tape at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
 - c. Colors (Black, Red, Blue):
 - 1) For Branch Circuits: Continuous color outer finish.
 - 2) For Feeders:
 - a) Continuous color outer finish, or:
 - b) Color coding tapes encircling the conductors, installed on the conductors at time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutter, pullboxes, and manholes.

- F. Identification: Use tags to identify feeders and designated circuits. Install tags so that they are easily read without moving adjacent feeders or require removal of arc proofing tapes. Attach tags with non-ferrous wire or brass chain.
1. Interior Feeders: Identify each feeder in pullboxes and gutters. Identify by feeder number and size.
 2. Exterior Feeders: Identify each feeder in manholes and in interior pullboxes and gutters. Identify by feeder number and size, and also indicate building number and panel designation from which feeder originates.
 3. Street and Grounds Lighting Circuits: Identify each circuit in manholes and lighting standard bases. Identify by circuit number and size, and also indicate building number and panel designation from which circuit originates.
- G. Use wire management products to bundle, route, and support wiring in junction boxes, pullboxes, wireways, gutters, channels, and other locations where wiring is accessible.
- H. Equipment Grounding Conductor:
1. Install equipment grounding conductor:
 - a. Where specified in other Sections or indicated on the drawings.
 - b. In conjunction with circuits recommended by equipment manufacturers to have equipment grounding conductor.
 2. Equipment grounding conductor is not intended as a current carrying conductor under normal operating circumstances.
 3. Color Coding For Equipment Grounding Conductor:
 - a. Color Code: Green.
 - b. "Green" For sizes No. 6 AWG or Smaller:
 - 1) Continuous green outer finish, or:
 - 2) Continuous green outer finish with one or more yellow stripes.
 - c. "Green" For Sizes Larger Than No. 6:
 - 1) Stripping the insulation or covering from the entire exposed length (see exception below).
 - 2) Marking the exposed insulation or covering with green color coding tapes.
 - 3) Identify at each end and at every point where the equipment grounding conductor is accessible.
- I. Connector Schedule - Types And Use:
1. Temperature Rating: Use connectors that have a temperature rating, equal to, or greater than the temperature rating of the conductors to which they are connected
 2. Splices:
 - a. Wet Locations: Use uninsulated indent type pressure connectors and insulate with resin splice kits, cold shrink splices or heat shrinkable splices. Exception: Splices above ground which are totally enclosed and protected in NEMA 3R, 4, 4X enclosures may be spliced as specified for damp locations.
 3. Terminations:

- a. For Conductors No. 10 AWG or Smaller: Use terminals for:
 - 1) Connecting wiring to equipment designed for use with terminals.
- b. For Conductors No. 8 AWG or Larger: Use compression or mechanical type lugs for:
 - 1) Connecting cables to flat bus bars.
 - 2) Connecting cables to equipment designed for use with lugs.
- c. For Conductor Sizes Larger Than Terminal Capacity On Equipment: Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduced section not longer than one foot). Use compression or mechanical type connectors suitable for reducing connection.

3.4 SAFETY SWITCH INSTALLATION

- A. Install switches so that the maximum height above the floor to the center of the operating handle does not exceed 6'-6".
- B. Identify each safety switch, indicating purpose or load served:
 1. NEMA 3R Enclosures: Attach nameplate to the cover using adhesive specifically designed for the purpose, or mount nameplate on wall or other conspicuous location adjacent to switch. Do not penetrate enclosure with fasteners.

3.5 GROUNDING AND BONDING

- A. Connections:
 1. Make grounding and bonding connections, except buried connections, with silicone-bronze hardware and ground clamps, ground lugs or compression connectors, to suit job conditions.
 2. For buried connections use exothermic type weld connectors.

END OF SECTION

SECTION 02630 - STORM DRAINAGE**PART 1 - GENERAL****1.1 SUMMARY**

- A. Provide storm sewer system in accordance with the requirements of the Contract Documents. Work includes:
 - 1. Installation of storm sewerage drainage piping, fittings and accessories.
 - 2. Installation of storm sewerage structures including manholes, catch basins, trench drains, cleanouts, and treatment devices.

1.2 RELATED SECTIONS

- A. Green Building requirements –Division 1.
- B. Section 02205 – Protection, Demolition and Relocation of Existing Utilities
- C. Section 02300 – Earthwork
- D. Section 02370 – Erosion Controls
- E. Section 02631 – Trench Drains
- F. Section 03700 – Cement and Concrete for Exterior Improvements
- G. Contract Documents

1.3 REFERENCES

- A. New York City Department of Environmental Protection Bureau of Water and Sewer rules, specifications, and details
- B. New York City Department of Buildings (DOB) rules, regulations and building codes (BC).
- C. City of New York DOB MEA 301-96-M and 321-99-M
- D. Certified Site Connection Proposal SCX-082/11.
- E. Operable Unit 1 Site Management Plan, East 173rd Street Works Former MGP Site, Starlight Park, Bronx, New York, dated March 2010; prepared by GEI Consultants, Inc. of Montclair, New Jersey.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate locations, elevations, invert elevations, piping, sizes and elevation penetrations of storm system piping and all appurtenant structures.
- B. Product Data: Provide component construction, features, configurations and dimensions. All submittals, including precast and cast-in-place structures of all types, must include statement of design load rating.

- C. Concrete Design: The stormwater treatment unit will require a base slab to counteract buoyancy and a top slab to provide H20 load rating. Submit design plans for each, signed and sealed by a New York State Licensed Professional Engineer.

1.5 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of pipe runs, connections, outlet structures, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions and the discovery of uncharted utilities.

1.6 QUALITY CONTROL INSPECTION

- A. Special inspections shall be performed by the City of New York in accordance with the NYC BC. The Contractor shall be responsible for coordinating the schedule of work with the Commissioner to confirm inspector availability.
- B. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Commissioner. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Commissioner's acceptance level, if permitted, or removed and replaced, entirely at the Contractor's expense.
- C. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface of all concrete shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.
- D. Concrete imperfections may be repaired, subject to the acceptance of the Commissioner, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final acceptance. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days when tested in 3 inch diameter by 6 inch long cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs.

PART 2 - PRODUCTS

2.1 PIPING

- A. Ductile Iron: Provide sizes as specified on the Contract Documents. Piping and fittings shall comply with the requirements of ANSI/AWWA C151/A21A, Ductile Iron Pipe – Centrifugally Cast; ANSI/AWWA C104/A21.4, Cement-Mortar Lining for Ductile Iron Pipe and Fittings; and ANSI/AWWA C1111/A21.11, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- B. High-Density Polyethylene (HDPE) Pipe Solid and Slotted / Perforated: Comply with

requirements of AASHTO M252 Type S for 4-inch through 10-inch diameter and AASHTO M294 Type S for 12-inch through 60-inch diameter. Fittings shall conform to AASHTO M294, AASHTO M252, and ASTM D3350 Cell Classification 335420C. Joints shall be bell and spigot with an o-ring gasket meeting ASTM F477.

- C. Reinforced Concrete Pipe: Comply with requirements of ASTM C 76, Class III or as indicated on Drawings, installed with flexible plastic (Bitumen) gaskets at all joints. Gaskets shall comply with ASTM C443, and shall be installed in strict accordance with pipe manufacturer's recommendations.

2.2 CATCH BASINS

- A. Precast Catch Basins: 4,000 psi concrete reinforced for H20 loading in accordance with ASTM C478 of size, shape and depth as indicated on the Contract Drawings. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
- B. Frame and Grate: Cast Iron frame and grates shall be rated for H-20 loading, and shall comply with the requirements of NYC DPR standards for frames and grates. All grates shall include two locking bolts in accordance with NYC DPR requirements.
- C. Hood: Where required, standard cast iron hood and hook in accordance with NYC DEP requirements.
- D. Steps: Steps are required for catch basin depths of 4-ft or greater (lid to sump). Steps shall be in accordance with NYC DEP requirements.
- E. Base Pad: Precast reinforced concrete or cast-in-place concrete leveled top surface. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.

2.3 MANHOLES

- A. Manhole Sections: Reinforced precast concrete
 - 1. 4,000 psi concrete reinforced for H20 loading or greater in accordance with ASTM C478, with self-sealing butyl gaskets in accordance with ASTM C923. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
 - 2. Construct manholes of precast concrete sections as required by the Contract Drawings to size, shape, and depth indicated.
- B. Alternate Method for Manhole Sections: Reinforced cast-in-place concrete.
 - 1. Construct cast-in-place manholes of 4,000 psi concrete reinforced for H20 loading or greater. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.
 - 2. Accurately make forms of steel sheets and shapes of sufficient strength to form dense watertight walls to true dimensions.
 - 3. Deposit concrete in evenly distributed layers of about 18 inches, with each layer

vibrated to bond it to the preceding layer.

C. Mortar and Grout:

1. Conform to the requirements of ASTM C91 for masonry cement used for laying up dimension masonry.
2. Grouting material for use in grouting anchor bolts, franges, dowels and other miscellaneous items in concrete shall be a non-metallic, non-shrink grout which when mixed with water, will harden rapidly to produce a permanent anchoring bond. It shall be free of any corrosion promoting agents.

D. Reinforcement: Grade 60 deformed steel rebars with galvanized finish. Reinforcing shall conform to the latest revised edition of the AISC code.

E. Lid and Frame: Cast Iron lid and frame shall be rated for H-20 loading, and shall comply with the requirements of NYC DPR standards for manhole lids and frames. All lids shall include two locking bolts in accordance with NYC DPR requirements.

F. Steps: Steps are required in all manholes. Steps shall be in accordance with NYC DEP requirements.

G. Base Pad: Precast reinforced concrete or Cast-in-place concrete leveled top surface. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.

H. Configuration:

1. Shaft Construction: Concentric with top slab; lipped male/female dry joints; sleeve to receive pipe sections.
2. Shape: Cylindrical.
3. Clear Inside Dimensions: 48 inch diameter unless noted otherwise on Contract Drawings.
4. Design Depth: As indicated on Contract Drawings.
5. Clear Lid Opening: 24 inches diameter minimum.
6. Pipe Entry: Provide openings as indicated.
7. Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls, and point up irregularities and rough edges with nonshrink grout.

2.4 CLEANOUTS

A. Lid and Frame: Heavy duty cast iron construction with H20 design loading and closed locking lid design.

B. Shaft Construction: Shaft diameter and material shall match sewer line. Provide square 4,000 psi concrete collar for cleanouts located in paved areas; minimum

dimension of cleanout diameter plus 12 in.

- C. Base Pad: Cast in place concrete, 4,000 psi leveled top surface to receive cast iron shaft sections, sleeved to receive sewer pipe sections. Class C Fly Ash, in accordance with ASTM C618, shall constitute 40% by mass of total cementitious material used in the concrete mix.

2.5 STORMWATER TREATMENT SYSTEM

- A. Each stormwater treatment system shall be of a type that has been installed and used successfully for a minimum of 3 years. The manufacturer of said system shall have been regularly engaged in the engineering design and production of systems for the physical treatment of stormwater runoff during the aforementioned period.
- B. Each stormwater treatment system shall be an AquaSwirl™ AS-2 system as manufactured by AquaShield™, Chattanooga, TN or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify the trench cut and excavation base to be hard, smooth, and dry.
- B. Verify excavation location, dimensions and elevation with contract drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations and thoroughly compact as per Section 02300.
- B. Remove large stones or other hard matter which may damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 02300 for work of this section.
- B. Place and compact bedding aggregate at trench bottom. Hand trim bedding for accurate placement of pipe to elevations indicated.
- C. Maintain moisture content of bedding aggregate between 1% below and 3% above the optimum.

3.4 INSTALLATION - PIPE

- A. Place pipe on minimum 6-inch deep bed of compacted bedding aggregate.
- B. Install pipe, fittings, and accessories in accordance with ASTM C12, ASTM D2321, manufacturer's instructions and/or state or local requirements. Seal joints to be watertight.
- C. Lay pipe to slope gradients noted on Contract Drawings; with maximum variation from true slope of 1/8 inch in 20 feet.

- D. Place and compact bedding aggregate at sides and to the springline of the pipe as per Section 02300.
- E. Refer to Section 02300 for trenching and backfill requirements. Do not displace or damage pipe when compacting.

3.5 INSTALLATION – CATCH BASINS

- A. Form bottom of excavation clean and smooth and to correct elevation. Place minimum of 6-inch deep bed of compacted bedding aggregate.
- B. Level top surface of bedding aggregate base to receive area drain basin and storm sewer pipe sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. Mount lid and frame level to elevation indicated.
- E. Outlet structures shall be installed in accordance with the section and elevations shown on the Construction Drawings.

3.6 INSTALLATION – WATER QUALITY UNITS

- A. Each Stormwater Treatment System shall be constructed according to the sizes shown on the Drawings and as specified herein. Install at elevations and locations shown on the Drawings or as otherwise directed by the Commissioner.
- B. Place the precast base unit on a granular subbase of minimum thickness of six inches after compaction or of greater thickness and compaction if specified elsewhere. The granular subbase shall be checked for level prior to setting and the precast base section of the trap shall be checked for level at all four corners after it is set. If the slope from any corner to any other corner exceeds 0.5% the base section shall be removed and the granular subbase material re-leveled.
- C. After setting the base, set the treatment unit and attach as required by the manufacturer / base slab design engineer.
- D. Backfill to pipe inverts in accordance with Section 02300.
- E. Make all required pipe connections in accordance with manufacturer's recommendations.
- F. Backfill to proposed grade, and install top slab for load rating as required by the slab design engineer.

3.7 INTERFACE WITH EXISTING FACILITIES

- A. Compliance with Facility Owner Requirements: Connections made into existing drainage facilities shall be performed in accordance with the requirements of the NYCDEP. The Contractor will be required to comply with all such requirements, including securing of all required permits, and paying the costs thereof. The cost of making the connections in accordance with the requirements of the Owner of the existing facility shall be included in the Contract Sum.

3.8 MODIFICATIONS OF EXISTING STRUCTURES

- A. General: The Contractor shall alter, reconstruct and/or convert existing structures where and as shown on the Drawings, and/or as approved by the Commissioner. In general, alterations shall be performed with the same type of material used in the original construction unless otherwise indicated on the Drawings or approved by the Commissioner.
- B. Damage to Existing Installations: The Contractor shall exercise extreme care during such alteration, reconstruction and/or conversions so as not to damage any portions of the structure and/or pipe shown to remain. Any such damage shall be repaired by the Contractor at his own expense and to the satisfaction of the Commissioner.

3.9 CLEANING AND REPAIR

- A. The Contractor shall clean the entire drainage system (pipes and structures) of all debris and obstructions. This shall include, but not be limited to, removal of all formwork from structures, concrete and mortar droppings, construction tools, debris and dirt. The system shall be thoroughly flushed clean and the Contractor shall furnish all necessary hose, pumps, pipe and other equipment that may be required for this purpose. No debris shall be flushed into existing storm drains or streams; all debris shall be removed from the system.
- B. After the system has been cleaned, the Contractor shall thoroughly inspect the system and all repairs shown to be necessary shall be promptly made by the Contractor.
- C. All Work of cleaning and repair as specified herein shall be performed at the Contractor's expense and to the complete satisfaction of the Commissioner.

3.10 FINAL INSPECTION

- A. Upon completion of the Work and before backfill is placed and final acceptance by the Owner, the entire drainage system shall be subject to a final inspection in the presence of the Commissioner. The Work shall not be considered as complete until all requirements for line, grade, cleanliness, and workmanship have been completed to the satisfaction of the Commissioner.

END OF SECTION

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SECTION 02631 – TRENCH DRAINS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this item, the Contractor shall furnish and install Trench Drains in accordance with the plans, specifications and directions of the Commissioner. There are two types used—exterior trench drains at building entrances, and interior trench drains at the boat garage, as shown on the Drawings.

1.3 RELATED SECTIONS:

- | | | |
|----|---------------|------------------------------------------------|
| A. | Division 1 | Specifications for Green Building Requirements |
| B. | Section 02300 | Earthwork Section |
| C. | Section 02630 | Storm Drainage |
| D. | Section 03300 | Cast In Place Concrete |
| E. | Section 03700 | Cement and Concrete for Exterior Improvements |
| F. | Division 15 | Plumbing |

1.4 SUBMITTALS:

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for

this Form shall include:

- 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittals shall be in accordance with General Conditions and Division 1.
- C. Samples: The Contractor shall submit one (1) inch long samples of the proposed trench drain bodies and grates for approval by the Commissioner. All paver grates and frames used on the work shall conform to the approved samples. All samples shall be clearly labeled with Contract No., manufacturer, color, and finish.
- D. Manufacturer's Literature: If the Contractor is proposing a trench drain body and grate other than the one specified, manufacturer's literature must be submitted to the Commissioner for approval.

PART 2 PRODUCTS

2.2 MATERIAL

- A. Unless otherwise herein specified, all materials of construction shall comply with General Conditions and Addenda to General Conditions.
- B. Trench Drain Body:
1. At Building Perimeter and Boat House (interior):
 - a. Klassic Drain, KS100S Trench Drain System as manufactured by ACO USA, Chardon, OH, or approved equal.
 - b. The trench drain body segment shall be model K010, neutral channel (or as indicated below), 39.37" in length with stainless steel edge rails, or approved equal. Provide end caps and outlet cap for a four (4) inch, schedule 40 PVC pipe.

- c. Drain body end and outlet caps, shall be manufactured from polyester polymer concrete with minimum properties as follows:
- | | |
|----------------------------------|------------|
| Compressive Strength | 14,000 psi |
| Flexural Strength | 4,000 psi |
| Water absorption | 0.07% |
| Frost proof | |
| Salt proof | |
| Dilute acid and alkali resistant | |
- d. Nominal clear opening shall be four (4) inches with overall width of five (5) and one (1) tenth inches. Pre-cast units shall be manufactured with a neutral invert and have a wall thickness of at least one half (.50) inch. Each unit will feature a full radius in the trench bottom and a male to female interconnecting end profile. Units shall have horizontal cast in anchoring features on the outside wall to ensure maximum mechanical bond to the surrounding bedding material and pavement surface. Stainless steel edge rail will be integrally cast in by the manufacturer to ensure maximum homogeneity between polymer concrete body and edge rail. Each edge rail shall be at least one-eighth (1/8) inch thick.
- e. At Boat House interior, provide sloped channel at invert of trench drain body segment with a high point invert depth of 4.60" to a low point invert depth of 6.73", incorporating 3 low points and 4 high points, as shown on drawings. High and low points are equivalent to Klassic Drain models K1 and K10, respectively, and associated interim segments, or approved equal.

2. At Boat House Plaza

- a. The surface drainage system shall be ACO Drain FG200 complete with bolted gratings as manufactured by ACO Polymer Products, Inc. or equal approved.
- b. Materials: The trench system bodies shall be manufactured from fiberglass, with minimum properties as follows:
- | | |
|----------------------------------|-------------------|
| Compressive strength: | 24,400 psi |
| Flexural strength: | 9,943 psi |
| Water absorption | 0.33% Frost proof |
| Salt proof | |
| Dilute acid and alkali resistant | |
- c. The nominal clear opening shall be 8.00" (203mm) with overall width of 10.63" (270mm). Pre-cast units shall be manufactured with either an invert slope of 1.0% or with neutral invert and have a wall thickness of at least 0.125" (3mm).

- d. Each unit will feature a full 'V' profile in the trench bottom and a 2" (50mm) male to female interconnecting end profile.
- e. The fiberglass channel body shall be fixed to the frame using push fit nylon studs at 17.17" (436mm) intervals.
- f. Frames shall be manufactured from black coated steel and shall incorporate anchoring features to ensure maximum mechanical bond to the surrounding bedding material and pavement surface. Frames shall incorporate installation brackets to ensure correct and easy installation. Frame shall be at least 3/16" (5mm) thick.

C. Trench Drain Grate:

- 1. At Building Perimeter
 - a. Grate shall be stainless steel Type 445 ADA Grate, 39.37" in length, 4.84" in width, .79" in depth, with quiklok locking mechanism as manufactured by ACO USA, Chardon, OH, or approved equal.
 - b. Stainless steel shall be 11 gauge, Grade 304 stainless steel. Grate shall meet ADA, 1990 Section 4.5.4, shall comply with ASME:A112.6.3 – 2001: Section 7.12 and shall be independently certified to meet Load Class A to DIN 19580 – 3,500 lbs., 70 psi.
- 2. At Boat Storage (interior)
 - a. ADA Cast Iron Grate 19.69" in length, 4.84" in width, .79" in depth, with quiklok locking mechanism, suitable for construction loading HS20 minimum, as manufactured by ACO USA, Chardon, OH, or approved equal.
- 3. At Boathouse Plaza
 - a. The grate shall be the ADA Iron FG200 grate and shall have an overall width of 10.00" and overall length 18.00" and shall have an intake area of 35.0 square inches per 18" grate, with two lock down bolt holes, as manufactured by ACO USA, Chardon, OH, or approved equal.
 - b. Grate shall be ductile iron to ASTM A536-84, Grade 65-45-12. and shall be independently certified to meet Load Class E to DIN 19580 – 135,000 lbs., 2,323 psi.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Unless otherwise herein specified, all materials of construction shall comply with General Conditions. Items below refer to installing exterior drains.

1. The trench drain system and grates shall be installed in accordance with the manufacturer's installation instructions and recommendations.
2. Install Trench Drain Body to the correct location and grade.
3. Install Pipe connection.
4. Pour concrete cradle so that drain body is fully encased in a minimum of four (4) inches of concrete on sides and bottom of body, leaving room for finish pavement, as shown on the plans.
5. Install Precast Concrete Pavers to recommended grade.
6. Install slotted drain cover at outlet cap.
7. Install Grating.

END OF SECTION

This section intentionally left blank

SECTION 02721 – AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Aggregate base courses.

1.3 RELATED SECTIONS

- | | | |
|----|---------------|-----------------------------------------------|
| A. | Division 1 | General Conditions |
| B. | Section 02316 | Pneumatic Excavation |
| C. | Section 02300 | Earthwork |
| D. | Section 02060 | Aggregate Materials – Landscape |
| E. | Section 02740 | Asphalt Concrete Pavement |
| F. | Section 02750 | Concrete Pavement |
| G. | Section 03700 | Cement and Concrete for Exterior Improvements |

1.4 REFERENCES

- A. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures.
- B. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- D. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

- E. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- F. NYSDOT Standard Specifications (latest edition) section 203-3.12 compaction.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. Test reports verifying required compaction has been achieved.

1.6 QUALITY ASSURANCE

- A. Testing and Inspection Service: Owner shall employ and pay for a qualified independent geotechnical testing and inspection service/laboratory to perform soil testing and inspection service during earthwork operations. Contractor shall notify Commissioner at least (2) two days prior to activity requiring testing, or of resumption of work following stoppages.
- B. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing and inspection service/ laboratory must demonstrate to Commissioner 's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field

and laboratory geotechnical testing without delaying the progress of the work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aggregate base course: As specified in Section 02060 – Aggregate Materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate has been inspected, gradients and elevations are correct, including crowns and cross sections, and is dry.

3.2 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.
- C. Proof roll sub-grade thoroughly using a 10-ton roller with two passes, the second pass perpendicular to the first.

3.3 AGGREGATE PLACEMENT

- A. Place aggregate sub-base on the prepared sub-grade in layers of uniform thickness, conforming to the cross-section and thickness indicated on the plans. Maintain the optimum moisture content for compacting the aggregate sub-base during placement operations.
- B. When a compacted aggregate sub-base course is shown to be 6" thick or more, place the material in equal layers, except no single layer more than 8" or less than 3" in thickness when compacted.
- C. Level and contour surfaces to elevations and gradients indicated. Place in such a manner to minimize segregation. No aggregate sub-base shall be placed under adverse weather conditions.
- D. Compact and roll each layer of aggregate sub-base course to 95% maximum density.
- E. All compaction requirements shall be in accordance with NYSDOT Standard Specification section 203-3.12. The depth of each sub-base course shall not exceed the compactor's capability. Each compactor lacking the original manufacturer identification plates, or with altered or illegible plates, will not be recognized as acceptable compaction equipment and shall be removed from the site.
- F. Add small quantities of fine aggregate to coarse aggregate as appropriate to

assist compaction.

- G. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- H. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- I. When the pavement sub-base becomes mixed with the sub-grade or any other material, it shall be removed and replaced with the appropriate material. The movement of any traffic over the fine graded aggregate sub-base is not recommended. When damage or contamination occurs, it must be repaired before paving begins.

3.4 TOLERANCES

- A. Fine grading of the pavement sub-base finish course shall not vary more than 1/2 inch above or below true grade at any point.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Flatness: Maximum variation of 1/2 inch measured with a 10 foot straight edge.

3.5 FIELD QUALITY CONTROL

- A. Quality Control Testing during construction: Allow testing service to inspect, test and approve each aggregate sub-base layer before further backfill or construction work is performed. Testing service shall review and test material and determine optimum moisture at which maximum density can be obtained in accordance with ASTM D 1557, modified proctor.
- B. Field Compaction testing will be performed in accordance with ASTM D1556 (sand cone method), ASTM D2167 (rubber balloon method), or ASTM D2922 (nuclear method).
- C. If tests indicate work does not meet specified requirements, remove work, replace and re-test.
- D. Frequency of Tests: Make at least one field density test for each layer of aggregate sub-base every 2,000 sq. ft.

3.6 MAINTENANCE AND CLEAN-UP

- A. Protection of graded areas: Protect newly graded and compacted aggregate sub-base courses from traffic and erosion. Repair and re-establish grades in settled, eroded and rutted areas.
- B. Remove all excess materials and debris from the Owner's property.

END OF SECTION

SECTION 02731 – SANITARY PUMP STATION

PART 1 - GENERAL

1.1 SUMMARY

- A. The specifications shall govern all work necessary to furnish, install and place into operation a complete sanitary pumping system consisting of the specified pumps to handle the maximum flow and equipment as indicated on the drawings and specified herein.
- B. Extent of packaged pump station work required by this Section is indicated on Drawings and Schedules and by requirements of this Section.
- C. Under this Section the Contractor shall furnish and install one (1) pre-packaged, pre-tested pump station complete with constant speed submersible pumps, precast concrete pump chamber with integral valve vault structure, slide rail pump removal system, ductile iron discharge piping with required supports and fittings, discharge check and plug valves, access hatches, valve vault access manhole rungs, liquid level controls, duplex pump control panel, internal wiring and other required appurtenances.
- D. The pre-packaged pump station shall be built and tested off site to ensure product quality and consistency. The pre-package pump station manufacturer shall provide sole-source responsibility to the City of New York through the warranty period and shall include one day of instructions to the City of New York.
- E. This work shall include, but not limited to the following:
 - 1. Sitework;
 - 2. Excavation, trenching, and backfilling
 - 3. Shoring and Bracing;
 - 4. Dewatering;
 - 5. Pipe, valve, fittings and appurtenance;
 - 6. Painting, coating;
 - 7. Pre-packaged pump station;
 - 8. Pre-cast concrete wet well;
 - 9. Pumps, motors, controls and appurtenances;
 - 10. Mechanical equipment;
 - 11. Plumbing fixtures;
 - 12. Electrical equipment;
 - 13. Startup, Testing and Service Days

14. Operation and Maintenance Manuals
15. Utility connections;
16. All other work required for the complete and satisfactorily operating installation.

1.2 RELATED SECTIONS

- A. Work performed under this section shall be subject to all the Contract Documents including the Drawings and documents and the General Conditions, the Supplementary Conditions and General Requirements.
- B. Section 02300 - Earthwork
- C. Section 02530 - Sanitary Sewer Systems
- D. Electrical Specifications
- E. Contract Drawings

1.3 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM) latest edition
 1. A 48: Gray Iron Castings
 2. C 478: Precast Reinforced Concrete Manhole Sections
 3. C 923: Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes
- B. New York City Department of Environmental Protection Bureau of Water and Sewer rules and specifications
- C. New York City Department of Buildings (DOB) rules, regulations and building codes (BC)
- D. American Concrete Institute (ACI)
 1. ACI-318: Building Code Requirements for Structural Concrete
- E. American Society For Testing And Materials (ASTM)
 1. ASTM C150: Portland Cement
 2. ASTM C33: Concrete Aggregates
 3. ASTM C260: Air-Entraining Admixtures for Concrete
 4. ASTM A185: Steel Welded Wire Fabric for Concrete Reinforcement
 5. ASTM C494: Chemical Admixtures for Concrete
 6. ASTM A615: Deformed and Plain Billet Steel Bars for Concrete Reinforcement

1.4 SUBMITTALS

- A. Submittal data shall be provided to show compliance with these specifications, plans or other specifications that will influence the proper operation of the pump(s). The Contractor shall submit Four (4) copies of complete project submittals for the Engineer's review and Approval. The submittal shall be assembled in a permanent binder, complete with index and cover, clearly identifying the Project Title, Customer, Project Engineer and submittal date. The submittal shall be compiled in a logical and organized manner.
- B. Product Data: Contractor shall submit manufacturer's specific technical product data, including installation and start up instructions, furnished specialties and accessories, and current accurate pump characteristic performance curves with selection points clearly indicated. Provide structural calculations stamped by a Professional Engineer registered in the State the project is being installed.
- C. Shop Drawings: Contractor shall submit manufacturer's assembly-type shop drawings indicating dimensions, mechanical & electrical components, complete bill of materials, structural layout & reinforcing per calculations and structural weights. Provide structural reinforcing drawings stamped by a Professional Engineer registered in the State the project is being installed.
- D. Work installed under this Section is considered equivalent to Plumbing and is exempt from Green Building LEED MR requirements.
- E. Wiring Diagrams: Contractor shall submit manufacturer's electrical requirements for packaged pump stations including ladder-type wiring diagrams for interlock and control wiring, clearly indicating required field electrical connections, conduit size and wiring.
- F. Standard submittal data for approval shall consist of the following at a minimum:
 - 1. Pump station drawing showing all mechanical, structural and electrical equipment;
 - 2. Signed and sealed pre-cast wet well and valve vault structural design drawings and calculations including buoyancy calculations; Calculations shall be signed by a Licensed Professional Engineer in the State of New York.
 - 3. Precast concrete manholes including signed and sealed drawings and design (structural and buoyancy) calculations;
 - 4. Pump Cut sheets, performance curves, electrical data, pump outline drawing, and dimensional data;
 - 5. Site Excavation Plan;
 - 6. Aluminum Access Hatches;
 - 7. Aluminum ladders and appurtenances;
 - 8. Backflow preventer and hotbox;
 - 9. Yard hydrant;

10. Trash basket;
11. Flexible and Transition Couplings;
12. Pipe penetration details;
13. Portable Davit and Wall Slot;
14. Concrete Design Mix;
15. All paintings and coatings;
16. Piping, Valves and Fittings;
17. Electrical Motor Loading Data;
18. Electrical Control Drawing and Schematic Diagram;
19. Access Frame Drawing;
20. Geotextile Liner;
21. Equipment Installation Documentation from Manufacturer;
22. Technical Manuals;
23. Parts List;
24. Printed Warranty for all installed equipment at the pump station site to City of New York;
25. Manufacturer's Equipment Storage Recommendations;
26. Manufacturer's Standard Recommended Start-Up Report Form; and
27. All submittals required by the electrical specifications.

G. Lack of the above requested submittal data is cause for rejection.

1.5 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of pipe runs, connections, outlet structures, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions and the discovery of uncharted utilities.

1.6 QUALITY CONTROL INSPECTION

- A. Special inspections shall be performed by the City of New York in accordance with the NYC BC. The Contractor shall be responsible for coordinating the schedule of work with the City of New York to confirm inspector availability.
- B. The quality of materials, the process of manufacture, and the finished sections shall be

subject to inspection by the Commissioner. Such inspection may be made on the work site after delivery, and the material shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements. Material rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All materials which have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Commissioner's acceptance level, if permitted, or removed and replaced, entirely at the Contractor's expense.

- C. All material shall be inspected for general appearance, dimensions, soundness, etc. The surface of all concrete shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.
- D. The Precast Concrete Pump Station Manufacturer shall have a minimum of 3 years successful experience in the design and the assembly of factory-built, prefabricated, pre-tested Pump Stations. In addition, the Manufacturer shall have made no less than 3 Pump Stations similar to the one on this project. Evidence must be submitted to verify that these requirements are met prior to being deemed an acceptable manufacturer.
- E. The Pump Station specified herein shall be a standard product in regular production by the Pump Station Manufacturer.
- F. The Pump Station Manufacturer must maintain PCI "Certification in Good Standing" for product groups B1 & C1A, under the PCI plant certification program, for the production and quality control of the precast modules.
- G. The Engineer shall have the right to inspect or test any materials during fabrication in the factory. At the option of the Engineer, certified tests of materials may be accepted in lieu of field tests.
- H. The Pump Station shall be manufactured by Oldcastle Precast, Avon, CT, or approved equal.
- I. Alternate systems based upon a built-in-place, field erected pump station utilizing separate precast structures or cast-in-place concrete shall not be accepted.
- J. All equipment and materials furnished in the pump station shall be new and free of defects. All equipment shall be the manufacturer's latest and proven design.
- K. All electrical materials, devices, and equipment shall be UL listed wherever applicable.
- L. All equipment and installations shall meet the National Electric Code.

PART 2 - PRODUCTS

2.1 SUBMERGED SEWAGE PUMPS – GENERAL INFORMATION

- A. To ensure that all equipment required for the installation of the pre-package pump station and controls is properly coordinated and will function as a unit in accordance with the intent of these specifications, the Contractor shall obtain all the equipment specified under this Section, from a single supplier in whom the responsibility for the proper function of all equipment, regardless of manufacturer, as an integrated and

coordinated system shall be vested. The intent of this paragraph is to establish unit responsibility for all the equipment with the equipment supplier. The use of the word irresponsibility relating to the equipment supplier is in no way intended to relieve the Contractor's ultimate responsibility for equipment coordination, installation, operation, and guarantee.

- B. The manufacturer shall furnish the services of an experienced service technician or engineer to check the installation and shall file in triplicate, with the City of New York, a certificate indicating that the pre-packaged submersible pump station has been installed in accordance with the manufacturer's recommendations and that a performance test has been run satisfactorily.
- C. Factory test: During construction and before shipment, all equipment shall be tested for excessive vibration and proper operation. All components shall be thoroughly inspected to insure satisfactory operation after installation.
- D. It is the intention that this Specification shall cover a complete pre-package submersible pump station with integral valve vault as hereinafter described and all necessary appurtenances, which might normally be, considered a part of the complete unit.

2.2 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering packaged lift stations which may be incorporated in the work include, but are not limited to the following:
 - 1. Pre-package Submersible Pump Station supplied by G A Fleet Associates.

2.3 MATERIALS, FABRICATION, AND COMPONENTS:

- A. All components of the pre-package submersible pump station with integral valve vault shall be amply proportioned for all stresses that may occur during continuous operation, and for any additional stresses that may occur during fabrication or erection. Workmanship shall be high quality in all respects. All equipment shall be constructed of materials that will maintain their functional integrity during continuous handling and contact with the liquids and atmosphere likely to be encountered in this application.

2.4 RECAST CONCRETE PUMP STATION SECTIONS WITH VALVE VAULT

- A. The Pump Station with Integral Valve Vault shall be composed of precast reinforced concrete units, rectangular in shape with rounded corners. The precast structures shall be monolithically cast, and have minimum interior dimensions of 5' wide by 9' long with 2' radius corners (RC509). The precast base section will be supplied with an extended buoyancy collar to withstand upward buoyant forces with ground water at grade. Overall structure heights shall be as shown on the contract drawings, and range from 10'-10" to 22'-10", in 2' increments.
- B. Exterior Walls shall be a minimum of 7 inches thick (RC509), integral valve vault common wall and floor shall be a minimum of 6 inches thick, station floor and buoyancy footing shall be a minimum of 8 inches thick, and the roof slab with hatches shall be a minimum of 12 inches thick.

- C. The Integral Valve Vault shall be monolithically cast into the pump station structure as shown on the contract drawing to conserve site space and to eliminate the possibility of differential settlement. Conventional means, utilizing two (2) separate structures for the pump station and the valve vault will not be accepted as an equal.
- D. The Precast Structures shall be comprised of the least number of sections to keep the joints to a minimum.
- E. The Pump Station Manufacturer shall have a sufficiently sized production facility in which all work associated with fabricating, assembling and testing the pump station will be preformed. The building shall keep the pump station components protected from the elements and kept at an ambient temperature of at least 45 degrees Fahrenheit. No concrete shall be batched and placed when the ambient temperature is below 50 degrees Fahrenheit.
- F. All wall penetrations shall be formed utilizing hole-formers for manhole boots, or galvanized threaded couplings with waterstops for electrical connection.
- G. All cast wall openings for ductile iron, PVC or galvanized steel pipe shall incorporate adjustable rubber manhole boots for a watertight seal.
- H. All Precast components shall be fabricated on steel forms with machined rings to form accurate bell and spigot joint surfaces to ensure watertightness.
- I. The Horizontal joints between precast sections shall be sealed with a vulcanized butyl rubber joint material conforming to AASHTO M-198. The joint material shall be "Conseal CS-102" as manufactured by Concrete Sealants, or approved equal.
- J. All surfaces of the precast structures shall be smooth, even, and free from roughness, irregularities and other defects. The surfaces shall be suitable for receiving exterior treatments as specified elsewhere herein.

2.5 PRECAST DESIGN CRITERIA

- A. Structural design calculations for the Pump Station with Integral Valve Vault shall be prepared and sealed by a registered Professional Engineer, in the project state, and shall be submitted for approval prior to fabrication.
- B. Precast Concrete sections shall conform to the latest requirements of ACI 318.
- C. The structural design shall take into account discontinuities in the structure produced by openings. All slabs and walls shall be fully reinforced on both surfaces with minimum reinforcing of #5 @ 12" each way. Additional reinforcing shall be provided around all openings.
- D. The Precast Pump Station with Integral Valve vault shall be designed to support its own weight as well as the minimum superimposed loads tabulated below. All additional equipment shall be accounted for in the design of the elements.
- E. Pump Station with Integral Valve Vault
 - Top Slab

Live Load – AASHTO HS20

Floor Slab (valve vault & base)

Live Load – 200 psf

F. Exterior Walls

1. All exterior walls below finished grade shall be designed for an equivalent fluid pressure of 90.0 psf caused by saturated earth pressure. The top of the pressure diagram is assumed to originate at finished grade. In addition to the soil pressure, a 2'-0" Live Load Surcharge shall be applied to a depth of 8'-0".
2. When the design yield strength "fy" for tension reinforcement exceeds 40,000 psi, the "z" value referred to in ACI 318 shall not exceed 95 ksi for the wet well and 115 ksi for the pump station. The flexural stress in reinforcement under service loads "fs" shall be calculated and shall not be greater than 50 percent of the specified yield strength "fy".
3. The structures shall be designed to prevent floatation without the benefit of skin friction and the weight of mechanical equipment when the ground water level is at finished ground surface. The factor of safety against uplift calculated as a ratio of the total resisting force (excluding skin friction and the weight of the equipment) to the total hydrostatic uplift force shall be at least 1.20. The net uplift force shall be transferred to the anti-buoyancy collar.

2.6 PRECAST CONCRETE

- A. Concrete used in the manufacture of the various structural components of the precast concrete pump station shall be factory batched and shall meet the following requirements:
 - B. Portland cement shall be Type I, II or III conforming to ASTM C-150.
 - C. Fine aggregate shall consist of natural sand conforming to ASTM specification C-33.
 - D. Coarse aggregate shall consist of 3/4" nominal well graded crushed stone conforming to ASTM specification C-33.
 - E. Air entrainment admixture shall conform to ASTM C260. The air-entrained content shall be not less than 4 percent nor greater than 7 percent.
 - F. A superplasticizer shall be used and shall conform to ASTM C494 type A or F. Concrete shall be placed at a slump of between 5 and 8 inches.
 - G. A Crystalline Waterproofing Additive shall be used when selected as a product option. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete, surface to surface, from deterioration due to harsh environmental conditions. The Waterproofing Additive shall be Xypex Admix C-100, as manufactured by XYPEX Chemical Corporation, Richmond, B.C., Canada, or approved equal.
- H. All concrete used for the structural components and non-structural components

(including fill concrete, and common interior wall and floor of integral valve vault) shall attain a minimum 28-day compressive strength of 5,000 psi.

- I. The Pump Station Manufacturer shall conduct concrete strength tests on 4" x 8" cylinders. An adequate number of tests shall be performed to certify and ensure the strength meets or exceeds the design strength. Concrete strength test results for all specific precast structures supplied must be made available in written reports, per PCI standards, at the request of the review engineer.

2.7 STEEL REINFORCING

- A. Reinforcing steel shall be new billet steel meeting the requirements of ASTM A615. Welded wire fabric shall conform to ASTM A185.
- B. Minimum Cover over reinforcement shall be 1 inch. Minimum bar lap shall be 30 bar diameters.
- C. All reinforcement shall be free from loose rust, oil, and contaminates which reduce bond. Any foreign material shall be removed by suitable means prior to installation.
- D. Provide supports for reinforcement including chairs, bolster bars, and other devices for spacing and securing reinforcing in accordance with CRSI requirements. Legs of all supports in contact with exposed-to-view surfaces shall be plastic coated in accordance with CRSI, class I.

2.8 PUMPS

- A. Furnish and install two (2) submersible non-clog wastewater pump(s). Each pump shall be equipped with a three (3) HP, submersible electric motor connected for operation on 208 volts, 3 phase, 60 hertz, with 80 feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and also meet with P-MSHA Approval.
- B. Pump Design Configuration (Wet pit installation)
 1. The pump shall be supplied with a mating cast iron 3 inch discharge connection and be capable of delivering 250 GPM at 13 FT. TDH. Shut off head shall be 25 feet (minimum). The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor. Each pump shall be fitted with 20 feet of lifting chain or stainless steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.
- C. Pump Construction
 1. Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. The lifting handle

shall be of stainless steel. All exposed nuts or bolts shall be AISI type 316 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

2. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or optional Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.
3. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

D. Cooling System

1. Motors are sufficiently cooled by the surrounding environment or pumped media. A water cooling jacket is not required.

E. Cable Entry Seal

1. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal.

F. Motor

1. The pump motor shall be an explosion proof motor, NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The motor and the pump shall be produced by the same manufacturer.

2. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
3. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
4. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

G. Bearings

1. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable.

H. Mechanical Seal

1. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary tungsten-carbide seal ring and one positively driven rotating tungsten-carbide seal ring. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.
2. The following seal types shall not be considered acceptable or equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.
3. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to

provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. The motor shall be able to operate dry without damage while pumping under load. The motor shall be able to operate on 208 volt 3 phase under full load.

4. Seal lubricant shall be FDA Approved, nontoxic.

I. Pump Shaft

1. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The pump shaft shall be stainless steel – ASTM A479 S43100-T.
2. If a shaft material of lower quality than stainless steel – ASTM A479 S43100-T is used, a shaft sleeve of stainless steel – ASTM A479 S43100-T is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the lubricant housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

J. Impeller

1. The impeller(s) shall be cast of ASTM A-532 (Alloy III A) 25% chrome cast iron, dynamically balanced, semi-open, multi-vane, back-swept, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on a replaceable insert ring.
2. The ASTM A-532 (Alloy III A) 25% chrome cast iron impeller shall have a hardness of Rc 55) and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater. The impeller shall be capable of momentarily moving axially upwards a distance of 15mm/0.6-in. to allow larger debris to pass through and immediately return to normal operating position.

K. Volute / Suction Cover

1. The pump volute shall be a single piece gray cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall have a guide pin integral to the casting and shall be cast of ASTM A-532 (Alloy III A) 25% chrome cast iron) and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

L. Protection

1. All stators shall incorporate thermal switches in series to monitor the temperature

of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

2. A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.
3. The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

M. Duplex control panel

1. Automatic pump controller shall be in a Nema 4X with inner door construction stainless steel enclosure designed to accept 120/208 volt, 3 Phase, 60 hertz, 4 wire power supply (3 power legs A,B,C and 1 neutral leg N). Pump motors shall be powered through across the line motor starters with individual circuit breakers and three phase thermal overload protection. Each pump is to be provided with an elapsed time meter, H-O-A selector switch and an individual pump MiniCAS seal monitor / motor over temperature protection circuit with indicating light and manual reset. The panel shall be arranged to accept one main power feeder and furnished with a lightning arrestor. There shall be a 24 volt control circuit transformer with circuit breaker protection.
2. Sequence of pump operation shall be as follows: The low level sensor FS1 shall be the OFF level sensor. Upon increasing liquid level the lead pump sensor FS2 shall tip and activate the lead pump and run to the pump off level. If the sump level continues to rise to tip the FS3 level sensor, the lag pump shall start and pump together with the lead pump down to the pump off level. The high water level sensor FS4 shall activate the high level alarm system should the level continue to rise. All wet well level sensors are energized through intrinsically safe relays. The pumps shall automatically alternate on every cycle. The elapsed time meters will record the operation intervals of each respective pump.
3. Each pump shall be furnished with the following pilot lights: run light, motor over temperature alarm light, seal leakage alarm light. The panel shall be provided with a high level alarm pilot and a top mounted exterior panel alarm light and horn. There shall be auxiliary alarm contacts present for each alarm condition. The panel shall be provided with clearly identified terminal strips for landing all external wiring from the pump chamber.

2.9 POWER SUPPLY

- A. The available power service is 120/208 volt, 3 phase, 4 wire. The Contractor shall include all incidentals required to provide the manufacturers required power input requirements.

2.10 HAZARDOUS LOCATION COMPLIANCE

- A. The wet well and the area within 2 feet of the wet well has been classified as a Class 1, Division 1, A Hazardous Location as defined by the National Electrical Code. All electric wiring and motors located within the subject area shall be in strict compliance with these standards. The shop drawings carry the manufacturer's certification that all equipment located in the subject area meets the requirements of NEC Class 1, Division 1 Criteria and the Underwriter's Laboratory (UL).

2.11 ACCESS FRAME AND COVER

A. Pump Access

1. Furnish and install (1) aluminum pump access hatch, 30" x 48" (RC509) single door, flush with precast cover, H20 load rating with 316 stainless steel hardware. Cover will be ¼" diamond plate with stainless steel slam lock and weather plug, lift handle which sits flush with cover, recessed pad lock clip (pad lock by others), hold open arm to lock cover in 90-degree position, heavy duty stainless hinges. Frame to be angle style with continuous 1 ½" anchor flange and full slab-height skirt to show no exposed concrete when hatch is open, exterior surfaces in contact with concrete to receive one coat bituminous paint. Pump access hatch to be supplied with integral safety grating system.
2. The safety grate shall be made of 6061-T6 aluminum and designed per the "Specifications for Aluminum Structures". The grating shall be designed to withstand H-20 loading. Each H20 grate shall be supplied with a heavy duty, stainless steel pneu-spring for ease of operation when opening. Each grate shall be provided with a permanent hinging system, which will lock the grate in the 90-degree position once opened. Grate shall be coated with an OSHA type safety orange color, base coat is a thermosetting epoxy powder coat finish with a minimum thickness of 2-4 mils. The top coat is a mar-resistant, TGIC polyester powder coating with a minimum thickness of 2-4 mils. Each coat shall be baked at 350-375 degrees F until cured.

B. Valve Vault Access

1. Furnish and install (1) aluminum valve vault access hatch, 30" x 36" single door, flush with precast cover, H20 load rating with 316 stainless steel hardware. Cover will be ¼" diamond plate with stainless steel slam lock and weather plug, lift handle which sits flush with cover, recessed pad lock clip (pad lock by others), hold open arm to lock cover in 90-degree position, heavy duty stainless hinges. Frame to be channel style with 1 ½" NPT drain port, continuous 1 ½" anchor flange and full slab-height skirt to show no exposed concrete when hatch is open, exterior surfaces in contact with concrete to receive one coat bituminous paint. Each H20 hatch will be supplied with a heavy duty, stainless steel pneu-spring, for ease of operation when opening cover.

2.12 PIPING

- A. Piping and fittings for the pump station shall be ductile iron class 52 of sizes as shown. All ductile iron pipe shall be centrifugally cast and conform to ANSI A21.51 and ANSI A21.50. All piping shall be made of ductile iron equal to grade 60-42-10. The pipe shall be coated on the outside and inside in accordance with the requirements of ANSI A21.51 or cement lined to the thickness as specified ANSI A26.51 and ANSI A21.4 and

shall be asphalt seal coated.

- B. All piping assembly hardware shall be stainless steel.

2.13 CHECK VALVES

- A. The check valves shall be all iron body, bronze mounted, full opening swing type. Valve clapper shall swing completely clear of the waterway when valve is full open, permitting a full flow through the valve equal to the nominal pipe diameter. They shall comply with AWWA Standard C-508 latest revision. The check valve shall be flanged with adjustable outside lever and weight.

2.14 PLUG VALVES

- A. The plug valves are to be of the non-lubricated eccentric plug type. Valves are to be rated for 175 LB WOG and cast of ASTM A126 Class B cast iron. Valve flanges must meet ANSI flange specifications and have wedge-gate face-to-face dimensions for sizes up to and including 12". All valves must have a minimum of 80% port opening to assure minimum turbulence and minimum pressure drop. Valves are to have a balanced plug, coated with Burna-N Neoprene or other material as required to assure low torque and bubble-tight shut-off. Valves to be corrosion resistant. Seat is to be raised, welded nickel.

2.15 GEOTEXTILE LINER

- A. The Geotextile liner shown on the plans shall be non-woven geotextile manufactured by Mirafi, Model 135N or approved equal.
- B. The Geotextile shall have the following mechanical properties.

Mechanical Properties	Test Method	Unit	Typical Value	
			MD	CD
Tensile Strength (at ultimate)	ASTM D 4595	kN/m (lbs/in)	4.7 (27)	4.7 (27)
Grab Tensile Strength	ASTM D 4632	N (lbs)	409 (2)	409 (92)
Grab Tensile Elongation	ASTM D 4632	%	70	70
Trapezoid Tear Strength	ASTM D 4533	N (lbs)	200 (45)	200 (45)
Mullen Burst Strength	ASTM D 3786	kPa (psi)	1309 (190)	
Puncture Strength ¹	ASTM D 4833	N (lbs)	240 (54)	
CBR Puncture Strength	ASTM D 6241	N (lbs)	1113 (250)	
Apparent Opening Size (AOS) ²	ASTM D 4751	mm (U.S. Sieve)	0.25 (60)	
Permittivity	ASTM D 4491	sec ⁻¹	2.9	
Flow Rate	ASTM D 4491	l/min/m ² (gal/min/ft ²)	8352 (205)	
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	83	

¹ ASTM D 4833 has been replaced with ASTM D 6241

² ASTM D 4751: AOS is a Maximum Opening Diameter Value

- C. The Geotextile shall have the following physical properties.

Physical Properties	Test Method	Unit	Typical Value	
Weight	ASTM D 5261	g/m ² (oz/yd ²)	115 (3.4)	
Thickness	ASTM D 5199	mm (mils)	0.8 (32)	
Roll Dimensions (width x length)	--	m (ft)	3.8 x 110 (12.5 x 360)	4.5 x 110 (15 x 360)
Roll Area	--	m ² (yd ²)	418 (500)	502 (600)
Estimated Roll Weight	--	kg (lb)	52 (113)	62 (136)

2.16 PIPING AND VALVES

- A. Furnish and Install valves, piping, fittings suitable for application in wastewater applications and shall be as shown in contract drawings.
- B. Pump Station force main piping:
 1. Pump Station force main piping material shall be as shown on the plans
 2. Ductile Iron pipe (where shown on the contract documents):
 - a. Flanged pipe thread-fabrication shall be Special Thickness Class 53 in accordance with ANSI/AWWA C115/A21.15 and ANSI/AWWA C110/A21.10. Threaded companion flanges for ductile iron pipe shall be ductile iron in accordance with AWWA C115.
 - b. Mechanical Joint Pipe shall be shall be Special Thickness Class 52 in accordance with ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11.
 - c. Ductile iron pipe barrels conform to the requirements of AWWA C151.
 - d. Flanged and Mechanical Joint Pipe shall be coated with two coats (primer and final coating) of bituminous outside coating in accordance with ANSI/AWWA C151/A21.51.
 - e. Flanged and Mechanical Joint Pipe shall be lined with two coats 40 mils (primer and finished coating) of Protecto 401 ceramic epoxy suitable for sewage applications. The contractor shall field cut the force main in accordance with the manufacturer's recommendations.
 - f. Flanged Ductile Iron Pipe fittings shall be in conformance with AWWA C110 or AWWA C115.
 - g. Acceptable manufacturers – American Cast Iron Pipe Company, US Pipe or approved equal.
 3. Drain Piping shall be PVC pipe schedule 40 minimum.
 4. HDPE Pipe
 - a. Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D 3350 with a minimum cell classification of PE445474C. Pipe shall have a manufacturing standard of ASTM F 714 and be manufactured by an ISO 9001 certified manufacturer. The pipe shall contain no recycled

compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

- b. The pipe and fittings shall meet the requirements of AWWA C906.
- c. HDPE pipe shall be rated for use at a pressure class 160 psi (DR 13.5).
- d. The outside diameter of the pipe shall be based upon the DIPS sizing system.

C. Fittings

1. Ductile Iron Fittings:

- a. Ductile iron restrained joint compact fittings shall be designed with the restraint system as an integral part of the fitting.
- b. Fittings shall be manufactured of ductile iron conforming to the requirements of mechanical joint, AWWA C110 or AWWA C111.
- c. The inside and outside coatings of the fittings shall match the coatings of the ductile iron pipe noted above.
- d. Gaskets shall in all respects conform to the requirements of ASTM F 477 and Table 8 of ANSI/AWWA C111/A21.11.
- e. Fittings, including the joints and restraint systems, shall have a minimum pressure rating of 250 psi.
- f. The joint shall be tested with pipe using the procedures found in ASTM F1674, including a short term high pressure test, a sustained pressure test, a cyclic surge test and shall be capable of being assembled without beveling a cut pipe.
- g. Joint restraint system shall be Megalug model 1100 for Mechanical Joint restraint for DIP pipe as manufactured by EBAA Iron, Inc or approved equal.

2. HDPE Fittings

- a. Butt Fusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE4710 and with a minimum Cell Classification as noted in section 2.5.B.4 – HDPE Pipe. Butt Fusion Fittings shall meet the requirements of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All fittings shall meet the requirements of AWWA C906. Markings for molded fittings shall comply with the requirements of ASTM D 3261. Fabricated fittings shall be marked in accordance with ASTM F 2206. Socket fittings shall meet ASTM D 2683.
- b. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell

Classification as noted in section 2.5.B.4 – HDPE Pipe. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits, and have nominal burst values of four times the Working Pressure Rating (WPR) of the fitting. Markings shall be according to ASTM F 1055.

- c. Flanges and Mechanical Joint Adapters (MJ Adapters) – Flanges and Mechanical Joint Adapters shall have a material designation code of PE3608 or higher and a minimum Cell Classification as noted in section 2.5.B.4 – HDPE Pipe. Flanged and Mechanical Joint Adapters can be made to ASTM D 3261 or if machined, must meet the requirements of ASTM F 2206. Flanges and MJ Adapters shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flange adapters or MJ Adapters shall be per ASTM D 3261. Fabricated (including machined) flange adapters shall be per ASTM F 2206.

D. Gate Valves:

1. Gate valves shall be of resilient wedge gate valves which meet or exceed the latest revision of AWWA C509 or AWWA C515 standard.
2. All gate valves shall be Outside-Screw and Yoke type (OS&Y).
3. The valves shall have the below features:
 - a. 250 psi maximum working water pressure.
 - b. 140 degrees F maximum working water temperature
 - c. 500 psi hydrostatic test pressure
 - d. ANSI / ASME B16.1 end connection
4. Materials shall be as follows:
 - a. The valve body and covers
 - i) 4" – 12" Cast Iron ASTM A-126, Class B
 - ii) 14"-24" - Ductile iron ASTM A536 Gr 65-45-12
 - iii) Coating - The body, bonnet, and o-ring plate shall be fusion-bond epoxy coated, both interior and exterior on body and bonnet. Epoxy shall be applied in accordance with AWWA C-550 and be NSF 61 approved.
 - b. Wedge - Gray Iron ASTM A126 Class B
 - c. Elastomers – EPDM FDA approved
 - d. OS & Y stems shall be bronze

- e. Fasteners – Zinc Plated steel ASTM A307 Grade B & 304 Stainless Steel
 - 5. Approved Manufacturers – Mueller and Co. (R-2360), Clow valve company (F-6136), and American Flow Control (Series 2500) and M&H valve company (Model 4067) or approved equal.
- E. Xtra-Flex Coupling
- 1. Furnish and install Xtra-Flex Coupling as manufactured by US Pipe or approved at locations noted on the plans.
 - 2. Cast Components shall be made of ductile iron conforming to all applicable requirements of ANSI/AWWA C110/A21.10.
 - 3. Coating for coupling shall match the coatings specified on the pipe and fittings above.

PART 3 - EXECUTION

3.1 COMPACTION

- A. Compaction testing for pipe and structures shall be performed by the a qualified Geotechnical Engineer. The Contractor shall notify the Engineer at least 72 hrs prior to schedule the compaction testing so that the Engineer can schedule his personnel accordingly.

3.2 INSTALLATION

A. Pipe

- 1. The type and class of pipe used shall be as shown on the construction plans. Pipes shall be laid and maintained to the required line and grade with necessary fittings, bends, and other appurtenances placed at the required locations. The pipe shall be installed with uniform bearing under the full length of the barrel of the pipe. The pipe shall be inspected for defects and cracks before carefully being lowered into the trench. Any defective, damaged or unsound pipe, or any pipe that has had its grade disturbed after laying shall be taken up and replaced. Commence installation at lowest point with the bell end upgrades.
- 2. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by a licensed land surveyor and replaced, as necessary, by same at no additional cost to the City of New York.
- 3. All materials to be carefully examined for defects, no pieces known to be defective to be installed. Defective pieces discovered after installation to be removed and replaced in a satisfactory manner, regardless of prior approvals.
- 4. Ream pipe and tube ends and remove burrs.
- 5. Prepare pipe for connections to equipment with flanges or unions Excavate pipe trench and place bedding material in accordance with Section 02322. No pipe shall be laid in water or when trench conditions are unsuitable for work.

6. Pipe connecting to manholes or other structures shall terminate flush inside of the structure wall.
7. All pipe and castings to be cleaned before being placed in trench or jointing. Exposed ends of all incomplete lines to be closed with tight plugs and adequately secured when pipe installation is not in progress.
8. All field cut or damaged ductile iron pipe shall be coated with Protecto 401, or equal, in accordance with the manufacturer's recommendations.
9. Pipe castings to accurately conform to lines and grades on plans or as ordered by Engineer. All wall pipes and other castings to be imbedded in concrete to be accurately set and rigidly secured. Pipe to be laid in manner to assure that valve stems and boxes will be plumb.
10. Exercise care at outside face of structure and manholes. Support pipes bridging excavation to structures or manhole.
11. Cracked or broken pipe or valves to be promptly removed and replaced with sound units regardless of prior approvals.
12. HDPE Force main and fittings shall be butt fused and installed as per the manufacturers recommendations. Install pipe to allow for expansion and contraction without stressing pipe or joints or as specified by pipe manufacturer.
13. Establish elevations of buried piping in accordance with Section 02300 Earthwork.
14. Clean and flush all lines of debris including dust, grease, oil and other foreign materials.
15. Maintain separation of water main from sanitary and storm sewer piping in accordance with state or local codes (3.3m minimum in horizontal from sanitary, except at crossings, and 0.46m minimum in vertical at crossings). Form and place concrete for thrust blocks at each elbow of pipe force main. See construction drawing for details of construction.
16. Make all connections to pipelines and appurtenances; furnish and install all valves and accessories; install concrete thrust blocks; construct manholes.
17. Certain construction operations described are a necessary part of pipe, valve, specialty and accessory installation. Materials and installation specifications not included in this Division are in appropriate subdivisions of specifications covering work other than piping, valves and specialties.
18. Making connections to existing pipelines or relocating existing pipelines or appurtenances requires careful consideration as to construction techniques. Contractor is solely responsible for maintaining existing pipelines in manner to prevent disruption of services or bypassing untreated wastewaters directly or indirectly to any water course or underground aquifer.
19. Backfill trench in accordance with Section 02300.

B. Pump Station

1. The Contractor shall be responsible for a complete operational system. The Contractor shall include all installation coordination of the pump chamber sections and related equipment in accordance with written instructions supplied by the manufacturer. The manufacturer shall provide the services of a factory trained technician for one day to perform the initial start-up of the station. Once the station is complete and ready for use, the Contractor shall provide one day of instruction to the City of New York's operation and maintenance personnel in the operation and maintenance of the station.
2. The pump station shall be factory assembled and shipped to the job site as follows:
 - a. Wet Well Assembly precast extended base with taper, pump slide couplings will be factory mounted.
 - b. Concrete Risers includes holes and rubber boots as required.
 - c. Wet Well Top includes aluminum access covers.
 - d. Valve Pit Assembly includes piping and valves factory installed. Piping extends three feet both directions.
 - e. Miscellaneous items provided but field installed pumps, control panel, mercury floats, discharge piping, dresser couplings, and guide rails.

3.3 QUALITY ASSURANCE

A. Pumps

1. All components of the pump station shall be given an operational test at the pump station manufacturer's facility to check for excessive vibration, for leaks in the piping or seals and for correct operation of the automatic control system and all auxiliary equipment. The pump suction and discharge lines shall be coupled to a reservoir and the pumps shall re-circulate water under simulated service conditions. The automatic controls shall be adjusted to start and stop the pumps at approximately the levels required by the job conditions. The control panel shall undergo both a dry logic test and full operational test with all systems operating.
2. Factory test instrumentation must include flow measuring with indicator; compound suction gauge; bourdon tube type discharge pressure gauge; electrical meters to measure amperes, volts, kilowatts and power factor; speed indicator and a vibrometer capable of measuring both amplitude and frequency.

B. Force Main

1. Perform installation in accordance with utility company or local governing authority requirements.

3.4 TESTING

A. Pumps

1. All components of the pump station shall be given an operational test at the pump

station manufacturers facility to check for excessive vibration, for leaks in the piping or seals and for correct operation of the automatic control system and all auxiliary equipment. The pump suction and discharge lines shall be coupled to a reservoir and the pumps shall re-circulate water under simulated service conditions. The automatic controls shall be adjusted to start and stop the pumps at approximately the levels required by the job conditions. The control panel shall undergo both a dry logic test and full operational test with all systems operating.

2. Factory test instrumentation must include flow measuring with indicator; compound suction gauge; bourdon tube type discharge pressure gauge; electrical meters to measure amperes, volts, kilowatts and power factor; speed indicator and a vibrometer capable of measuring both amplitude and frequency.
3. Upon Commissioner's request, a written quality assurance record confirming the above testing/inspections shall be supplied with each pump at the time of shipment.
4. Each pump shall be tested in accordance with the latest test code of the Hydraulic Institute (H.I.) at the manufacturer to determine head vs. capacity and kilowatt draw required.
5. The pump(s) shall be rejected if the above requirements are not satisfied.

B. Force Main

1. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
2. Pressure testing shall be conducted per Manufacturer's recommendations and as approved by local governing authorities.
3. All force mains shall be field-tested. Contractor shall supply all labor, equipment, material, gages, pumps, meters and incidentals required for testing. Each main shall be pressure tested upon completion of the pipe laying and backfilling operations, including placement of any required temporary roadway surfacing.
4. The force mains shall be tested at a pressure of 150 psi for a period of 3 hours.
5. Pressure testing procedure shall be per Manufacturer's recommendations or as follows:
 - a. Fill line slowly with water. Maintain flow velocity less than 2 feet per second.
 - b. Expel air completely from the line during filling and again before applying test pressure. Air shall be expelled by means of taps at points of highest elevation.
 - c. Apply initial test pressure and allow to stand without makeup pressure for four hours, to allow for diametric expansion or pipe stretching to stabilize.
 - d. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for three hours with no pressure drop. If a pressure drop is encountered after the two hours then proceed to step F below to determine the allowable leakage and measure

the amount of water needed to bring the pressure back up to the final test pressure.

- e. Upon completion of the test, the pressure shall be bled off from a location other than the point where the pressure is monitored. The pressure drop shall be recorded on a pressure read-out submitted to the Engineer of Record.
 - f. **WARNING:** Under no circumstances shall the total time under test exceed eight (8) hours at 1½ times the pressure rating. If the test is not completed due to leakage, equipment failure, etc., the test section shall be permitted to "relax" for eight (8) hours prior to the next testing sequence.
6. Leakage test shall be conducted concurrently with pressure test. Leakage is defined as quantity of water that must be supplied into newly laid pipeline or valved section thereof to maintain pressure within 5 psi of specified test pressure after air in pipeline has been expelled and pipeline has been filled with water. Leakage shall not be measured by drop in pressure in test section over period of time. Contact engineer, Water Company and fire official to observe testing.
7. No pipeline installation will be accepted if leakage is greater than that determined by the following formula or 12 gallons per inch diameter per day per mile of pipe (whichever is greater):

SD P

L = 133,200

L = allowable leakage, (gallons per hour)

S = length of pipe tested, (feet)

D = nominal diameter of pipe, (inches)

P = average test pressure during test, (psig)

Where the utility authority has additional or alternate testing, the utility authority requirements will govern.

- 8. Visible Leakage:
 - a. Visible leaks shall be repaired regardless of amount of leakage measured.
- 9. Acceptance of Installation:
 - a. If test of pipe laid in place discloses leakage greater than that specified, Contractor shall, at his own expense, locate leak and make repairs as necessary until leakage is within specified allowance.
- 10. Supply water for testing at no expense to City of New York.

3.5 SPECIALTY PUMP TECHNICIAN SERVICES

- A. The pump supplier shall provide the services of a factory trained technician to provide

the following minimum services for each pump station:

1. Instruct the Contractor on proper installation of the equipment;
2. One eight-hour day for pre-startup assistance;
3. One eight-hour day for start-up of pumps, controls and all other equipment supplied;
4. One eight-hour day to instruct City of New York's personnel on the operation and maintenance all equipment supplied. This additional day of service is not to be used for calibration, testing and startup, but is to be provided after acceptance of the equipment. Days left unused after Commissioner's personnel have been instructed in operation and maintenance of the equipment (if any) are to be credited in writing to Commissioner for future use for instruction or service. Each service day specified herein shall be deemed to include all travel and lodging expenses.

B. The technician shall be fully trained in the installation, operation and maintenance of the pumps, controls and all other equipment supplied. A resume and factory training for all equipment being provided shall be included in the submittal package. Start-up services by salespersons are not acceptable. The technician shall perform the following tests after the pumps have been completely installed and wired, and shall furnish a written report to the Commissioner within two working days of the startup and testing:

1. Megger stator and power cables.
2. Check seal lubrication.
3. Check for proper rotation.
4. Check power supply voltage.
5. Measure motor operating load and no load current.
6. Check level control operation and sequence
7. Check functioning of seal fail devices
8. Check impeller adjustment against specifications
9. Check for debris in station that may damage pumping equipment

3.6 OPERATION AND MAINTENANCE MANUALS

A. The contractor shall prepare and submit to the City of New York an Operation and Maintenance manual for the pump station equipment that will include but not limited to the following:

1. As-built pump station mechanical and electrical drawings;
2. As-built pump station site and utility plan;

3. Electrical and control drawings provided by the manufacturer;
4. Pump station startup report;
5. Four (4) complete sets of Operation and Maintenance Manuals shall be furnished for the pump station supplied. The manuals shall contain instructions that are comprehensive, and sufficiently detailed for the intended use.
6. The Operation and Maintenance Manuals shall be assembled in a permanent binder, complete with index and cover clearly identifying the pump station name. The manuals shall be compiled in a logical and organized manner.
7. The Manuals shall contain specific pump station instructions which will enable personnel to operate and maintain the overall pump station and all equipment associated with each individual system installed within the station.
8. Manuals that are a compilation of generalized manufacturer's literature that are not solely applicable to the particular pumping station will not be accepted.
9. All necessary permit documents;
10. A list of installed mechanical and electrical equipment (As-built) with make and model in a tabular format;
11. Manufacturer's cut sheets on pumps with information such as shutoff head, discharge head, pump curves, electrical information, and typical flow rate based on startup report;
12. Manufacturer's cut sheets on Valves, Generator, control Panel, and electrical equipment;
13. Typical operating procedures for the installed electrical and mechanical including reference to hazards and safe practices;
14. Contingency plan incase of equipment failure. The plan should at a minimum address the response after the failure of the pumps, controls and the generator or any other equipment necessary for the smooth operation of the pump station;
15. Maintenance frequency of each installed equipment;
16. Schedule for testing emergency and standby equipment;
17. A list of phone emergency numbers that City of New York and other government agencies may need to be notified during emergencies;
18. List of manufacturer recommended spare parts for the electrical and mechanical equipment.

3.7 SPARE PARTS

- A. The following spare parts shall be available at a stocking and service facility. Spare parts shall be available for each size and type of pump and control installed.

1. Mechanical Seals complete
 2. Rings
 3. Wear Ring (where appropriate)
- B. A notarized statement shall be part of the submittal, confirming that these parts are available for inspection by the Commissioner. Should the Pump supplier be unable to meet this requirement, the spare parts listed shall be supplied as part of the installation.
- C. Factory Service
1. Factory-Approved service facilities with qualified factory-trained mechanics shall be available for prompt emergency and routine service.
- D. Warranty
1. The manufacturer of the station shall guarantee for one (1) year from date of start-up, not to exceed eighteen (18) months from date of shipment, that the structure and all equipment he provides will be free from defects in material and workmanship. Warranties and guarantees of the suppliers of various components in lieu of a single source responsibility by the Manufacturer will not be accepted. The manufacturer shall assume prime responsibility for the guarantee of the station and all components.
 2. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the Manufacture shall repair or replace, at this discretion, such defective part. He shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the steel structure, main pumps, main pump motors and main piping manifold. After start-up service has been performed, the labor to replace accessory items, such as the ventilating blower, dehumidifier, sump pump, alternator, etc., shall be the responsibility of others.
 3. The repair or replacement of those items normally consumed in service, such as seals, grease, light bulbs, etc., shall be considered as part of routine maintenance and upkeep.
- E. Experience
1. The pump manufacturer shall have a minimum of 10,000 heavy-duty submersible wastewater pumps installed and operating for no less than 3 years in the United States.

3.8 AS-BUILT RECORD DRAWINGS

- A. The contractor shall prepare an As-Built record of the sewer pump station, force main and appurtenances as sections are completed. The As-Built record shall be produced in AutoCAD or approved equal computer drafting software and include the exact location of the constructed sanitary system, rim, and invert elevations, size, and material of all sanitary lines. Elevations and coordinates shall be based on the datum

and coordinate system established by the project design team.

- B. The Contractor shall submit an electronic file and 3 copies of the As-Built record of the work completed under this section to the Commissioner.

END OF SECTION

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SECTION 02740 – ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED SECTIONS AND DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- B. Related Sections
 - 1. Division 1 Specifications for Green Building Requirements
 - 2. Section 02060 -- Aggregate Materials
 - 3. Section 02721-- Aggregate Base Courses
 - 4. Section 02300 – Earthwork
 - 5. Section 02205– Protection, Demolition, and Relocation of Existing Utilities
 - 6. Section 02760 – Pavement Markings

1.2 SUMMARY

- A. Overall work under this Contract shall include all labor, materials, equipment, supervision, coordination efforts, permitting costs, certificate costs, services, filing fees, testing costs, security, insurance and all other associated or related items specified herein that are necessary and are required to complete the Work. The Work of this Section includes, but is not limited to the following:
 - 1. Asphaltic concrete surface course and wearing course.

1.3 SUBMITTALS

- A. Design Mix: Before any asphaltic concrete paving is constructed, submit actual design mix to the Owner's Representative for review and/or approval. Design mix submittal shall include the type/name of the mix, gradation analysis, grade of asphalt cement used, sources of all ingredient materials, and percentages by weight and the number of pounds of each of the materials and direct references to the Standard Specifications sections for each material. Mix designs over three (3) years old will not be accepted by the owner.
- B. Material Certificates: Submit materials certificate to the Owner's Representative which is signed by material producer and Contractor, certifying that materials comply with, or exceed, the requirements herein.

1.4 QUALITY ASSURANCE

- A. The Contractor shall submit the required submittals to the Owner or the Owner's Engineer at least one week prior to the start of construction for approval.

1.5 PERFORMANCE REQUIREMENTS

- A. Contractor shall maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Weather Limitations: Do not place asphalt pavement top course when ambient air or base surface temperature is less than 40 degrees F, or surface is wet. Asphalt binder course may be placed when ambient air or base surface temperature is above 30 degrees and rising and base is dry.
- B. Apply tack coat when ambient air or base surface temperature is above 50 degrees F for 12 hours immediately prior to application. Do not apply when base is wet.

1.7 REFERENCE STANDARDS

- A. New York City Department of Transportation Standard Highway Specifications, dated November 1, 2012, and as amended to date.
- B. ASTM D946 Penetration Graded Asphalt Cement for use in Pavement Construction
- C. ANSI/ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10 lb (4.54 Kg) Hammer and 18 inch (457 mm) Drop.
- D. ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth), Method B (Direct Transmission).
- E. ASTM D424 – Standard Method of Test for Plastic Limit
- F. ASTM C33 – Standard Specification for Concrete Aggregates
- G. ASTM D1559 – Test Method for Resistance of Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
- H. ASTM D2028 – Standard Specification for Cutback Asphalt (Rapid-Curing Type)
- I. ASTM D2950 - Density of Bituminous Concrete in Place by Nuclear Methods
- J. ASTM D2041 - Specific Gravity and Density of Bituminous Paving Mixture, Theoretical Maximum
- K. TAI - (The Asphalt Institute) - MS-2 Mix Design Methods for Asphalt Concrete and Other Hot Mix Types
- L. TAI - MS-8 Asphalt Paving Manual

PART 2 - PRODUCTS

2.1 ASPHALT MATERIALS

- A. Asphaltic Concrete Wearing Course

1. Asphaltic concrete wearing course shall consist of a binder mixture and a fine-mix asphaltic concrete surface course mixture in layer thicknesses indicated on Drawing.
2. Asphaltic cement shall comply with the requirements of ASTM D946, except that the ductility test shall be run at 60 degrees Fahrenheit and that the petroleum derivative in the Spot Test with standard naphtha solvent in 24 hours shall be negative. Asphaltic cement shall be NYCDOT viscosity grade AC-20 meeting the requirements listed below and shall be either fluxed natural asphalt or residual asphalt derived from the distillation of asphaltic petroleum.

NYCDOT Grade	AC-10		AC-20	
	Min.	Max.	Min.	Max.
Requirements				
Viscosity@ 140F(60C), poises	800	1200	1600	2400
Viscosity@ 275F(135C), Cs.	250 *	-	300 *	-
Penetration, 77F(25C) 100g, 5 sec.	70 *	-	60 *	-
Flash Point, COC, F	425	-	450	-
Solubility in trichloroethylene, %	99	-	99	-
Test on residue from thin-film oven test (TFOT):				
Loss on heating, %	-	0.50	-	0.50
Ductility, 60F(15.5C), 5 cm/min., cm.#40	40 *	-	30 *	-
Viscosity Ratio@ 140F(60C), poises after:before TFOT	-	4 *	-	4 *

3. The above requirements denoted with an asterisk (*) may deviate for asphalt cements refined from Domestic Mid-continent, Canadian, or Boscan crudes with prior approval of the Owner's Representative.
4. Sand shall be of NYCDOT Type 2A or 2B and shall consist of clean, hard, durable, rough-surfaced mineral particles. Sand shall not contain any deleterious substances in excess of that shown in Table 1 of ASTM C33.

B. Asphaltic Concrete Surface Course

1. Coarse aggregate for binder mix shall be a NYCDOT Type 1, Grade B, AASHTO size #57 stone. Coarse aggregate for fine-mix surface course shall be a NYCDOT Type 1, Grade A, AASHTO size #8 stone. NYSDOT Standard Specifications section 401-2, Type 7, Item 403.18.

2. Mineral dust shall be limestone or other approved dust, be thoroughly dry when delivered, be of one grade, and contain no more than 50% free silicon dioxide. Dust shall have a record of satisfactory performance in pavements for not less than three (3) years. Mineral dust shall not be permitted in Binder Mixture.
3. Aggregate within asphaltic concrete mixes shall comply with the following sieve analyses:

Sieve Size	Binder Course		Fine-Mix Surface Course	
	% Passing	Tol.(%)	% Passing	Tol.(%)
1 1/2"	100	-		
1"	95-100	-	100	-
1/2"	70-90	± 6	90-100	-
1/4"	48-74	± 7	65-85	± 7
1/8"	32-62	± 7	36-65	± 7
#20	15-39	± 7	15-39	± 7
#40	8-27	± 7	8-27	± 7
#80	4-16	± 4	4-16	± 4
#200	2-8	± 2	2-6	± 2
Bitumen percent by weight soluble in chloroform	4.5-6.5	± 0.4	5.8-7.0	± 0.4

4. Tack Coat shall be rapid curing liquid asphalt conforming to ASTM D2028 Grade RC-70, and shall be a product of fluxing an asphaltic residuum with a distillate. Liquid asphalt shall be homogeneous and free from water. Homogeneous Asphalt Emulsion Tack Coat conforming to NYSDOT Material Designation 702-90.

C. Asphalt Curb:

1. The Contractor shall have the option of supplying the mix specified herein or he may elect to furnish an alternate mixture subject to prior approval by the Owner's Representative. The requirements of NYSDOT Section 401 - Hot Mix Asphalt Production shall apply with the following modifications:
 - a. Automatic batching and recording equipment will not be required.
 - b. The asphalt concrete mix shall include a powdered, devulcanized tire rubber which is moisture free, black in color, free flowing and containing no fabric or

cord material. The gradation shall conform to NYSDOT Section 714-06 Asphalt Concrete Curb.

- c. The asphalt cement used in the mix shall comply with either material specification NYSDOT Sections 702-0400, 702-0500, or 702-0600.
 - d. The aggregate gradation shall conform to NYSDOT Section 714-06 Asphalt Concrete Curb.
2. Tack Coat: Homogeneous Asphalt Emulsion Tack Coat conforming to NYSDOT Material Designation 702-90.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify sub-base conditions under provisions of Section 02710.
- B. Verify that compacted sub-base is dry and ready to support paving and imposed loads.
- C. Verify gradients and elevations of base are correct, including crown and cross slope.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

3.3 INGREDIENTS

- A. The asphaltic cement shall be heated in approved receptacles to a temperature between 275 and 325 degrees F. It shall be kept uniform in composition and consistency by thorough mixing and agitation. Approved methods of agitation that will not injure the cement shall be used.
- B. The materials comprising the charge for each batch shall be proportioned accurately by weight or by volume. The proportioning apparatus shall be of approved NYCDOT design, kept in good working order and accurate to 0.5 percent. Fluid materials may be measured by approved fluidometers.
- C. When mixed in a batch mixer prior to the addition of the asphaltic cement, the aggregate shall be deposited in the mixer and thoroughly mixed for a period of not less than ten seconds for binder mixture and fifteen seconds for surface mixtures.
- D. Mixing shall be continued until a homogeneous mixture is produced in which all particles of the mineral aggregate are completely coated with asphaltic cement.

3.4 PREPARATION

- A. Saw cut existing pavement to produce a clean, straight edge for new work to meet.
- B. Verify that substrate has been inspected and that substrate is hard, uniform and stable, true to gradients and elevations, and dry prior to any sub base course construction.
- C. Proof roll base material surface to check for areas requiring additional compaction and areas requiring removal and re-compaction.

- D. Do not begin paving work until deficient base material areas have been corrected and are ready to receive paving.
- E. Weather limitations:
 - 1. Apply tack coat when ambient temperature is above 40°F, and when temperature has been above 35°F for 12 hours immediately prior to application. Do not apply when base is wet, contains excess moisture, or during rain.
 - 2. Construct asphaltic concrete paving when atmospheric temperature is above 40°F.

3.5 TRANSPORTATION

- A. Asphalt mixtures shall be transported to work site in tight vehicles having clean and smooth heated metal beds and protected from weather.
- B. The inside surface of transportation vehicles shall be lightly coated, just before the vehicles are loaded, with either a whitewash of lime and water, soap solutions, or detergents, as approved by the Commissioner. After application, the truck bodies shall be raised for a sufficient time to allow the excess fluid to drain.

3.6 APPLICATION

A. Tack Coat

- 1. Apply to contact surfaces of previously constructed asphaltic concrete base courses or Portland cement concrete and surfaces abutting or projecting into asphaltic concrete or into asphaltic concrete pavement.
- 2. Apply tack coat between each lift or layer of full depth asphaltic concrete and on surface of all such bases where asphaltic concrete paving will be constructed.
- 3. Apply at minimum rate of 0.10 gallon per square yard of surface.
- 4. Allow to dry until at proper condition to receive paving.

B. Asphaltic Concrete Placement

- 1. Place asphaltic concrete mixture on completed compacted subgrade surface, spread, and strike off. Spread mixture at following minimum temperatures:
 - a. When ambient temperature is between 40°F and 50°F, mixture temp. = 285°F
 - b. When ambient temperature is between 50°F and 60°F, mixture temp. = 280°F
 - c. When ambient temperature is higher than 60°F, mixture temp. = 275°F
- 2. Whenever possible, all pavements shall be spread by a finishing machine; however, inaccessible or irregular areas may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and

rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster than can be properly spread. Workers shall not stand on the loose mixture while spreading.

3. Place in typical strips not less than 10' 0" wide or the full path width, whichever is smaller. Place in strips of equal width for each driving lane. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Any irregularities in the surface of the pavement shall be corrected directly behind the paver. Excess materials forming high spots shall be removed. Indented areas shall be filled with hot mix and smoothed. Casting of mix over such areas will not be permitted.
4. Joints: Make joints between old and new pavements, or between successive days and work in a manner that will provide a continuous bond between adjoining works. Construction joints shall have same texture, density, and smoothness as other sections of asphaltic concrete course. Clean contact surfaces of all joints and apply tack coat.

C. Placing Extruded Asphalt Curb

Use one of the following methods, or other method approved by the Engineer, to furnish and place an asphalt concrete curb of the required cross-section

1. Method A:
 - a. After completing the surface course, paint or spray only the area to be occupied by the asphalt concrete curb with tack coat. Apply the asphalt material at the rate of 0.15 gallon per square yard (0.7 L/m²).
 - b. Place the curb with a hand-operated or self-propelled machine consisting of a hopper and power-driven screw, which forces the material through an extrusion tube. Force the material through a die attached to the end of the extrusion tube to obtain the proper density and cross-section.
2. Method B:
 - a. As an independent operation preceding the final rolling of the asphalt concrete surface course that the curb is placed, place loose asphalt concrete of sufficient height and shape by hand methods using suitable templates or by other means to produce the specified cross-section.
 - b. Compact the loose asphalt concrete using a hand-operated mechanical vibrating tamper equipped with a compacting shoe of such shape that will produce the specified final cross-section dimensions of the curb.

3.7 ROLLING AND COMPACTION

1. The mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of the rollers without undue displacement. The number, weight, and types of rollers and sequences of rolling operations shall be such that

the required density and surface are consistently attained while the mixture is in a workable condition.

2. The bituminous concrete pavement shall have a minimum thickness as specified on the Contract Documents and should be compacted to a minimum of 96% of the maximum unit weight as determined by the Marshall Mix Design Procedures in accordance with ASTM D-1559.
3. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
4. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling with hot material.
5. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
6. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
7. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphaltic concrete. Compact by rolling to maximum surface density and smoothness.
8. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 CLEANING

- A. Clean-up and dispose of all surplus or waste material as a result of work of this section. Asphalt Pavement shall be broom cleaned and the surrounding area shall be cleaned of any loose asphalt mix.

3.9 FIELD QUALITY CONTROL

- A. Grade Control: Establish and maintain required lines and elevations.
- B. Temperature: The Owner's Representative shall monitor the asphaltic concrete mixture on the paver immediately prior to spreading asphalt mixture to certify that the minimum temperature requirements of this section are met. Temperature measurement shall be taken on the average of one test per 20 tons of material.
- C. Thickness: In place compacted thickness shall not be less than thickness specified on the drawings. Areas of deficient paving thickness shall receive a tack coat and a minimum 1" overlay; or shall be removed and replaced to the proper thickness, at the discretion of the Owner; until specified thickness of the course is met or exceeded at no additional expense to the Owner. Saw cut adjacent pavement to match overlay; "feathering" shall not be permitted.

D. Surface Smoothness: The Contractor shall perform testing on the finished surface of each asphalt concrete course for smoothness, using 10' 0" straightedge applied parallel with, and at right angles to centerline of paved area. These tests shall be performed under the observation of the Owner's Representative. Surfaces will not be acceptable if the following 10' straightedge tolerances for smoothness are exceeded.

1. Wearing Course Surface: 3/16"

E. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable paving as directed by Owner's Representative.

F. Compaction: The Owner's Representative shall perform in place density tests as part of the construction testing requirements using the Nuclear Method in accordance with ASTM D-2922 Method B direct transmission. Field density tests shall be performed at the rate of one test per 20,000 square feet of pavement.

3.10 MAINTENANCE AND PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 2 days, or until surface temperature is less than 140 degrees F.

3.11 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation from True Elevation: Within 1/2 inch.

END OF SECTION

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SECTION 02750 – CONCRETE PAVEMENT

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. In this Section, the Contractor shall furnish and place COLORED REINFORCED CEMENT CONCRETE PAVEMENT and BOAT PLAZA PAVEMENT, in accordance with the plans, specifications, and directions of the Commissioner.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
B. Section 02060 Aggregate Materials – Landscape
C. Section 02796 Natural Stone Porous Paving System

1.4 LEED BUILDING – PERFORMANCE REQUIREMENTS

- A. Every effort shall be made to maximize post industrial/post consumer recycled content. Portland Cement shall contain fly ash and be a minimum of 5% (combined) post industrial/post consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements herein.
- B. Concrete shall be manufactured within 500 miles (by air) of the project site and shall be documented in accordance with the Submittal Requirements herein.

1.5 SUBMITTALS:

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include

the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittals shall be in accordance with General Conditions.
- C. Concrete Color Admixture, Sealant and Curing Compound: Catalog Cuts, a three inch (3") square color concrete sample and Manufacturers Application instructions shall be submitted to the Designer for approval prior to ordering of Admixture, Sealant, and Colorwax curing compound.
- D. Permeable Paver Insert: Submit methodology for creating openings in the concrete pavement to the dimensions and patterns shown on the drawings.
- E. Fiber Mesh: Submit fiber mesh manufacturer's product data, including application rate and mixing instructions, and a sample of synthetic fiber reinforcement.

1.6 MOCKUP:

- A. After approval of the three inch (3") square color sample (see submittals) a four foot (4') by four foot (4') size mockup with inserts shall be cast at the job site using the approved specified materials and construction techniques, including finish, prior to placement of any color-conditioned concrete for approval by the Landscape Architect. The mockup shall be cast apart from the proposed work. All colored concrete pavement shall match the approved four foot (4') square mockup in every respect.

PART 2 PRODUCTS

2.1 CONCRETE

- A. Pavement shall consist of a single course, thickness as shown on the plans, or as directed by the Commissioner, except driveways and quadrants which shall be seven inches (7") thick to conform with N.Y.C. Department of Transportation Builders Pavement requirements. Seven inch (7") thick concrete pavements for herein stated quadrants shall be deemed included in the unit price bid for five inch (5") thick concrete pavements.
- B. Cement: Air Entraining Portland Cement shall comply with the ASTM Specifications for Portland Cement, Designation C150.
- C. Concrete Pavement: The pavement shall consist of a single course thickness and reinforcement placed as shown. Concrete shall conform to N.Y.C. Dept. of Transportation Class B-32, Type II A, air entrained, moderate sulphate resistant. The batch shall contain a minimum of six (6) bags of cement per cubic yard of concrete, maximum of six and one-quarter (6 1/4) gallons of water per bag, a maximum of three inch (3") slump, and compressive strength of 3,200 psi. Large aggregate shall be limited to one inch (1").
1. The concrete shall contain no reactive aggregate and no calcium chloride.
- D. Color Admixture: Concrete shall be integrally colored using pigment admixture, color as noted on drawings and as approved by the Landscape Architect. The color admixture shall be a single component, pigmented, water reducing concrete admixture such as Chromix Admixture for color conditioned concrete, as manufactured by L.M. Scofield Co., Douglasville, Ga, or Davis Color Inc., Beltsville, Maryland, or approved equal. Colored Concrete shall contain the number of pounds of color admixture per sack of concrete noted on the drawings. Admixture shall be thoroughly and uniformly mixed into the concrete.
1. Admixture shall comply with Uniform Building Code Standard No. 26-9 as evidence by a Research Committee Recommendation from I.C.B.O. (International Conference of Building Officials).
 2. Colored reinforced concrete pavement shall be 'Pebble, 641' as manufactured by Davis Colors, or approved equal.
- E. Forms for Natural Stone Porous Pavement: Removable forms for porous pavement shall be fabricated as per the drawings.
- F. Expansion Joint Sealant: Joint sealant shall be a two (2) component polyurethane based self-leveling elastomeric sealant such Sikaflex 429 primer with Sikaflex - 2C SL sealant as manufactured by Sika Corporation, Lyndhurst, NJ, or approved equal. The color of the sealant shall match the color of adjacent pavements.
- G. Compound for Curing Concrete: Shall be a waterbased blend of pure waxes, polymers, and additives specifically designed for use with color conditioned concrete. Compound shall be a liquid membrane forming compound for curing concrete, in compliance with ASTM designation C309. Curing compound for use with color conditioned concrete shall be Lithochrome Colorwax, as manufactured

by L.M. Scofield Co., or approved equal.

- H. Steel Bar Reinforcement: Reinforcement shall meet the requirements of the applicable paragraphs of Section "B", the N.Y.C. Building Code and the latest ASTM specification for "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement", Designation A-615, and in accordance with the item "STEEL BAR REINFORCEMENT". Reinforcement shall be of the sizes and dimensions shown on the plans.
- I. Steel Fabric Reinforcement: Steel fabric shall meet the requirements for cold drawn steel wire for concrete reinforcement described in the latest revision of ASTM Designation A-82. All welded steel fabric shall comply with ASTM A-185, latest revision. Steel fabric shall consist of longitudinal members with transverse members at right angles thereto, six inch (6") by six inch (6") 8/8 welded wire mesh. All steel fabric shall be delivered in flat sheets or rolls of such width as to fit the designated pavement slab area, not more than three inches (3") from the edges of slabs. When sheets or rolls overlap, they shall overlap at least six inches (6").
- J. Base Foundation Material: Material for Foundation shall be a straight run of single size aggregate and shall consist of either all one and one-half (1 1/2") inch stone or all three-quarter (3/4") inch stone in accordance with ASTM C33, free from organic or other deleterious material. In addition, Foundation Material may contain no more than five (5%) percent of fines, defined as aggregates passing a No.4 sieve or smaller.
1. The Magnesium Sulfate Soundness loss after ten (10) cycles shall be eighteen (18%) percent or less, as per ASTM C88.
 2. Foundation Base Material shall be the following:
 - a. Broken Stone or gravel of approved quality and conforming to the requirements of Section 02630.
 - b. **IMPORTANT**: Material substitutions will not be approved under any circumstances. All recycled materials will be rejected.
- K. Expansion Joint: The expansion joint material shall be one of the following:
1. A premoulded bituminous fiber joint filler, (requires a bond breaker and sealant) or,
 2. A premoulded closed cell expanded polyethylene foam joint filler, such as Sonoflex F by Sonneborn Corporation (requires only sealant) or,
 3. A shredded recycled rubber aggregate joint filler, such as a polymerically bound reclaimed rubber expansion joint CEJ6510 by Concrete Expansion Joint Company, (requires only sealant) or,
 4. An approved equal of any of the above.

- L. Bond Breaker: If bituminous fiber material is used, a bond breaker such as one-half inch (1/2") width polyurethane tape or five-eighth inch (5/8") diameter expanded polyethylene foam backer rod shall be installed as recommended by the manufacturer. A bond breaker will not be required for a premolded foam joint or a shredded recycled rubber aggregate joint filler, but sealant is always required.

PART 3 EXECUTION

3.1 Preparation of Fine Grade:

- A. Before any pavement is placed upon the fine grade, the fine grade shall be prepared to line and grade and compacted where practicable with an approved self propelling roller weighing not less than ten (10) tons. All hollows and depressions which develop under rolling shall be filled with acceptable material and shall again be rolled. This process of shaping, filling and rolling shall be repeated until no depressions develop.
- B. The Contractor shall remove from the subgrade all debris, foreign material, and all other undesirable material designated by the Commissioner. The fine grade shall not be muddy or otherwise unsatisfactory when the pavement is placed upon it. If the fine grade becomes rutted or displaced, due to any cause whatsoever, the Contractor shall regrade same without additional payment.
- C. Separation Fabric: The Contractor shall place a geotextile fabric on the prepared Fine Grade prior to placement of Foundation Base Material.
- D. Spreading Foundation Base Material: Material for foundation base shall be evenly spread on a prepared sub-grade in the position shown on the plans or directed by the Commissioner, in four inch (4") layers, each layer to be rolled while wet with a seven (7) to twelve (12) ton tandem roller, or other approved method satisfactory to the Commissioner, to the thickness shown on the plans or as directed by the Commissioner.
- E. Forms: Forms shall be made of substantial material (preferably steel), with suitable metal dividing plates and of sufficient strength to satisfactorily resist distortion when fastened together and secured in place. Forms for inserts and permeable paver drain shall be made of substantial material suitable for ease of removal without damage to the cured concrete.
1. Forms and dividing plates shall be of a depth not less than that of the thickness of the concrete slab, be properly located with tops set to the designated sidewalk surface, and be left in place until the concrete is set. Forms for inserts and permeable paver drain shall be made of substantial material suitable for ease of removal without damage to the cured concrete.
- F. Natural Stone Porous Pavement Insert Forms: Insert and secure forms to the design grade and locations, as per the drawings.
- G. Expansion Joints: For pavements located within DPR property, expansion joints shall conform to this specification. For sidewalks, the expansion joints shall

conform to NYCDOT Builders Pavement requirements.

After the concrete is placed, finished, and set, and the bond breaker, if necessary, installed, the space as shown in the drawings shall be filled with a poured joint sealer. Thoroughly clean expansion joints of dirt, loose particles, asphalt, tar, paint, wax, waterproofing, and curing compounds. Cover adjacent sides of joints with masking tape to prevent spillage onto pavement.

- H. Expansion Joint Sealant: After the concrete is placed, finished, and set and the bond breaker, if necessary, installed, the space as shown in the drawings shall be filled with a poured joint sealer. Sealant shall be installed as per Application Instructions No. 465 for SikaFlex®-2c SL by Sika Corporation, Lyndhurst, NJ, or approved equal.

3.2 PATTERN:

- A. Pattern shall be as shown on the plans.

3.3 PLACING CONCRETE

- A. Foundation course shall be wetted immediately before concrete is placed. The concrete shall be placed within the forms and thoroughly tamped until the surface is at the finished grade.
- B. Finish: The top surfaces shall be finished to true smooth planes by trowelling, and finally, by wood floats. Do not over trowel. Only the perimeter of the concrete areas shall be tooled to ease the edge with proper tools prior to final floating. No trowelled border shall be visible.
- C. Slabs: Pavement shall be constructed in independent rectangular slabs, as shown on the plans or as directed by the Commissioner. The expansion joints shall be constructed after every four hundred (400) square feet of concrete paving, or as shown on the drawings. Control Joints shall be sawn using appropriate tools, as indicated on the drawings. Adjacent to structures, (manholes, hydrants, etc.) expansion joints and sealant shall be installed as directed.
- D. Natural Stone Porous Pavement: Pavement inserts shall be installed flush with adjacent pavement, in a neat and workmanlike fashion. See Section 02796.

3.4 PROTECTION AND CURING:

- A. Curing wax shall be installed as per manufacturer's installation instructions (Scofield Application instructions A-513 for colorwax), or approved equal. Pavement shall be carefully protected from the drying effects of the sun and wind, traffic, or other causes by means of suitable guards and coverings, and shall be kept moist for a period of three (3) days. No dusting of cement or sprinkling or fogging with water shall be permitted. Do not cover with plastic.

END OF SECTION

SECTION 02760 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents and the New York City Department of Transportation. The Contractor must accept the site as is and shall be deemed to have inspected the site and reviewed all Contract Documents.

1.2 SECTION INCLUDES

- A. Overall work under this Contract shall include all labor, materials, equipment, supervision, coordination efforts, permitting costs, certificate costs, services, filing fees, testing costs, security, insurance and all other associated or related items specified herein that are necessary and are required to complete the Work. Work elements shall include, but not be limited to the following:
 - 1. Cleaning and priming the pavement surface in preparation of new pavement markings.
 - 2. Furnishing and application of hot extruded reflectorized white and aqua-blue Thermoplastic Heat Fused Preformed Reflective Markings ("Thermoplastic HFPRM") pavement markings, for lane lines, centerlines, gore lines, edge lines, shoulder striping, symbols, words, etc., in specified constant widths and at locations indicated on the plans, or as ordered by the Commissioner.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Green Building Requirements – Divison 1.
- B. Contract Documents

1.4 SUBMITTALS

- A. Product Certificates: Submit product certificate to the Commissioner which is signed by manufacturer and Contractor, certifying that products comply with, or exceed, the requirements herein.
- B. Scope of Work: Submit a work plan to the Commissioner following the final scoping walk-through noting limits of paving marking to be completed (refer to FINAL SCOPING section below).
- C. The Contractor shall submit for approval complete details of the thermoplastic pavement graphics system he proposes to use. The specifications of all information (products or systems, manufacturer's names, product description, technical and laboratory data, priming and installation requirements) as may be required to demonstrate to the satisfaction of the Commissioner that the system the Contractor proposes to use meets the requirements of these specifications.
- D. Samples: The Contractor shall submit the following for approval:

1. One four inch (4") by four inch (4") sample of the HFPRM material in each color to be used in this contract.
 2. One drawing, at a reasonable scale, of each symbol and letter to be used in this contract.
- E. Guarantee: Contractor shall submit a five (5) year Manufacturer's guarantee against fading and peeling.

PART 2 - PRODUCTS

2.1 MATERIAL – THERMOPLASTIC GRAPHICS AND STRIPING

- A. The Preformed Markings shall be capable of adhering to asphaltic concrete and cement concrete pavements by means of heat fusion. Adhesives, primers or sealers shall not be used prior to the preformed markings application on pavements. They shall be very durable, oil and grease impervious and provide immediate and continuing retroreflectivity.
- B. The graphics shall be a thermoplastic compound that is prefabricated and installed on site and shall contain a minimum of 35% glass beads as part of the aggregate in the material to act as the basic reflective material. The graphics shall be in colors as shown on the drawings and shall be manufactured by Surface Signs, Middle Village, NY, or approved equal.
- C. A.D.A Parking Symbol: Shall consist of a solid 3 foot by 4-foot rectangular shaped background with a 32" inch wheelchair symbol as shown on the drawings.
- D. A.D.A Route Symbol: Shall consist of a solid 1 foot by 2 foot bullet shaped background with a 7 ½" inch wheelchair symbol and three-quarter inch wide directional arrows as shown on the drawings.
- E. Parking Lines: for A.D.A. parking spot shall be 4 inches in width.
- F. Colors for Symbols/lines shall be as follows (unless otherwise shown on the drawings):
 1. Background - Aqua blue
 2. Wheelchair Symbol – white
 3. Parking lines-aqua blue or white (per drawing)
- G. The thermoplastic material shall be 100% virgin stock, using no reprocessed materials. Pigments, beads and filler shall be uniformly dispersed in the resin. The material shall be free of all skins, dirt and foreign materials.
- H. The manufacturer has the option of formulating the thermoplastic material according to his or her own specifications. However, the manufacturer shall meet the minimum requirements specified herein, including but not limited to, composition, physical characteristics, etc. The physical and chemical properties contained in this specification shall apply regardless of the type of formulation used.

- I. The thermoplastic graphics shall be of an alkyd type and the material shall consist of the following:
 1. 20% - Bonding Agent (Minimum)
 2. 35% - Titanium and white filler
 3. 10% - White sand
 4. 35% - Glass Beads (Minimum)

- J. The following physical specifications shall be strictly adhered to:
 1. The Contractor shall furnish a laboratory report of the material, consisting of the following tests:
 - a. Color Retention ASTM D620-57T
 - b. Indentation ASTM D2240-68
 - c. Flexibility ASTM D747
 - d. Binder Content ASTM D4797
 - e. Titanium Dioxide Content X-Ray Fluorescence ASTM D476 - Type 2
 - f. Glass Beads ASTM D1155
 - g. Condition of Wetness ASTM E2177
 - h. Condition of Continuous Wetness ASTM E2176
 2. Color Retention: The retention of the initial color shall be determined by preparing and testing specimens from samples submitted in accordance with ASTM designation D620-57T, "Tentative method of test for color fastness of plastic; Ultra Violet Light and Condensate Exposure, ASTM G53, 300 hours total, alternate 4 hours condensate exposure at 40 deg. C, 4 hours UV exposure at 60 deg. C.
 3. Indentation Resistance: The reading of the shore durometer, Type A2, as described in ASTM designation D2240-68, after fifteen seconds shall not be less than 95 when the material is tested after heating for four hours at 400 deg. F, and cooled at 75 deg. F.
 4. Cracking Resistance: At low temperatures after heating the thermoplastic material for 4 hours at 218 deg. C (425 deg. F), applied and cooled to -9.4 +/-1.7 deg. C (15 +/-3 deg. F) the thermoplastic material shall show no sign of cracking or chipping.
 5. Glass beads: The glass spheres shall be colorless, clean, transparent, free from milkiness or excessive air bubbles and essentially clean from surface scarring or scratching. They shall be spherical in shape and at least 70% of the glass beads shall be true spheres when tested in accordance with ASTM D1155. The

refractive index of the spheres shall be a minimum of 1.50 as determined by the liquid immersion method at 25 deg. C.

K. General Characteristics:

1. The thermoplastic material shall be readily applicable at temperatures between 200 & 250 deg. F from the approved equipment to produce graphics and symbols of the required thickness as described in the contract document. The thermoplastic material shall not deteriorate or discolor when held at the application temperature.
2. The compound shall not deteriorate by contact with sodium chloride, calcium chloride, or other chemicals used against formation of ice on roadways or streets, or because of the oil content of pavement materials, or from oil droppings from traffic. Deposits of dirt, tar, road material, tires, or other foreign material shall not adhere to the installed line. The line shall not blacken or discolor after vehicles pass over the line.

- L. Other Requirements: Thermoplastic material shall not emit fumes that are toxic or injurious to persons or property when it is heated to application temperature. The material shall not emit excessive smoke during heating or application.

2.2 MATERIAL – THERMOPLASTIC LETTERING, BICYCLE PATH MARKINGS

- A. The Preformed Markings shall be capable of adhering to asphaltic concrete and cement concrete pavements by means of heat fusion. Adhesives, primers or sealers shall not be used prior to the preformed markings application on pavements. They shall be very durable, oil and grease impervious and provide immediate and continuing retroreflectivity. Preformed markings shall be as manufactured by American Reflective Products, Bedminster, NJ, or approved equal.
- B. The Preformed Marking material shall consist of a resilient white, green and yellow polymer thermoplastic with uniformly distributed glass beads throughout its entire cross section, and shall conform to the current edition of the Manual of Uniform Traffic Control Devices for Streets and Highways as issued by the U.S.A. Federal Highway Administration.
- C. The preformed markings shall conform to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics and be capable of fusing to itself and previously applied worn hydrocarbon and/or alkyd thermoplastic pavement markings.
- D. The Preformed Markings shall be capable of application on new, dense and open graded asphalt concrete wearing courses during the paving operation in accordance with the manufacturer's instructions. After application, the markings shall be immediately ready for traffic. The preformed markings shall be suitable for use for one (1) year after the date of receipt when stored in accordance with the manufacturer's recommendations.
- E. The Preformed Markings shall not be brittle and must be sufficiently cohesive and flexible at temperatures exceeding 50 degrees F for one person to carry without the danger of fracturing the material prior to application. They shall be highly durable

retroreflective pliant polymer thermoplastic materials designed for transverse, longitudinal, legend and symbol markings subjected to high urban traffic volumes and particularly severe wear conditions such as repeated shear action from crossover or encroachment on typical configurations such as crosswalks, edge lines and lane lines.

- F. Composition: The markings shall consist of a homogeneous mixture of high quality polymeric thermoplastic binders, pigments, fillers and glass beads. The thermoplastic material must conform to AASHTO designation M249-79(86) with the exception of the relevant differences due to the material being preformed. They shall contain a minimum of 30% glass spheres which shall conform to AASHTO M247-81 Type 1, except that glass spheres shall have a minimum of 70% true spheres on each sieve and 80% true spheres overall. The glass beads must be homogeneously blended throughout the material with a securely bonded protruding exposed layer of beads that provide immediate and continuous retroreflectivity; no additional glass beads shall be dropped on the material during application. Curved arrows must be available without protruding glass beads if reversibility is needed.
- G. Retroreflectivity: The preformed markings shall, upon application, exhibit uniform adequate nighttime retroreflectivity. At 86 degree 30' incidence angle and 1degree 30' divergence angle, the markings shall have average minimum intensities of 350 millicandelas for white and 175 millicandelas for yellow as measured with a Mirolux retroreflectometer, or equal.
- H. Color Characteristics: The thermoplastic material without glass beads shall meet the following:
1. White: Daylight reflectance at 45 degree/ 0 degree of 80% minimum.
 2. Yellow: Daylight reflectance at 45 degree/ 0 degree of 45% minimum.
- I. The daylight reflectance shall not change significantly when the preformed thermoplastic is properly applied to the roadway surface. Yellow material shall not degrade when exposed to heat placed by appliance torch.
- J. For highway use, the white markings shall contain a minimum of 8% by weight of Titanium Dioxide pigment. Yellow color shall reasonably match color chip number 13538 of Federal Standard number 595 and be lead free.
- K. Green shall be American Reflective Products- (Magna code #912-1), or approved equal.
- L. Skid Resistance: The surface of the preformed thermoplastic markings shall provide a minimum skid resistance value of 55BPN when tested according to ASTM E303-74.
- M. Thickness: The width of the supplied material shall have a minimum average thickness of .090 inch (2.3mm), (Expressed as 90 mils), except for lanes markings and symbols for Park paths which shall be 60 mils.
- N. Tensile Strength and Elongation: The preformed thermoplastic film shall have a minimum tensile strength of 150 lbs. per square inch of cross section, at 90 mil (2.3mm) thickness, when tested according to ASTM-D-638-76 except that a sample 6" by 1" shall be tested at a temperature between 70 degrees F and 80 degrees F using a

jaw speed of 10" to 12" per minute. The sample shall have a maximum elongation of 20% at break when tested by this method.

- O. Environmental Resistance: The applied markings shall be resistant to deterioration due to exposure to sunlight, water, oil, diesel fuels, gasoline, pavement oil content, salt and adverse weather conditions.
- P. Effective Performance Life: When properly applied, in accordance with manufacturer's instructions, the pavement markings shall be neat and durable. The markings shall remain retroreflective and show no fading, lifting, shrinkage, tearing, roll back or other signs of poor adhesion and shall not dissolve or smear after rubbing a small amount of motor oil on a small piece of preformed thermoplastic for two (2) minutes.

2.3 EQUIPMENT

- A. Maintain striping equipment in satisfactory operating condition and correct breakdowns in a manner that will not delay or be detrimental to progress of striping / marking operations.

PART 3 - EXECUTION

3.1 FINAL SCOPING

- A. At the completion of exterior construction activities, but prior to sewer system cleaning, the Contractor shall perform a site walk-through with the Commissioner to confirm the extent of pavement marking work to be performed.

3.2 INSTALLATION OF NEW MARKINGS

- A. Install thermoplastic and tape markings in strict accordance with each manufacturer's recommendations on clean and dry surfaces.
- B. Marking configuration shall be in accordance with the "Manual on Uniform Traffic Control Devices".
- C. Thermoplastic graphics are not to be applied below 40 deg. F, or on wet pavements, or during periods of high humidity, except with special permission of the Commissioner.
- D. Before proceeding to install any graphics, the Contractor shall clean the area of the surface to be marked, and make certain that the pavement is free of dirt, foreign material, oil, etc. New concrete surfaces must be sandblasted to entirely remove curing compound. A.D.A. Symbol shall be placed as shown on the Landscape series plans.
- E. The work included herein shall be done in a neat, professional manner, pleasing to the eye, and shall be kept straight so far as total alignment is concerned. To ensure alignment, the Contractor shall snap guidelines.
- F. Graphics and lettering shall be protected from both vehicular and pedestrian traffic until it is set. Final layout of the markings shall be approved by the Commissioner before heat is applied to make the markings permanent.

3.3 FIELD QUALITY CONTROL

- A. The contractor shall lay-out major control lines for the various types of striping (lane markings, crosswalks, restricted access, etc.) and receive written approval from the Commissioner on the installation prior to installing the markings.
- B. Spotting, spilling, or other marking of the roadway with marking material will not be permitted and must be removed by the contractor.
- C. Upon completion of the work of this section, the contractor shall provide the Commissioner with an as-built survey locating newly installed pavement markings, tied into established project benchmarks. The survey shall be provided in digital (AutoCAD DWG) and paper formats, and shall be signed and sealed by a New York State Licensed Professional Land Surveyor. This survey may be combined with other as-built survey requirements of site work items, with the approval of the Commissioner.

END OF SECTION

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SECTION 02761 – UNIT PAVEMENTS**PART 1 GENERAL****1.1 GREEN BUILDING REQUIREMENTS**

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. PreCast Concrete Pavers
- B. Granite Pavers on Asphalt Base
- C. Gravel and Paver Access Path
- D. Detectable Warning Pavers
- E. River Cobble Pavement
- F. Stone Border
- G. Steel Edging

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
- B. Section 02060 Aggregate Materials – Landscape
- C. Section 02721 Aggregate Base Courses
- D. Section 02300 Earthwork
- E. Section 02740 Asphalt Concrete Pavement
- F. Section 02930 Planting
- G. Section 03700 Cement and Concrete For Exterior Improvements

1.4 REFERENCES

- A. American Society of Testing and Materials (ASTM) (latest edition):
 - 1. C 33 Specification for Concrete Aggregates.
 - 2. C 136 Method for Sieve Analysis for Fine and Coarse Aggregate.

3. C 140 Sampling and Testing Concrete Masonry Units.
4. C 144 Standard Specifications for Aggregate for Masonry Mortar.
5. C 936 Specifications for Solid Interlocking Concrete Paving Units.
6. C 979 Specification for Pigments for Integrally Colored Concrete.
7. D 698 Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5 lb (24.4 N) Rammer and 12 in. (305 mm) drop.
8. D 1557 Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (44.5 N) Rammer and 18 in. (457 mm) drop.
9. D 2940 Graded Aggregate Material for Bases or Subbases for Highways or Airports.
10. C 29 Bulk Density and Voids in Aggregate Materials.
11. D6373 for Performance Graded Asphalt

1.5 QUALITY ASSURANCE

- A. Installation shall be by a contractor with at least three years of experience in placing concrete pavers on projects of similar size.
- B. The Contractor shall conform to all local, state/provincial licensing and bonding requirements.

1.6 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a) For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if

less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittals shall be in accordance with General Conditions and Division 1
 - C. Pavers (PreCast Concrete, Granite)
 1. Submit two (2) full size samples of each paver unit to indicate material, color and shape selections.
 2. Manufacturer's Literature.
 3. All pavers used on the work shall conform to the approved samples.
 4. Test results shall be submitted from an independent testing laboratory for compliance of paving unit requirements to ASTM C 936 or other applicable requirements.
 - D. Gravel and Paver Pavement (See Section 02060 for Gravel Submittal Requirements).
 - E. River Cobble Pavement Pavement (See Section 02060 for Gravel Submittal Requirements).
 - F. Edge Restraint: a two (2) foot sample of the edging properly marked and identified by manufacturer and distributor with accompanying manufacturer literature.

1.7 MOCKUPS

- A. PreCast Concrete Pavers.
 1. Construct mockup, approximately five (5) square feet, showing jointing pattern and radial layout, where applicable, as indicated on drawings.
 2. Locate where directed by the Commissioner.
 3. Incorporate accepted mockup as part of Work.
- B. Granite Pavers on Asphalt Base.
 1. Construct mockup, approximately five (5) square feet, showing jointing pattern and radial layout, where applicable, as indicated on drawings.
 2. Locate where directed by the Commissioner.
 3. Incorporate accepted mockup as part of Work

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Concrete pavers shall be delivered to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift. The pavers shall be unloaded at the job site in such a manner that no damage occurs to the product.
- B. Delivery and paving schedules shall be coordinated in order to minimize interference with normal use of buildings adjacent to paving.
- C. Edge Restraint shall be stored out of direct sunlight.

1.9 ENVIRONMENTAL CONDITIONS

- A. Do not install bedding aggregates or pavers during heavy rain or snowfall.
- B. Do not install bedding aggregates and pavers over frozen base materials.
- C. Do not install frozen bedding aggregates.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE PAVERS

- A. Pavers: Pavers shall be as shown on the plans. The pavers shall be manufactured from high quality, atmospherically cured precast concrete having a minimum compressive strength of 8,000 P.S.I. and a maximum water absorption of five (5%) percent. Pavers shall conform with ASTM C936.
- B. The face of pavers shall be at right angles with all sides, except where circular or other specialty pavers are specified. The thickness of pavers may range between two (2") and three inches (3") depending on the manufacturer. However, all pavers to be used on the work shall be of the same manufacture and thickness
- C. Maximum allows breakage of product is 5%.
- D. Basis of Design for PreCast Concrete Pavers shall be Hanover Prest Paver, Matrix 1810, Finish 13, as manufactured by Hanover Architectural Products, Hanover, PA, or approved equal.

2.2 GRANITE PAVERS ON ASPHALT BASE

- A. Granite Pavers
 - 1. Granite pavers shall be site salvaged pavers, cleaned for reuse, or shall be newly procured granite of the same material, rectangular in shape and cut to the following sizes:
 - a) Four (4) inches by four (4) inches. Depth shall match existing pavers. Pavers shall be gauged to ensure uniform length, width and depth.
 - b) Thirty (30) inches by thirty (30) inches. Depth shall match existing pavers.
 - 2. Material for new pavers shall be as follows

- a) Four by four pavers:
 - 1) Jet Misty, as supplied by Architectural Craft Stone Source
 - 2) Virginia Mist, as supplied by North Carolina Granite Corporation
- b) Thirty by thirty pavers:
 - 1) Rocky White, as supplied by Architectural Craft Stone or Structural Stone.
 - 2) White Mount Airy, as supplied by North Carolina Granite Corporation

3. Granite shall be hard, durable and free from seams, cracks or other defects.

- a) All granite shall be of uniform color and tone.
- b) Sizes shall be as specified or as shown on the drawings.
- c) Granite shall meet the following requirements:

Absorption by weight	0.4% maximum	ASTM C97
Density:	160 lbs./cu. ft. minimum	ASTM C97
Compressive Strength	19,000 psi minimum	ASTM C170
Modulus of Rupture	1,500 psi average	

4. Finish: All exposed faces shall have a thermal finish unless otherwise indicated on plans.

B. Asphaltic Materials

- 1. Asphalt Base The material for the base course shall meet the requirements of the latest edition of the N.Y.S. Department of Transportation Standard Specifications Section 400 "Bituminous Pavement".
- 2. Composition of the asphalt concrete binder shall be Type 3

C. Bituminous Setting Bed: Asphalt cement to be used in the bituminous setting bed shall conform to PGA 64-22, ASTM D6373 for Performance Graded Asphalt.

- 1. The fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coatings, lumps of clay, alkali salts and organic matter. It shall be uniformly graded from "coarse" to "fine" and all passing the No. 4 sieve and meet the gradation requirements when tested in accordance with the standard method of test for sieve or screen analysis of fine and course aggregates ASTM C136.
- 2. The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300° F. at an asphalt plant. The

approximate proportion of materials shall be seven (7) percent cement asphalt and ninety-three (93) percent fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 lbs. asphalt to 1,855 lbs. sand. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet construction requirements.

D. Tack Coat

1. Tack Coat shall be # 237 2% Neo-Asphalt, Brush Grade as manufactured by Hanover Architectural Products, Hanover, PA, or approved equal. Tack coat shall be an asbestos free, cold applied, rubberized asphalt cement, and shall consist of two percent (2%) neoprene rubberized asphalt with 150⁰ softening point and 6.5 percent (6.5%) inorganic material.

2.3 GEOTEXTILE

- A. Geotextile shall be synthetic, non-woven and rotproof having no tears or defects which adversely alter its physical properties. Geotextile used shall conform to the following properties:

	ASTM Test	
Elongation	D4632	>=50%
Grab Strength	D4632	400 N
Tear Strength	D4533	250N
Puncture Strength	D4833	250N
Permittivity (min)	D4491	.21/sec
Apparent Opening Size (max)	D4751	.25 mm

Geotextile shall be similar to FX-40HS by Carthage Mills, Cincinnati, OH; 140 NL, as manufactured by Mirafi, Charlotte, NC; AEF 480 HS, as manufactured by American Engineering Fabrics, Inc., Bridgewater, MA, or approved equal.

2.4 DETECTABLE WARNING PAVERS

- A. Precast Concrete ADA Pavers complying with ASTM C109, 8,000 psi minimum average compressive strength, 8% maximum average water absorption. as manufactured by:
1. Hanover Architectural Products, Hanover, PA
 2. Wausau Tile, Wausau, WI
 3. Tile Tech Pavers, Los Angeles, CA
- B. Color: Dark Gray

2.5 CONCRETE: See Section 03700 Cement and Concrete for Exterior Improvements

2.6 EDGE RESTRAINTS

- A. Edge restraints shall be
 - 1. "Steel Landscape Edging" by Border Concepts, Charlotte, NC.
 - 2. "Steel Landscape Edging" as manufactured by Sure-Loc Edging Corporation, Holland, MI.
 - 3. "Ryerson Steel Edge" as manufactured by Ryerson-Thypin Steel Co., Eastern, PA
 - 4. Or approved Equal

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade preparation, compacted density and elevations conform to the specifications. See Section 02300 Earthwork for establishment of subgrade.
- B. Verify that geotextiles, if applicable, have been placed according to specifications and drawings.
- C. Verify that aggregate base materials, thickness, compaction, surface tolerances and elevations conform to the specifications.

3.2 PRECAST PAVER INSTALLATION

- A. Preparation of Subgrade: Before any pavement is placed upon the fine grade, the fine grade shall be prepared to line and grade and compacted where practicable with an approved self-propelling roller weighing not less than ten (10) tons. All hollows and depressions which develop under rolling shall be filled with acceptable material and shall again be rolled. This process of shaping, filling, and rolling shall be repeated until no depressions develop and the following densities are achieved:
 - 1. Cohesive Subgrade - Minimum of 95% of AASHO T 180 Method density.
 - 2. Cohesion less Subgrade - Minimum of 100% of AASHO T 180 Method D density.
- B. The Contractor shall remove from the subgrade all debris, foreign material, and all other undesirable material designated by the Commissioner. The fine grade shall not be muddy or otherwise unsatisfactory when the foundation material is placed upon it. If the fine grade becomes rutted or displaced, due to any cause whatsoever, the Contractor shall regrade same without additional payment.
- C. Material for Base Course Aggregate shall be evenly spread on a prepared subgrade in the position shown on the plans or directed by the Commissioner, in four inch (4") layers, each layer to be rolled while wet with a seven (7) to twelve (12) ton tandem roller (or other approved method satisfactory to the Commissioner),

to the thickness shown on the plans or as directed by the Commissioner.

D. Bedding Material

1. Spreading: The spreading of Base Fine Top Aggregate shall be accomplished using suitable equipment from piles dumped along the proposed site. Top aggregate shall be evenly spread over the compacted base course aggregate so that the course will have, after rolling, the required thickness.
2. Rolling: After the Base Fine Top Aggregate has been properly spread, it shall be thoroughly compacted by rolling with an approved roller weighing no less than ten (10) tons. The fine top aggregate shall be sprinkled and saturated immediately before material becomes set. If pavement becomes unstable and waves under the roller, the roller shall be taken off and this portion shall be left to dry out before rolling is resumed.
3. More fine top aggregate shall be added where necessary, and the sprinkling and rolling shall continue until the base has been properly compacted. If necessary to secure satisfactory results, in the opinion of the Commissioner, the base shall be sprinkled and backrolled on succeeding days. The Contractor shall maintain and repair the aggregate foundation course until the block has been placed.

E. Pavers

1. Placement: Pavers shall be clean when placed. Pavers which are not satisfactorily clean shall be washed before placing. The pavers shall be placed as per approved patterns, true to line and grade unless otherwise noted on the plans, joints shall be hand tight or maximum one-sixteenth inch (1/16"). The top aggregate base in front of the pavement shall not be disturbed or walked on during the laying of the pavers.
2. After the pavers are placed, stone dust shall be swept into the joints and pavers settled into the top fine aggregate base with a mechanical vibrator of adequate size. All joints shall be completely filled with stone dust and water sprayed to ensure compaction of the stone dust in the joints. After the joints are deemed completely filled, the pavement shall be swept clean.
3. After a sufficient area of pavement has been laid, the pavement shall be tested with a ten foot straight edge and any depressions exceeding one-quarter inch (1/4") shall be corrected and brought to proper grade. Any pavers disturbed in making replacements or correcting depressions shall be settled into place by ramming.

3.3 GRANITE PAVERS ON ASPHALT BASE

A. Subgrade Preparation:

1. The subgrade shall be compacted with equipment that will yield the following density:

- a) Cohesive Subgrade - Minimum of 95% of AASHO T 180 Method D density
 - b) Cohesionless Subgrade - Minimum of 100% of AASHO T 180 Method D density
2. The Contractor shall remove from the subgrade all debris, foreign and other undesirable material which interferes with satisfactory construction. The fine grade shall not be muddy or otherwise unsatisfactory when the base course material is placed upon it. If the fine grade becomes rutted or displaced, due to any cause whatsoever, the Contractor shall regrade same without additional payment.
- B. Spreading Foundation Material: Material for foundation shall be evenly spread on a prepared sub-grade in the position shown on the plans or directed by the Commissioner, in four inch (4") layers, each layer to be rolled while wet with a seven (7) to twelve (12) ton tandem roller (or other approved method satisfactory to the Commissioner) to the thickness shown on the plans or directed by the Commissioner.
- C. Spreading Of Base Course:
- 1. The asphalt cement base course shall be laid by means of a mechanical spreader of approved design to a depth, which after compaction, shall be equal to the specified depth.
 - 2. In areas where the use of a mechanical spreader is impractical, as determined by the Commissioner, other approved means of spreading and compacting may be permitted. The use of hand rakes will not be permitted. The Contractor shall use lutes where necessary.
- D. Rolling Of Base Course:
- 1. The asphalt concrete base course when properly spread shall be rolled with one or more approved power driven rollers weighing not less than 10 tons. Rolling shall proceed continuously not in excess of the following rates:

<u>Method of Placement</u>	<u>Square Yd/Hr/Roller</u>
Hand	800
Machine	1200

- 2. After final compacting, the base course shall have a density of not less than 95% of the theoretical maximum density as calculated in accordance with Appendix B of the Asphalt Institute Manual, MS-2.
- 3. After compaction of the base course and before the placing of the asphaltic block, the binder course shall be checked for depressions and high spots. The Contractor shall check the entire surface using a 10 foot wood or metal straight edge. Any depressions or high spots greater than

three-sixteenths (3/16) of an inch shall be satisfactorily corrected before placing the asphalt block.

E. Bituminous Setting Bed:

1. To install the setting bed over the surface of the base, place 3/4" deep control bars directly over the base course. If grades must be adjusted, set wood chocks under depth control bars to proper grade. Set two bars parallel to each other approximately 11 feet long (2" x 6" board). The depth of control bars must be set carefully to bring the paver, when laid, to the proper grade.
2. Place some bituminous material between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous materials to produce smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel.
3. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks.
4. Bed shall be spread in a continuous workmanlike manner. Installation of base in spotted, different and isolated areas will not be accepted. Bed depth greater than 1-1/8" will not be acceptable.
5. After setting bed has cooled, it shall be rolled by hand with a 100 lb. roller to eliminate sponginess and to prepare the surface for the installation of the tack coat.
6. Setting bed shall be protected against all pedestrian traffic and construction equipment to insure a level surface for setting pavers.

F. Tack Coat:

1. The neoprene-modified asphalt adhesive tack coat shall be applied by mopping, squeegeeing or troweling over the top of the bituminous setting bed so as to provide a bond between the bituminous setting bed and the paver.

G. Setting Pavers:

1. When modified asphalt adhesive is dry to touch, carefully place the pavers by hand, ground finish side up unless otherwise specified, in straight course, with hand tight joints and uniform top surfaces, keeping full alignment according to the patterns shown on the plans.
2. Pavers may vary slightly in shade and tonality. Installer shall work from at least four (4) pallets at a time in order to create a uniform blend of paver shades.

3. Joints between blocks shall have a maximum width of one-eighth (1/8") inch.
4. All blocks shall be cleaned when placed on the pavement.
5. In no case shall the bituminous setting bed in front of the pavement be disturbed or walked on during the laying of the blocks.

H. Joint Filler:

1. Upon the completion of the work of laying the blocks in each section to the satisfaction of the Commissioner, the surface of the blocks shall be swept clean, and the joints filled with fine sand. All joints shall be filled the same day as the blocks are laid.
2. Filler shall not be applied if the blocks are wet or if the air conditions are such that the filler does not readily enter the joints. Filler shall be well worked into the joints by means of squeegees or other approved devices operating slowly backward and forward. Squeegeeing shall continue until the joints are flush with top surface. Immediately after the joints are filled, the pavement shall be lightly sprayed and cleaned.

I. Defects:

1. Where defects in composition, compression or finished appear in the complete work, such finished areas shall be removed to the full depth of the course and the defective material replaced with the required thickness of pavement at the expense of the Contractor for such removing and replacing.

J. Cold Weather:

1. Asphalt base course shall be mixed and placed in accordance with minimum placement temperature as specified in the following table:

PART 2 MINIMUM PLACEMENT TEMPERATURES

SURFACE TEMP. (F)	MAT THICKNESS IN INCHES					
	1/2"	3/4"	1"	1 1/2"	2"	3"
+32-40	--	--	--	305	295	280
+40-50	--	--	310	300	285	275
+50-60	--	310	300	295	280	270
+60-70	310	300	290	285	275	265
+70-80	300	290	285	280	270	265
+80-90	290	280	275	270	265	260
+90	280	275	270	265	260	255

ROLLING TIME MINUTES	4	6	8	12	15	15
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2. Unless notified by the Commissioner in writing, no material shall be mixed or placed when the temperature is at, or lower than 50° F.

K. Precipitation Probability:

1. Placement of bituminous paving materials shall not be scheduled when the Precipitation Probability, obtained by the Contractor from the U.S. Weather Bureau within three (3) hours prior to the start of such operations, equals or exceeds fifty (50) percent. The Contractor shall notify the Commissioner of the exact time at which the above information was obtained.

3.4 GRAVEL AND PAVER PATH

- A. For Gravel and Paver Access Path, the pavers shall be laid directly on the Base Coarse Aggregate, and the Base Fine Top Aggregate used to fill to the level of the paver.

3.5 STONE BORDER

- A. Place stone to the dimensions and grades shown on the drawings.

3.6 RIVER COBBLE PAVEMENT

- A. Preparation of Subgrade: Subgrade shall be tamped lightly to obtain a firm and level grade.
- B. Aggregate Base: The spreading of Base Fine Top Aggregate shall be accomplished using suitable equipment from piles dumped along the proposed site. Top aggregate shall be evenly spread over the compacted subgrade so that the course will have the required thickness after tamping. More fine top aggregate shall be added where necessary as river cobbles are set.
- C. Placement: Cobbles shall be clean when placed. Cobbles which are not satisfactorily clean shall be washed before placing.
- D. The cobbles shall be laid split face down, in a random pattern as indicated on the drawings, true to line and grade unless otherwise noted on the plans, joints shall be one (1) inch minimum, three (3) inch maximum, except where accommodating planting pockets, as shown on the plans. Planting pockets shall be filled with topsoil flush with adjacent joints.
- E. After the cobbles are placed, joint filler shall be swept into the joints. All joints shall be completely filled with the fine aggregate and topsoil mix or with stone dust and water sprayed to ensure compaction of the stone dust in the joints. Joints shall be level or slightly higher than adjacent pavements.
- F. Sheet Moss: Sheet Moss shall be cut and placed in the joints and around plants in Planting Pockets as shown on the drawings. After placement, water thoroughly.

3.8 DETECTABLE WARNING PAVERS

- A. Pavers shall be clean when placed. Pavers which are not satisfactorily clean shall be washed before placing. The pavers shall be placed as per approved

patterns, true to line and grade.

- B. Precast Concrete or Clay Brick Pavers shall be placed on a 1" mortar setting bed, hand tight on a 6" concrete base. Pavers shall be sawcut as necessary to facilitate installation
- C. Any depressions exceeding 1/4 inch shall be corrected and brought to proper grade. Any pavers disturbed in making replacements or correcting depressions shall be resettled into place by ramming before mortar bed is set.
- D. All fresh mortar work shall be carefully protected from freezing and from drying effect of the sun and wind, and if required, it shall be sprinkled with water at such intervals and for such time as may be directed. No mortar work shall be laid or relaid when the temperature is below 40 degrees Fahrenheit.
- E. All work shall be cleaned immediately after installation using fiber brushes, and if necessary, diluted muriatic acid. Acid shall be thoroughly rinsed off with water. No soiled, stained or dirty work will be accepted.

3.9 STEEL EDGING

- A. The steel edging shall be installed true to line and grade in accordance with the designs indicated on the plans. All bends and curves shall be smooth and uniform. Where bends or curves are of such radius as to make field bending impracticable, they shall be made in the shop. All joints shall be welded as shown on the detail sheet.

3.10 FIELD QUALITY CONTROL

- A. Final elevations shall be checked for conformance to the drawings after removal of excess jointing aggregate.

END OF SECTION

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SECTION 02771 – STONE CURBS AND STEPS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Granite Edging.
B. Granite Step Tread
C. Concrete for setting.
D. Mortar for joints.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
B. Section 02740 Asphalt Concrete Pavement
C. Section 02761 Unit Pavements
D. Section 03700 Cement and Concrete for Exterior Improvements

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
- 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
- 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
- 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. The Contractor shall furnish two (2) samples of proposed granite before starting work, for approval by the Commissioner. Samples shall demonstrate the color, texture, and proposed finish for each type.
1. Curb stone and Steps used on the work shall conform to the approved samples, in the opinion of the Commissioner.

C. Anchoring and attachment devise Samples:

1. Contractor shall submit the Samples and Certificates listed below, and any additional anchoring and attachment devises for review:

QTY.	SIZE	DESCRIPTION
1	ACTUAL	Stainless Steel Anchoring Pins

PART 2 PRODUCTS

2.1 GRANITE EDGING

- A. Edging blocks shall be new or site salvaged and shall match the adjacent granite edging. Granite is "Double Gray" as supplied by Architectural Craft Stone or Structural Stone.
- B. The granite shall be reasonably uniform in quality and texture throughout and shall be free from an excess if mica and feldspar and from seams, scales or evidence of disintegration. If used blocks are used they shall be clean, free or mortar, asphalt, etc.
- C. Blocks shall be rectangular in shape and shall be 2 1/2" wide, 8" deep, and 3'-0" in length. Top edge shall be honed, sides shall be natural cleft.

- D. Blocks shall match the existing granite block edging dimensionally, materially and in treatment. Block shall be laid with one half (1/2) inch joints.

2.2 GRANITE STEP

- A. Granite shall be Summit Granite as supplied by Champlain Stone, Ltd., Warrensburg, NY, or approved equal. Step shall be a single piece of stone cut to the length, width and radius shown on the drawings.
- B. Stone shall have a clean snapped surface on the tread and riser, variation not to exceed 1/4". The step shall have 3/4" diameter quarry drill marks 3" on center along the tread edge.

2.3 STORAGE

- A. Store granite above ground on level, non-staining blocking. Cover with weatherproof coverings to prevent staining by weather, dirt, mud, oils and grease. Carefully handle to prevent chipping and cracking and any other damage which impairs strength, durability, and appearance. Discard and remove damaged materials from job site.
- B. Maintain materials and surrounding air temperature minimum of above 50 degrees F., prior to, during, and 48 hours after installation. During freezing or near freezing weather, provide adequate equipment and cover to protect completed portions of work to maintain minimum temperature of above 50 degrees Fahrenheit.

2.4 CONCRETE:

- A. Shall be as specified for "Cement and Concrete for Exterior Improvements" or as indicated on the plans.

2.5 MORTAR:

- A. Mortar at all masonry joints shall comply with ASTM C-270. Type N, and shall consist of:
1. 1 part Portland cement
 2. 1 part lime
 3. 6 parts sand
- B. Mortar products shall comply with the following requirements:
- | | | |
|----|-------------------------------|----------------------------------------|
| 1. | Compressive Strength (28 day) | 4000 psi |
| 2. | Slump | 1 to 2 inches |
| 3. | Air Entrainment | 5 to 7 percent |
| 4. | Portland Cement | ASTM C150, Type 1, provide gray cement |
| 5. | Hydrated Lime | ASTM C207, Type S |
| 6. | Sand | ASTM C144 |
| 7. | Water | Clean, non-alkaline, and potable |
- C. Thoroughly mix ingredients in quantities needed for immediate use.

2.6 GROUT

A. Latex-Portland Cement Grout:

1. Latex additive (water emulsion) serving as replacement for part or all of gauging water, combined at job site with dry grout mixture shall be 1.C Acrylic resin.
2. Dry Grout mixture:
 - a. Portland Cement: ASTM C 150, Type I or II, of natural color or white as required to produce black color.
 - b. Colored Aggregate: ASTM E 144, ground marble, granite, or other sound stone; selected as required to produce black mortar color.
 - c. Color Mortar Pigments for Grout: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar and grout mixes.
3. Water: Clean, free of materials detrimental to strength or bond of grout.

2.7 GRANITE ANCHORS AND DOWELS

- A. Dowel anchors for capstones and curbs shall be stainless steel, ASTM A666 Type 304, size as specified on contract drawings.

PART 3 EXECUTION

3.1 PREPARATION:

- A. Contractor shall examine all surfaces to receive stonework, and correct all conditions which are not in compliance with the requirements specified herein, or which are unsatisfactory in any way. The Contractor shall verify the finished elevations and field dimensions taken at the job site affecting the work. Field dimensions which are at variance with the drawings or specifications are to be brought to the attention of the Owner's Representative.

It shall be the responsibility of the Contractor to ensure that all footings to receive stonework are clean, level, and adequately prepared.

- B. Clean all surfaces of stones that may have become dirty or stained prior to setting.
1. Remove all soil, stains, and foreign materials.
 2. Clean stones by thoroughly scrubbing stones with fiber brushes followed by a thorough drenching with clear water. (Do not use ferrous or other metallic brush.)
 3. Use only mild cleaning compounds that contain no caustic materials or abrasives.

3.2 STONE FABRICATION AND INSTALLATION:

- A. Fabricate stonework to the size, shape and finish as illustrated on the drawings.

Where field cutting of stones is required, use power saws to cut stones. For exposed edges, produce edges that are cut straight and true.

- B. Cut and drill sinkages and holes in stones for anchors, fasteners, supports, lifting devices and conduit as shown on the drawings or as required to set stonework securely in place.
- C. Install stonework using only experienced and competent stone masons. The Contractor shall supply supporting information, including a list of similar completed projects, owner references with telephone numbers, and resumes of key personnel. The Owner's Representative reserves the right to reject masons based on insufficient or unsatisfactory prior experience.
- D. Surfaces to which this work is to be secured and the stone surfaces themselves shall be free from frost, wetness, dirt, grease, visible rust, and foreign materials, which will be detrimental to the proper execution of the work.
- E. Patched, chipped, cracked, broken or otherwise defective pieces shall not be set, and the Owner's representative shall be notified of any damaged stone.
- F. In cold weather, International Masonry Industry All-Weather Council's recommendations for setting from 40°F to 20°F shall be followed, with the exception that no additives shall be used in the setting mortar. At temperatures below 40° F and falling all work shall be done in heated enclosures.
- G. In warm weather, wind-breaks and shade must be provided for areas in construction and recently completed (completed within two (2) days).
- H. Before sorting, all stones shall be thoroughly wetted by drenching or sponging with water.
- I. Do not set heavy stones until the mortar in the courses below has hardened sufficiently as to resist being squeezed out of joint.
- J. Horizontal stone joints shall be kept level and vertical joints shall be kept plumb, unless otherwise shown.
- K. Typical wall joint widths shall be 5/16" thick with a variance of +/- 1/16" inch. Expansion joints shall be 3/4" thick, unless otherwise indicated on contract drawings, and installed as per the manufacturer's instruction.
- L. Remove all mortar droppings from the face of the stonework and surrounding area before it sets, using stiff, natural bristle brushes, and/or clean running water. Do not brush or scrape mortar from stone surfaces with metal tools. No acid cleaning will be acceptable.

3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb:
For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet (6 mm/3 m), 3/8 inch in 20 feet (10 mm/6 m), or 1/2 inch per 40 feet (12 mm/12 m) or more. For

external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch per 20 feet (6 mm/6 m) or 1/2 inch in 40 feet (12 mm in 12 m).

- B. Variation from Level:
For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch per 20 feet (6 mm/6 m) or 1/2 inch per 40 feet (12 mm/12 m).
- C. Variation of Linear Building Line:
For position shown in plan and related portion of walls, and partitions, do not exceed 1/2 inch per 20 feet (12 mm/6 m) or 3/4 inch per 40 feet (19 mm/12 m). Measure variation from plumb, level, and position shown in plan as the variation of the average plane of the face of each stone from a plumb, level, or dimensioned plane.
- D. Variation in Mortar-Joint Thickness:
Do not vary from joint size range indicated.
- E. Variation in Plane between Adjacent Stones:
Do not exceed one-half of tolerance specified for thickness of stone.
- F. Variation in Plane on Face of Individual Stone:
So not exceed one-half of tolerance specified for thickness of stone.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry veneer of the following description:
1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if the methods and results are approved by the Owner's representative.
 2. Defective joints.
 3. Stone masonry veneer and joints not matching approved samples and mockups.
- B. Replace in a manner that results in stone masonry veneer's matching approved samples and mockups, complying with other requirement and showing no evidence of replacement.
- C. In-Progress Cleaning:
Clean stone masonry veneer as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning:
After mortar is thoroughly set and cured, clean stone masonry veneer as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on mockup by leaving half of the panel un-cleaned for comparison purposes. Obtain the Owner's representative's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect the adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 5. Clean stone by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using the following masonry cleaner:
 - a. Job-mixed detergent solution.
 - B. Acidic cleaner, applied in compliance with written directions of acidic cleaner manufacturer.
- E. Protection:
Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure stone masonry is without damage and deterioration at the time of Substantial Completion.

3.5 MAINTENANCE

- A. The Contractor shall maintain all stonework during the life of this contract until final acceptance of the work, and shall repair and replace all work that are disturbed, damaged, or destroyed at no cost to the Owner.

3.6 MATERIAL DELIVERY, STORAGE AND HANDLING:

- A. The Contractor shall unload and store the stone immediately upon delivery. The Contractor shall inspect the stone at that time. If any of the stone is delivered damaged, flawed, having dimensional errors or is otherwise not suitable for installation, the Contractor shall notify the owners representative immediately. Once the stone shipment has been inspected and accepted, the Contractor is responsible for the condition of the stone and any damaged, broken, or discolored stone will be replaced or repaired at the Contractor's expense.

Upon receipt of the stone at the construction site, stack stone on timber or platforms at least four inches (4") above the ground. Take care to prevent staining during storage.

3.7 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition.

END OF SECTION

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SECTION 02796 – NATURAL STONE POROUS PAVING SYSTEM

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. The porous paving system is used to provide a rigid, permeable insert pavement to fill cells in the Boathouse Plaza concrete pavement. See drawings for locations.

1.3 REFERENCES

- A. ASTM D 1505 - Density of Plastics by the Density-Gradient Technique
- B. ASTM D 1693 - Environmental Stress-Cracking of Ethylene Plastics
- C. ASTM D 5199 - Measuring Nominal Thickness of Geotextiles and Geomembranes
- D. ASTM E 41 - Terminology Relating to Conditioning

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1) Cost breakdowns for the materials included in the

Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.

- 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
- 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
- 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. Product Data: Submit product data provided by manufacturer.
- C. Submit a copy of the MSDS for epoxy coated gravel pavement.
- D. Technical Drawings: Submit manufacturer's technical drawings including section layout, direction of expansion, and any other relevant information.
- E. Samples: Submit representative samples provided by the manufacturer.
 1. A 6" x 6" sample of epoxy aggregate pavement.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Quality management system certified to ISO 9001:2000.
- B. Installation: Choose an installer with a satisfactory record of performance on landscaping and/or paving projects of comparable size, complexity, and quality.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original packaging, with identification labels clearly intact.
- B. Storage:
 1. Store all materials per manufacturer's instructions.
 2. Store all materials out of direct sunlight.
 3. Epoxy must be stored in original, unopened containers.
 4. Epoxy must be stored in a dry place with temperature between 60 and 100 degrees Fahrenheit.

- 5. Epoxy should be used within one year of expiration date indicated on outside of container.
- C. Handling: Use care when unwrapping, handling, expanding, and infilling LSG series grid sections.
 - 1. Be certain to overfill cells prior to any load bearing or vehicular traffic.

1.7 MOCKUP

- A. Provide mockup of infill panels, of both sizes.

1.8 RELATED SECTIONS

- B. Division 1 Specifications for Green Building Requirements
- C. Section 02721 Aggregate Base Courses
- D. Section 02750 Concrete Pavement

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. As Basis of Design, Gravel Lok Natural Pebbles, as manufactured by Cell-Tek Geosynthetics, LLC, Crofton, MD, or approved equal.
- B. For spill or emergency/first aid questions related to Gravel-Lok liquid, contact Chemtrec or manufacturer of equivalent products.

2.2 Bonding Liquid - Read MSDS before use.

- A. Available in two forms: Clear Bond or Amber Bond.
 - 1. Clear Bond
 - a. Contains Isophorone Diisocyanate CAS#4098-71-9; 1,3-Dioxolan-2-one, 4-methyl- CAS# 108-32-7
 - b. Clear in color c. UV stable
 - c. Available in one gallon, five gallon, and fifty gallon containers.
- B. Coverage rates depend upon application and installation method.

2.3 INSERT INFILL MATERIALS

- A. Fill inserts with clean, washed, angular gravel.
- B. Gravel shall be three times washed & specifically engineered for use with the clear bonding agent.
- C. Gravel mix shall be 3/8" Riverjack pebbles.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Evaluate site conditions. Notify the Commissioner and refrain from excavation until site conditions have been corrected.
- B. Evaluate that the layout of the project is as indicated on the drawings. Notify the Commissioner and do not proceed until the layout of the project matches the drawings.

3.2 INSTALLATION OF NATURAL STONE POROUS PAVING for inserts in concrete pavement.

- A. See Section 02750 Concrete Pavement for subgrade and base installation and forming of insert openings.
- B. Insert Preparation:
 - 1. Place geotextile over subgrade according to geotextile manufacturer's recommendations.
 - 2. Inspect infill openings of installed concrete for obstructions.
 - a. Add base material to maintain uniform aggregate depth. See Section 02750 Concrete .
 - b. Compact base material to a minimum of 95 percent SPDD.
 - 3. Clean edges of concrete infill openings thoroughly. Allow to dry.
- C. Clean stone thoroughly. Allow to dry. Aggregates must be free from any fines or dirt. The cleaner the stone, the stronger the bond.
- D. Mix stones with liquid to coat them until they are wet. Ratio should be approximately 16 oz. - 18 oz. : 1 five gallon bucket of stones. Mix stones in either a five gallon plastic bucket, wheelbarrow or cement mixer. Cement mixer can be cleaned with acetone before liquid cures.
- E. Pour out the coated stones placing them into the desired areas. Trowel can be used if necessary to smooth it out. Be careful to not get the coated stones on any surrounding pavements, flagstones, etc. It can stain those areas permanently. Rope off treated area to protect it from people and animals. Do not install if rain is expected within 12 hours. Do not cover area with plastic. Install when outdoor temperature is 50 degrees or above and will not drop below 50 degrees F for at least 12 hours. If the temperature is around 50 - 50 degrees F then it may take up to 48 hours to cure.

END OF SECTION*

SECTION 02810 - IRRIGATION AND CONTROLLER SYSTEM

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. The Work of this Section shall include the furnishing of all labor, materials, equipment and services necessary to complete the irrigation system as shown on the drawings and specified herein, including, but not necessarily limited to, the following:
1. Water supply stubs to be provided for Irrigation Contractor's point of connection as indicated on the plans.
 2. Excavation of all trenches and proper backfilling after irrigation lines are installed.
 3. Furnishing and installing an automatic drip irrigation system including piping, dripper line, fittings, quick coupling valves, gate valves, drain valves, and any accessories necessary to complete the installation in Landscape and on Cement Board Rainscreen as outlined in the Contract Documents.
 4. All material to be incorporated in the work, all labor performed, and all appliances, tools and methods shall be subject to the inspection and approval or rejection of the Commissioner.
 5. The Contractor shall provide all sleeves necessary for irrigation piping. Sleeves shall be required when piping crosses paths, driveways and other paved surfaces.
 6. All material must be as specified. Any alternate manufacturers must be submitted for approval before being substituted as an equal.
 7. The Contractor shall verify any existing site utility locations in the area of his work. Any damage to existing utilities during construction will be repaired at the Contractor's expense.
 8. Providing an automatic fertigation system, capable of fertilizing by zone.
 9. The Contractor shall test and make operative the irrigation and fertigation system.

1.2 SCOPE DESCRIPTION

- A. "Root Drip Irrigation and Controller System" includes connection to domestic supply, backflow preventer, controller, exterior underground main loop, all valve boxes and control wiring, root drip laterals, stub-outs to wall-mounted (vertical) wall drip irrigation, and all components as shown on drawings. System sized for wall drip irrigation.
- B. "Wall Drip Irrigation" includes connection to valve boxes, vertical risers and laterals, relief valves, and other components shown on drawings, installed in coordination with Cement Board Rainscreen installation. The design intent is to provide sufficient zones

and water to promote plant growth in the vertical wall planting panels, mounted on exterior face of cement board sheathing, and for future wall plantings.

1.3 RELATED WORK

- A. Division 1 Specifications for Green Building Requirements.
- B. Section 02930 - Planting
- C. Section 07450 – Cement Board Rainscreen System
- D. Section 13900 – Vertical Wall Planting Panels
- E. Division 15 – Plumbing Connections

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturing irrigation systems materials and products, of types and sizes required, whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. Installer's Qualifications: The contractor must carry a Certification from the Irrigation Association (Certified Irrigation Contractor) to qualify as the contractor. Furthermore, firms must have successfully completed projects within the last three (3) years involving the installation of irrigation and piping work similar in size, scope and complexity to that required for this project. Such experience should be able to be demonstrated through references.
- C. Codes and Standards:
 - 1. Comply with all applicable state and local ordinances and codes.
 - 2. All materials and work shall meet the requirements of the A.W.W.A., A.S.S.E. and the USC Foundation for Cross Connection Control.

1.5 FEES, PERMITS AND CERTIFICATES

- A. The Contractor shall obtain all permits, inspections, and approvals as required by all authorities having jurisdiction, except as noted below. All fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid for by the Contractor.
- B. Where required, all NYC DOB Special Inspections and Special Progress Inspections will be provided by the City of New York.

1.6 UTILITIES AND SITE PROTECTION

- A. Existing Utilities:
 - 1. Owner shall supply site utility and all pertinent background information relating to the existing conditions of the site to the Contractor, to the best of its abilities.
 - 2. Contractor shall be thoroughly acquainted with all site conditions. Should utilities not shown on the plans be found during excavations, contractor shall promptly notify the owner's representative for instructions as to further action. Failure to do

so will make Contractor liable for any and all damage thereto arising from his/her operations subsequent to discovery of such utilities not shown on plan.

3. Contractor shall make necessary adjustments in the layout as may be required to connect the existing stub out. Should such stubs not be located exactly as shown, Contractor may be required to work around existing conditions at no cost to the Owner.

1.7 DRAWINGS, SPECIFICATIONS AND DETAIL SHEETS

A. Scale and Dimensions:

1. Consider drawings and specifications as being compatible and therefore work called for by one and not the other shall be furnished and installed as though called for by both. When discrepancies exist between scale and dimension or between the work to be accomplished by each trade, they shall be called to the Commissioner's attention immediately before work is to proceed.
2. Where diagrams have been made to show piping connections, etc., Contractor is cautioned that these diagrams must not be used for obtaining lineal runs or number and type of fittings.
3. All measurements shall be verified at the site. Do not scale measurements from drawings.

1.8 CODES AND STANDARDS

- A. All materials, installation and workmanship shall comply with all applicable local, county, state and federal codes, specifications, ordinances, utility company regulations, and manufacturers and industry standards.
- B. In case of differences in building codes, specifications, state laws, local ordinances, industry standards, utility company regulations and the contract documents, the most stringent shall govern. The Contractor shall promptly notify the Commissioner in writing of any such difference. Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, state laws, local ordinances, industry standards or utility company regulations, he shall bear all costs arising in correcting these deficiencies.
- C. In addition to the local, county and state ordinances, as well as the utility company regulations, the following industry standards and codes will be referred to:
 1. ANSI American National Standards Institute
 2. AWWA American Waterworks Associates
 3. ASTM American Society for Testing Materials
 4. NSF National Sanitation Foundation

1.9 SUBMITTALS

- A. Shop Drawings: Contractor shall be responsible for providing shop drawings of recommended irrigation design based on the proposed planting design. The quantity, type and location of all pipes, fittings, valves, etc. shall be indicated based on the specifications herein.
- B. All materials of every description are to be furnished exactly as specified and shall be new and of the best quality and grade obtainable. Contractor, before beginning work herein specified shall submit to the Commissioner for approval: Manufacturer's technical product data and installation instructions; and Three (3) sets of material submittals, bound and indexed for all irrigation system materials and products to be furnished. If Contractor requires more than one (1) copy of submittal returned, then the initial submittal shall be increased by the appropriate number. Material submittals shall include, but are not limited to, the following:
1. Dripper Lines and Lateral Lines
 2. Emitter Lines and Bubblers
 3. Valves (including, but not limited to, Gate/ Flush Drain, Quick Coupling, Remote Control, and Pressure Regulation Valves)
 4. Filters
 5. Pipes and Fittings
 6. Access Boxes (Valve Boxes)
 7. Automatic Controller
 8. Solvent / Cement
 9. Control Wire
 10. Sleeves
 11. Flush / Drain Valves
- C. All materials which are to be used must be submitted for approval before work begins, whether they are as specified or a substitution for materials specified.
- D. Record Drawings: During the course of the installation, the Contractor shall be responsible for recording all changes made during installation on a reproducible copy. Contractor shall submit the reproducible copy plus six (6) sets of As-Built Drawings with details for approval. Drawings submitted must show Contractor's title block with name, address, scale and project name. If contractor requires more than one (1) copy of the submittal returned, then the initial submittal shall be increased by the appropriate number. Once the As-Built Drawings have been approved by Commissioner, they will be used as a permanent record of the installation.
- E. Maintenance Data: Submit maintenance data and parts lists for irrigation system materials and products. Include these data, product data, shop drawings and record drawings in a maintenance manual three ring binder.

1.10 DELIVERY, STORAGE AND HANDLING OF MATERIALS

- A. Delivery and Storage: Inspect all materials delivered to the site for damage. Unload and store with the minimum of handling. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris. Protect pipe and fittings from exposure to direct sunlight over extended periods.

- B. Handling: Handle materials in such a manner as to ensure delivery to the trench in sound undamaged condition.

1.11 PIPING ARRANGEMENT

- A. Suggestions for changes in location of piping, etc., by the Contractor shall be submitted to Commissioner for approval before proceeding with the work, with written assurance that such changes will not cause any extra cost on their part or the part of any other Contractor, and will not cause any alteration of design requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS – IRRIGATION EQUIPMENT

- A. Manufacturer: Submit to compliance with requirements, provide products as follows:
 1. NETAFIM USA Techline, or approved equal.
 2. RAIN-BIRD Corporation, Glendora, California, or approved equal.

2.2 MATERIALS

- A. General:
 1. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements.
 2. All materials throughout the system shall be new and in perfect condition.
 3. All components shall be compatible, to achieve a fully functional installation.
- B. Piping: Provide pipes of one of the following materials of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
 1. Polyvinyl Chloride (PVC): Sized as shown on drawings. All PVC pipe shall be continuously and permanently marked with manufacturer's name, material and schedule or type. Pipe shall conform to U.S. Department of Commerce Commercial Standard CS 256-63, or latest revision. All PVC pipe shall be SDR 21.
 2. Fittings: Schedule 40, polyvinyl chloride (PVC) weight as manufactured by Spears or approved equal. Solvent weld or insert fittings are acceptable. No saddle tube clamping or fittings shall be used. Fittings to conform to ASTM D-2466.
- C. Valves:
 1. Gate Valves: Shall be sized for mains. The valves shall be all bronze solid wedge, screw bonnet rated at 200 WOG.

2. Quick Coupling Valves: Shall be Rain Bird 1 " brass (or approved equal) with locking top and hose swivel, located on main lines, or approved equal.
3. Remote Control Valves: Rain Bird (or approved equal) electrically operated solenoid valve DVF series or Xerigation Assemblies XCZ series installed in valve boxes of appropriate size and type for valves specified with manual isolation shut-off valve to match pipe size, or approved equal.

D. Netafim Techline Sub Surface Drip (or approved equal)

1. Continuously Self-Flushing, Pressure-Compensating Dripperline: Techline tubing is a low volume dripperline with integral and evenly spaced pressure compensating drippers at the specified intervals in two discharge rates (0.61 & 0.92) in gallons per hour (GPH). Techline tubing is available in lengths of 100', 300' and/or 1000' coils.
2. Techline (or approved equal): The dripper line shall consist of nominal sized one-half inch low density linear polyethylene tubing, housing internal pressure compensating, continuous self-cleaning, integral drippers at the specified spacing (12" centers). The tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.67 inches and an inside diameter (I.D.) of 0.57 inches. Individual pressure compensating drippers shall be welded as an integral part of the tubing assembly. These drippers shall be constructed of plastic with a hard plastic diaphragm retainer and a soft rubber diaphragm extending the full length of the dripper.
3. The drippers shall have the ability to independently regulate discharge rates, with an inlet pressure of (7-70 PSI) seven to seventy pounds per square inch (PSI), at a constant flow and with a manufacturer's coefficient of variation (Cv) of 0.03. Recommended operating pressure shall be between 15-45 PSI. The dripper discharge rate shall be 0.92 gallons (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and a diaphragm to maintain uniform discharge rates. The drippers shall continuously clean themselves while in operation. The dripper line shall be 12" spacing between drippers unless otherwise specified. Techline pipe depth in soil, in landscape areas shall be 4" unless otherwise specified.
4. For Landscape installations 6" metal wire staples shall be installed to hold and support sub surface lines, 18" on center. For Moss Wall installations "U" shaped pipe hangers of appropriate size shall be installed 18" on center on all piping to hold in place. The Techline tubing shall be Netafim Model Numbers TLDL -9-12 - xx, or approved equal.

E. DRIPPERLINE ACCESSORIES

1. FITTINGS

- a. Techline fittings (or approved equal) shall be constructed in one of the following end configurations:
 1. barbed insert fittings only,

2. male pipe threads (MPT) with barbed insert fittings, or
 3. female pipe threads (FPT) with barbed insert fittings.
- b. All fittings shall be constructed of molded brown plastic having a nominal outside dimension (I.D.) of 17 mm or (0.57"). Female and male threaded ends shall be capable of mating to standard PVC pipe threads with tapered threads.
- c. Techline connections shall be mated with Netafim Techline tubing (or approved equal) by pushing the tubing and twisting side to side until the tubing abuts to either adjoining tubing or a fitting stop. The Techline fittings shall be Netafim model numbers TLTEE, TLCOUP, TL2WO75MA, TLELL, TLCROS, TL075MA, & TL075FTEE, or approved equal. Note: Netafim TLIAPVC-B may be used on all Headers, Footers, and Center fed PVC 1 1/2" lines to connect Netafim Techlines to the PVC. In this case only Netafim Drill Bit TDBIT 16.5 shall be used to provide the proper diameter hole in the PVC, or equivalent method from approved equal supplier.

2. LINE FLUSHING VALVE

- a. Line Flushing Valves are used to reduce sediment build-up within the Techline tubing (or approved equal) and to pass sediment or debris which may not have been captured by the disc filter.
- b. The line flushing valve shall be constructed of brown molded plastic with one of the following end configurations:
1. 1/2" MPT
 2. Insert barbed fitting
- c. The line flushing valve shall operate at the beginning of the irrigation cycle as the system begins to pressurize, but before drip operation begins, and shall be capable of flushing approximately one gallon of water at 50 psi maximum, or 1.5 psi minimum. Note: Permanent damage could be sustained to the line flushing valve where incoming pressure exceeds 50 psi. Pressure regulators are required even with pressure regulating remote control valves which tend to pause for a brief period of time before pressure regulation occurs.
- d. Line Flushing Valves are to be installed below grade, as detailed in a valve box to allow for periodic inspection and are to be installed in one of two ways:
1. vertically: with the dome portion facing upward, installed on a 90 degree elbow.
 2. horizontally: with the dome portion facing sideways. The Line Flushing Valve shall be Netafim Model Number TL F-1, or approved equal.

3. AIR/VACUUM RELIEF VALVE

- a. The air/vacuum relief valve serves two purposes; 1) to evacuate air from the Techline laterals (or approved equal) during system start-up and, 2) to prevent a vacuum from occurring after the remote control valve has closed thus avoiding debris intrusion into the drippers at the higher locations in the zone.
- b. The air/vacuum relief valve shall be constructed of black and/or grey plastic with a 1/2" male pipe thread capable of mating with a threaded PVC reduction bushing or 1/2" FIPT fitting.
- c. Design and installation techniques require that these valves be installed at the highest elevation in each zone (some zones may require more than one) in order to expel air and relieve vacuum. In a zone where the highest elevation occurs between the intake and exhaust headers (such as a mound or berm), an air relief lateral shall interconnect the Techline Dripperlines to avoid the necessity of installing one air relief valve on each Techline lateral. Valves can be installed below grade in valve boxes to allow for periodic inspection. The air/vacuum relief valve shall be Netafim Model Number TLAVRV, or approved equal.

4. PRESSURE REGULATION VALVE

- a. The purpose of the pressure regulator is to control downstream pressure at or below the specified system operating pressure. Unregulated pressures in excess of the recommended operating ranges can diminish and disable line flushing valves or cause the integrity of the Techline (or approved equal) fitting connection to diminish and/or fail.
- b. The pressure regulator shall be a Netafim (or approved equal) spring-operated piston-type unit with an externally accessible regulation unit that can be serviced without removing the valve from the system. The body shall be molded of black plastic with a combination of male/female pipe threaded inlet and outlet. Removable and interchangeable springs shall be color-coded to denote varying pressure ranges.
- c. The regulator shall have a built-in indicator that shows when it is operating. It shall be able to respond immediately to any inlet pressure variation. The regulator shall be capable of regulating from 15 PSI to 50 PSI. The pressure regulator valve shall be a RAIN BIRD or Netafim Model (or approved equal) as indicated on the plan or as recommended by the manufacturer, or approved equal.

5. DISC FILTER

- a. The purpose of the disc filter is to capture and retain water-transported debris or sediments that could reduce the efficiency of the Techline Drippers, or approved equal.

- b. The filter shall be a multiple disc filter with color-coded filter elements indicating the size of the element being used. The discs shall be constructed of chemical-resistant thermoplastic for corrosion resistance.
 - c. The disc filter body shall be molded of black plastic with male pipe threads for both inlet and outlet. A portion of the disc filter shall be capable of periodic servicing by unscrewing a threaded cap or unlatching the band. The 3/4" model shall have a integral manual shut-off valve option.
 - d. Typical installation of the disc filter shall be per the enclosed details or based on regional practices. Disc filters can be installed downstream of the remote control valve to allow for periodic servicing when the remote control valve is not operating or upstream of the remote control valve if the disc filter is specified with manual shut-off valve or when a line size ball valve is also specified to allow for periodic servicing with a pressurized mainline. Disc filters shall be installed below grade and positioned in a valve box large enough to remove the cap and internal disc element. A gravel sump, 6 inches deep, shall be placed at the bottom of the valve box to drain off water during periodic maintenance procedures. The filters can be installed above ground when security enclosures are provided.
 - e. The filter shall be a Netafim Model or RAIN BIRD, or approved equal.
6. STAINLESS STEEL CLAMPS (for operating pressures in excess of 45 psi)
- a. Stainless steel clamps are made to secure Techline (or approved equal) tubing to insert barbed fittings. Clamps shall be manufactured by "Oetiker" and shall be one "ear" type, or approved equal. Nominal size recommended for use with Techline is 13/16", Part No. 210, or approved equal.
 - b. Oetiker (or approved equal) clamps shall be constructed of 304 AISI stainless steel. Clamps shall be one "ear" type and formed with a "dimple", allowing for thermal expansion and contraction properties without loosening the clamp.
 - c. Interior clamp wall shall be smooth to prevent crimping or pinching of tubing. Wall thickness of clamps shall be .0236" (0.6 mm) with an overall band width of 1/4" (7 mm).
 - d. Stainless steel clamps are used to secure Netafim Techline (or approved equal) tubing over barbed fittings when design operating pressures exceed 45 psi. Clamps are to be slipped over the tubing before being fitted to barbed insert fittings. Place the clamp between the first and second ridge of the barbed fittings. Crimp the "ear" of the clamp tightly with an Oetiker (or approved equal) pincer tool. Crimp twice to ensure proper seating.

7. DRIPPER PLUG RING

- a. The Netafim (or approved equal) dripper plug ring is a plastic pre-formed ring with an inside rounded plug that can be used to plug Techline (or approved equal) dripper outlets to prohibit water from dripping in areas where water is not needed.
 - b. The dripper plug ring is constructed of black molded plastic of a diameter slightly larger than the outside diameter of the Techline (or approved equal) tubing. The circular design is open on one end to enable it to be slipped over the tubing. Within the interior of this ring (opposite the open end) is a rounded plug made to press-fit into the water outlet of the dripper to prevent water emission.
 - c. Slip the dripper plug ring over the Techline (or approved equal) tubing and push the plug into the water outlet until it seats into the inlet hole securely. The Dripper Plug Ring shall be a Netafim Model Number TDLPLUG, or approved equal.
- F. Reduced Pressure Backflow Prevention Units: Reduce pressure backflow prevention unit shall be provided by others as indicated on plumbing drawings and shall be in compliance with local codes.
- G. Solvent Cement: Compatible with PVC pipe and or proper consistence ADTM D-2564.
- H. Control Wires: 24 volt solid wire, UL approved for direct burial ground. Minimum wire size 14 gauge. All wire to be Paige wire or approved equal. Two additional pulse wires are to be installed – but not used at this time.
- I. Expansion Curls: Expansion curls shall be provided within three (3) feet of each wire connection to solenoid and at least every three hundred (300) feet in length. (Expansion curls are formed by wrapping at least 5 turns of wire around a rod or pipe 1" or more in diameter, then withdrawing the rod).
- J. Sleeves for Control Wires: Under all walks through walls, and paving, PVC Schedule 40 pipe or galvanized heavy wall steel conduit. Minimum size 3" I.D.
- K. Sleeves for Irrigation Pipe: Under all walks and paving, Schedule 40 PVC pipe or as otherwise approved by the Owner's Representative. To be two (2) times the O.D. of sleeved pipe.
- L. Control Valve Boxes: Electric Control Valve boxes shall be sized accordingly allowing for easy maintenance of the valve assemblies. They shall be installed with brick supports, pea gravel for drainage and wrapped in Landscape filter fabric which may not be shown on detail sheets. They shall be lockable. The contractor shall provide at least 36" of control wire coiled and connected to each solenoid. Concern shall be given to keep all equipment out of the way of foot traffic and out of sight of pedestrians.
- M. Quick Coupler / Drains: Connections of approved design shall be provided for winterizing at several locations so that the entire system can be drained by blowing it out with

compressed air. Quick coupler valves are to be provided to enhance maintenance capabilities.

- N. Rubber Hose: Commercial quality, quantity of one; for each point of quick coupler connection location, heavy duty rubber hose, 50 feet long, for use with Rain Bird key and hose swivel quick coupling valves shall be furnished by the Contractor.
- O. Automatic Controller: The contractor shall install a Rain Bird ESP MC Series controller (or approved equal) with a wireless remote rain switch device. Space shall be provided by the owner for mounting and electric for the controller. The contractor shall provide controllers of proper zone number with at least two additional zone connections. The controllers, model numbers ESP-MC -8, shall be manufactured by Rain Bird Corporation, Glendora, California, USA, or approved equal. Controller must be compatible with fertigation system.
- P. FERTIGATION
 1. The contractor shall install a proportional rate in-line injector fertigation system, equivalent to L500A by Turf Feeding System, Houston, TX, or approved equal.
 2. System shall consist of pump, maximum 50-gallon fertilizer tank, injection valve, flow sensor, digital timer and controller.
 3. System shall be capable of delivering fertilizer by zones, in varying quantities and sequences, accurately from a minimum rate of 1 oz. per hour up to a maximum of 0.6 gallons per hour.
 4. Mount unit and tank inside Boat House Storage, adjacent to irrigation controller. Coordinate all electrical requirements prior to installation.

PART 3 EXECUTION

3.1 STAKE-OUT

- A. General: Examine areas and conditions under which irrigation system's materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Stake out entire system, including pipes and valves. Final stake-out shall be reviewed by the Owner's Representative prior to trenching to ensure that no conflicts with related site improvements occur.

3.2 EXCAVATION AND BACKFILL

- A. The Contractor shall furnish all labor, materials, and equipment for the excavation and backfilling of pipe trenches, and other structures as shown on the Drawings. This item of work includes trench excavation, disposal of excavated materials, sheeting and shoring, disposal of surface and ground water, protection of existing streets and structures pipe embedment, trench backfill, and the maintenance of the construction area during progress of the work. The described includes delivery and storing of material and all vehicular traffic related thereto.
- B. The width of trenches for installation of irrigation lines shall be in accordance with pipe manufacturer's requirements, all applicable codes of the City, County and State in which

installation is accomplished and utility company regulations. Trench widths shall not be less than is necessary for proper construction.

- C. The depth of the irrigation line trenches shall:
 - 1. 18" minimum cover over main lines;
 - 2. 12" minimum cover over lateral control lines from controller to valves;
 - 3. 4" cover (not including mulch) over lateral line drip tubing;
- D. Irrigation line trenches shall be excavated in a manner that will provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point.
- E. Backfilling of all trenches shall be with clean fill, free of rock and debris. If in rock excavated section, pipe shall be installed in a bed of sand six (6) inches to each side above and below pipe.
- F. All trenches shall be backfilled and compacted every six (6) inches of fill.

3.3 PIPE AND ASSEMBLY

- A. Carefully inspect all pipe, fittings, and accessories before installation. Reject any defective material.
- B. Remove all fins and burrs and thoroughly clean all pipe fittings and accessories before jointing and placement.
- C. Cut pipe accurately to measurements established at the site and work into place without springing or forcing.
- D. Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by the manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush. The use of Netafim (or approved equal) specialty tools (drill bit) and fittings (PVC push in fittings) is highly recommended for ease of installation.
- E. Grade pipe in straight lines with no dips or low points. The full length of each section of pipe and fitting shall rest solidly on the pipe bed with recesses excavated to accommodate joints and couplings. Provide anchors and supports where necessary for fastening work into place.
- F. No pipe shall be laid when, in the opinion of the Commissioner-, trench or weather conditions are unsuitable. When pipe laying is not in progress, the open ends of the installed pipe shall be closed by approved means to prevent entrance of trench water and other foreign material into the line. Enough backfill shall be placed in the center sections of the pipe to prevent floating. Any pipe that has floated shall be removed from the trench and re-laid.
- G. All pipe crossing sidewalk areas shall have a minimum of 18" cover over pipe and be installed in a 4" schedule 40 PVC pipe sleeve. All sleeving shall extend 18" beyond the

edge of pavement, curb or building face. Assembly of piping shall meet all manufacturer's requirements.

- H. Pipe shall be protected during storage and handling against impact shocks, or free fall. Pipe shall be kept clean at all times and no pipe shall be used that does not conform fully with standards or specifications herein described. All pipe and appurtenances shall be installed in strict accordance with these specifications. Any section of pipe found to be defective either before or after laying shall be replaced with new sections without additional expense to the owner.
- I. Pipe may be assembled and welded on the surface. Snake pipe from side to side in the trench to allow for expansion and contraction.
- J. Before lowering into the trench, each section of pipe shall be inspected for defects. Defective pipe shall be rejected. Deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets, shall not exceed piping manufacturer's requirements for snaking. If alignment required deflections in excess of limitations or undue stress upon the pipe, the Contractor shall provide joints or a sufficient number of shorter lengths of pipe to provide angular deflections within the limit set forth.
- K. During construction operations, the pipe interior shall be kept clean by means of plugs or other approved methods. Pipe shall not be laid in water, or when trench or weather conditions are unsuitable for work proposed, except by permission of the Commissioner. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth, or other materials will enter the pipe or fittings. Prior to completing the joint, the Contractor shall insure that each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate the joints. Pipe shall be laid at locations shown on the drawings.
- L. All pipe and appurtenances shall be installed so as to prevent contact with rock, mulch, or other excessively acid, alkaline, or unstable soils, destructive to physical properties of the pipe. Under these conditions pipe will be set in a bed of sand.
- M. Make all connections between plastic pipe and metal valves or steel pipe with threaded fittings using plastic male adapters
- N. Valves:
 - 1. All valves shall be installed in accordance with details and this specification. Where possible, control valves shall be manifolded in parallel.
 - 2. Install remote valves where shown and group together where practical; place no valve closer than six (3) inches to edges, buildings and walls. Locate valve boxes in lawn areas or planting beds.

3.4 DRIPPERLINE INSTALLATION

- A. Techline (or approved equal) is designed for use in surface and sub-surface applications utilizing a grid design, the result being a complete wetted area within the grid. It can also be installed as "snaked" lines where grids are not justified. The most uniform way to install Techline (or approved equal) is in a grid, sub-surface at a uniform depth as specified.

- B. Techline (or approved equal) is available in dripper flow rates of 0.61 gallons per hour (gph) and 0.92 gallons per hour (gph) with drippers spaced at 12 inch, 18 inch or 24 inch intervals. The drippers are designed to regulate flow at the specified output from 7 psi to 70 psi with maximum recommended pressure of 45 psi when using unclamped Techline insert fittings.
- C. The choice of dripper spacing, Techline (or approved equal) lateral spacing and depth is dependent on the soil type and plants being used. Drip line shall be spaced at 18" apart using 12" emitter spacing and .92 gph drippers for Landscape applications. Drip line shall be spaced at 24" apart using 12" emitter spacing and .92 gph drippers for Wall Drip Irrigation applications.
- D. It is necessary to use Techline (or approved equal) insert fittings for all Techline (or approved equal) connections to ensure the integrity of the connection. Techline (or approved equal) dripperline has an ID of 0.57", or 17 mm, which differs from most other polyethylene tubing dimensions and improperly sized fittings will cause leaks.

1. Techline (or approved equal) can be installed by:

- a. Trenching, and backfilling to the specified grade depth,
 - b. Vibratory plow installation topped with 4" of soil and Techline (or approved equal) staples (TLS6) to hold it in place along with a four (4) to six (6) inch shredded bark mulch cover (if specified by the Landscape Architect) or as shown on landscape drawings.
- E. Drip Tubing: Install all drip tubing center fed in a grid as detailed on drawings. Use only Teflon tape on all threaded connections.
 - F. Closing of Pipe and Flushing Lines:
 - 1. Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
 - 2. Thoroughly flush out all water lines before installing valves and other hydrants.
 - 3. Test in accordance with Local laws for Hydrostatic Tests.
 - G. Backfilling and Compacting:
 - 1. After system is operating, and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of rubbish.
 - 2. Backfill for all trenches, regardless of type of pipe covered, shall be compacted to minimum 90% density.
 - 3. Compact trenches in areas to be planted by thoroughly flooding the backfill.
 - 4. Dress off all areas to finish grades.

3.5 VALVE BOXES

- A. Electric Valves shall be installed in a valve box Rain Bird, Ametek, Carson , or approved equal. All electric valves shall be installed in beds.
- B. Valve boxes where used shall be set on firm base of brick pavers, wrapped in Landscape filter fabric and pea gravel, to allow for drainage.

3.6 CONTROLLER

- A. Controller shall be installed and properly grounded in/on the proposed building as indicated on the drawings.
- B. Connect remote control valves to controller in a logical sequence to correspond with specification of the Commissioner.

3.7 CONTROL CABLE

- A. Install control wires at least six (6) inches below finish grade and lay to the side and below main line. All control cable shall be of size for voltage drops and shall be installed in PVC conduit under hardscapes. Pipe trench shall be partially backfilled to provide three to four inches of cover over the pipe before wire is installed. Wire shall then be placed in the trench to one side of the pipe. Wire shall be "snaked" into the conduit as loose as possible and with as much "slack" as possible to allow for expansion and contraction of the wire. If it is so desired, rather than leaving slack in the wire, expansion joints in the wire may be provided at 200 foot intervals by making 5 to 6 turns of the wire around a piece of 1/2" pipe. Where it is necessary to run wire in a separate trench, the wire shall have a minimum cover of 18". 12 Gauge single strand direct burial wire shall be used for common wire and 14 gauge for the hot wire.
- B. Control wire splices will be allowed only in runs more than five hundred (500) feet. Connections of all underground wires shall be by the use of wire nuts, covered with 3m DBY waterproof splice for each wire per installation instructions provided by the manufacturer, or as otherwise required by local ordinance.
- C. Install control wires, sprinkler mains and laterals in common trenches whenever possible.
- D. All wires passing under existing or future paving, construction, etc., shall be encased in plastic or galvanized steel conduit extending at least twelve (12) inches beyond edges of paving or constructions.
- E. All wire connections at remote control valves shall be made in control boxes and shall be left with sufficient slack so that in case of repair the valve bonnet of splice may be brought to the surface without disconnecting the wires.
- F. The controller shall have a separate common ground wire system entirely independent of the common ground wire system of any other controllers. Only those remote control valves which are being controlled by one controller, shall be connected to that controller's common ground wire system.

3.8 DRIP LINES

- A. All drip lines or drippers shall be installed in accordance with the details on the drawings as per manufacturers recommendations.

3.9 FLUSHING AND TESTING

A. Hydrostatic Test:

1. Request the presence of the Commissioner at least 48 hours in advance of testing.
2. Testing to be accomplished at the expense of the Contractor, and in the presence of the Commissioner.
3. Center load piping with small amount of backfill to prevent arching or slipping under pressure.
4. Apply a continuous and static water pressure of no more than 60 psi when welded plastic joints have cured at least 24 hours and with the risers capped as follows:
 - a) Main Lines and sub mains to be tested for one (1) hour.
 - b) Lateral lines to be tested for one (1) hour.
5. Repair leaks resulting from tests.
6. The lines shall then be retested until deemed satisfactory.

3.10 INSTRUCTIONS

- #### A.
- After completion and testing of the system, the Contractor will instruct the Owner's personnel in the proper operation and maintenance of the system. Contractor shall provide the owner with a complete maintenance binder with all irrigation parts and manuals for the products used on this project.

3.11 PROTECTION

- #### A.
- Contractor shall be responsible for work until finally inspected, tested and accepted. After delivery, and before and after installation, protect work against theft, injury or damage. Protect open ends of work with temporary covers or plugs during construction, to prevent entry of obstruction material.

3.12 WINTERIZATION AND START-UP

- #### A.
- The Contractor shall winterize the system using compressed air for two (2) hours at no more than 30 psi
- #### B.
- The Contractor shall be responsible for the first start-up the following season.
- #### C.
- Irrigation Contractor shall be responsible for providing flush caps and valves at the ends of the drip lines for flushing the system.
1. Contractor shall be responsible for reviewing the system's features, operations and procedures with appropriate Owner's representatives to train them on all annual winterizing and start-up maintenance functions.

END OF SECTION*

SECTION 02821 – METAL BARRIER GATES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this Section the Contractor shall furnish and erect powder coated METAL BARRIER GATES of the types and sizes shown on the plans, in accordance with the plans, specifications, and directions of the Commissioner.
- B. INTENT: It is the intent of this item to effectively and securely close the areas shown on the plans from vehicular access. In addition, the gates include components to secure them in the open position.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
- B. Section 03300 Structural Concrete
- C. Section 03700 Cement and Concrete for Exterior Improvements

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittal shall be as per General Conditions.
- C. Shop Drawings: shall be submitted prior to manufacture.
- D. SAMPLES: The Contractor shall submit for the approval finished samples of parts of the fences. The workmanship and finish of the final product shall be equal to the approved samples. Only if proposed manufacturer is other than as specified, a full size sample must be submitted for approval for the following: Hitch pin, padlock, Park Leaf.
- E. FOUNDRY CERTIFICATE: A certificate verifying the quality of ductile iron for the Parks Leaf shall be submitted. Certificate shall be on Manufacturers' letterhead, dated and signed by the company President with Contract Number, Contract Title, Contractor Name, and Class of Ductile Iron provided.
- F. PAINT SUBSTITUTION: A written request for paint substitution must be submitted to the DPR Coordinator of Submittals. The Contractor shall submit this request, along with manufacturer's data sheets for approval, a minimum of two (2) weeks prior to the intended date of paint application. All paint substitutions must be approved in writing prior to use.

PART 2 PRODUCTS

- 2.1 GATES shall be constructed of galvanized steel pipe, welded as shown on the plans. Gates shall be powder-coated. All material shall conform to Specification ASTM A36.
- 2.2 FITTINGS
- A. All fittings, hardware and equipment shall be designed to carry one

hundred percent (100%) overload.

- B. Malleable iron castings shall be powder coated after hot dipped galvanizing in accordance with ASTM Serial Designation: A-153-82.
- C. Pressed steel fittings and appurtenances shall be powder coated after hot dipped galvanizing in accordance with ASTM Serial Designation: A-123-89.
- D. All fittings, hardware and equipment shall be powder coated of a color to match the framework and shall be of the materials listed in the following schedule:

2.3 POSTS AND RAILS

- A. Posts and rails shall be standard weight galvanized steel pipe of the sizes shown on the plans and shall conform to ASTM Serial Designation F-1083 Schedule 40, except for posts, which shall be Schedule 80. Posts and rails shall be hot dip galvanized inside and outside.

2.4 SURFACE COATINGS

- A. All posts, rails and fittings shall be powder coated with either polyvinyl chloride (PVC) or TGIC-Polyester (with the exception of the turnbuckles and threaded ends of the truss rods, both of which shall be sprayed with powder coat touch-up after installation).
- B. Galvanizing of all components shall provide an acceptable substrate for applied powder coatings. No lacquer, urethane or other coatings which would prevent proper adhesion of powder coating shall be applied to the pipe.
- C. The powder coating shall be applied to the galvanized surfaces in such a manner that the coating will not peel off. Insure surfaces to be coated are clean and dry and free of grease, dust, rust, etc. All coated parts shall first receive phosphating and chromatizing treatments to improve the adhesion of the surface coating. Color to be black unless otherwise indicated on the plans.
- D. The entire gate installation shall be coated with one of the two following types of powder coating, (with the exception of gates, all of which shall be TGIC-Polyester and fabric which shall always be PVC). All gate components shall be coated on all surfaces, of a color to match the framework. All coated surfaces shall comply with the adhesion specifications listed in ASTM F1043.
- E. TYPE B -TGIC-Polyester Powder Coating: TGIC-Polyester Powder shall be applied to the galvanized steel or iron in such a manner that the coating will not peel off. The TGIC-Polyester shall be applied at a film thickness of 3 to 6 mils by electrostatic spray process and bake finished per manufacturer's directions. The TGIC-Polyester shall be applied

without voids, tears or cuts that reveal the substrate and shall thoroughly adhere to the metal without peeling when scratched with a pick device or knife blade point.

- F. Field Test For PVC Powder Coating: As per ASTM F668, three sample sections of the PVC powder coated fence shall be tested for bonding of the powder coat to the metal. Each test will consist of making two cuts parallel to the axis of the pipe or fitting, through the coating, appx. 1/16 inch (1.6 mm) apart, at least 1/2 inch (12.7 mm) long. With a knife peel back a section of the coating between 1/8 inch (3.2 mm) and 1/4 inch
- G. On welded and cut surfaces, apply organic zinc repair paint complying with ASTM A780, then (6.4 mm) long to produce a tab. Attempt to remove the 1/16 inch strip of coating by pulling the tab. The fence shall be deemed acceptable if the coating breaks rather than separates from the metal on all three samples.
- H. Laboratory Test For TGIC-Polyester Powder Coat: At the discretion of the Commissioner, a sample of the TGIC-Polyester powder coated fence shall be laboratory tested for bonding of the powder coating to the metal. Test shall be the Cross Hatch test per ASTM D3359, Method B. Failure to satisfactorily pass this test shall be a basis for rejection.
- I. TOUCH-UP & REPAIR: For minor damage caused by installation, transportation, field welding and cutting of metal powder coated surfaces: clean welds, bolted connections, abraded or sawcut areas, then:
1. On welded and cut surfaces, apply organic zinc repair paint complying with ASTM A780, then repair powder coating per number 2 below. Galvanizing repair paint shall have 65 percent zinc by weight. Thickness of repair paint shall be not less than that required by ASTM A123.
 2. On damaged powder coated surfaces, touch-up finish in conformance with manufacturer's recommendations. Provide touch-up such that repair is not visible from a distance of six feet (6').
- J. Gate Locking Device:
1. This latch shall be a bent stainless steel hitch pin, dropped through corresponding galvanized steel plates with corresponding holes, welded to opposing gate leaves, as shown on the drawings. Locking device shall be constructed so that the center drop rod or plunger bar cannot be raised when the gate is locked. The hitch pin shall have a hole to accommodate a padlock.
 2. All necessary fittings and gate holders to lock gates in both open and closed positions shall be furnished.
- K. PADLOCK: The Contractor shall furnish two padlocks for each single gate and each leaf of double gates. The padlocks shall be American No. 5571 as manufactured by American Lock Co., Crete, IL., or approved

equal. All padlocks for the same park facility shall be keyed alike, with two inch (2") wide by three-quarter inch (3/4") thick brass body, maximum security, five (5) pin tumblers with hardened alloy steel chrome plated shackle no less than three-eighth inch (3/8") diameter and two inch (2") clearance (elongated shackle). A galvanized steel chain, nine inches (9") long shall be fastened to the gate and body of the lock. The chain shall be five-sixteenths inch (5/16") by one and three-eighths inch (1 3/8"). The Contractor shall furnish two (2) keys for each padlock.

L. PARKS LEAF:

1. The Park Leaf casting shall be as fabricated from plate and bar stock steel, galvanized and welded to each leaf of the steel gate in the shop. Field welding will not be permitted.
2. Park Leaf shall be laser cut from the plate steel.
3. Park Leaf shall be powdercoated black.

M. GROUT: Grout for fence posts shall be non-shrink, cement based grout such as Sonneborn 10K Grout as manufactured by BASF Building Systems, Shakopee, MN or SikaGrout 212, as manufactured by Sika Corporation, Lyndhurst, NJ, or approved equal.

N. SEALANT: Sealant around fence post shall be one part polyurethane, elastomeric adhesive such as Sonneborn's Ultra Sealant, as manufactured by ChemRex, Shakopee, MN or Sikaflex-1a, as manufactured by Sika Corporation, Lyndhurst, NJ, or approved equal.

PART 3 EXECUTION

3.1 FABRICATION-METAL GATES

- A. Gates shall be fabricated in strict accordance with the plans and approved Shop Drawings. Pipe shall be formed into panels of the shapes on the plans and joints completely and continuously welded with welds of proper size and shape; all welds ground smooth to a neat finish. Connection shall be provided as indicated on the plans.
- B. Posts shall, in all cases, be truly vertical. Rails shall be parallel to grade as shown on the plans. Braces shall run from corner to corner.
- C. The gate post and terminal post shall be cast in place as shown on the drawings in reinforced concrete footings. Barrier Gate with sleeve shall fit over the gate post and lock securely at the center of the road or to the terminal post.
- D. Any fences and gates not set plumb and true to line and grade shall be removed and replaced at the Contractor's expense. The Contractor shall maintain the fences and gates during the life of the contract and shall repair replace all members that are disturbed, damaged, or destroyed.

END OF SECTION

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SECTION 02825 – RANGE FENCE

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this Section, the Contractor shall furnish and furnish and install a RANGE FENCE in accordance with the plans, specifications, and directions of the Commissioner.
- B. The installed Range Fence 4'-0" Height shall become the property of the Owner upon completion of the life of the Contract.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
- B. Section 02920 Lawns & Grasses
- C. Section 02930 Planting

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.

- 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
- 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
- 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. All submittal shall be as per General Conditions.

PART 2 PRODUCTS

2.1 RANGE FENCE

- A. Fabric: Shall be four foot (4') wide rolls of fuse bonded PVC powder coated two inch (horizontal) by four inch (vertical) (2" x 4") 12 gauge galvanized wire mesh, (14 gauge core, 12 gauge after powdercoating) as manufactured by C. E. Shepherd Co., Houston, TX, Boundary Fence and Rail Systems, Richmond Hill, NY, or approved equal. Color to be Black.
- B. Line Posts: Line posts shall be 'Heavy Vinyl Guard Post', 'T' shape, 13 gauge, rust proofed steel with stabilizing anchor plate, six (6'-0") foot height, manufactured by Boundary Fence and Rail Systems, Richmond Hill, NY or approved equal. Color to be Black.
- C. Tie Wire: Shall be aluminum or steel ties.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The steel stakes shall be driven into the ground to a depth of two feet (2'). Fabric shall be secured to line stakes with three-sixteenth inch (3/16") aluminum or steel tie wire spaced eighteen inches (18") apart on posts. Line post spacing shall not exceed eight feet (8') on center. The Contractor shall maintain the range fence during the life of this contract and shall repair or replace all members that are disturbed, damaged, destroyed, or vandalized at no extra cost to the City.

Posts shall not extend above fabric by more than 1"

END OF SECTION

SECTION 02840 – TIMBER BARRIER RAIL

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this Section, the Contractor shall furnish and erect timber barrier railing in accordance with the plans and specifications and directions of the Commissioner. The work under these items includes necessary excavation and backfill.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
B. Section 02761 Unit Pavements
C. Section 03700 Cement and Concrete for Exterior Improvements

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-

- 3) consumer recycled content in the supplied product(s). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittal shall be as per General Conditions.
- C. Shop Drawings: The Contractor shall submit shop drawings detailing posts, rails, fasteners and all details necessary to document the work.
- D. WOOD TREATMENT AFFIDAVIT: The Contractor shall provide at his own expense a sworn affidavit as to the type, grade and quality of preservative treatment provided, and the net final retention in pounds per cubic foot of wood impregnated all conforms to the requirements of the specifications.

PART 2 PRODUCTS

2.1 TIMBER

- A. All timber posts & rail shall be similar to those manufactured by MCM Forest Products, Bayonne, NJ, or approved equal.
- B. Lumber: shall be solid sawn timbers of stress-rated Southern Pine Grade No. 1 Dense or better, surfaced S4S, to the nominal dimensions indicated. Timbers shall be graded by an ALSC Certified grading Agency.

2.2 HARDWARE

- A. Shall include bolts with necessary nuts and washers, timber connectors, nails, and other metal fastenings. Bolts and nuts shall conform to ASTM A307. Washers shall be cast iron ogee, or ASTM A36 plate washers, as indicated. Provide bolts with washers under nut and head. Nails shall be Maze Storm-guard PTL nails, Anchor Down Type, double hot dip zinc coated, as manufactured by Maze Nails, or approved equal.
- B. Supports: Steel angles for the timber construction shall be epoxy coated and shall conform to the requirements of the Structural Steel specifications. Steel pipe used as connectors to timber piles shall be un-coated, and shall conform to ASTM A53.

2.3 PRESERVATIVE TREATMENT

- A. Prior to preservative treatment, prefabricate to the extent possible. Dry the timber as required for full penetration of the preservative treatment.
- B. Decking and other timbers shall be pressure treated in strict accordance with the provisions of the AWWA standards. Wood shall be seasoned, either by air-drying or kiln drying, and the moisture content prior to treatment shall be not more than 25%. Wood shall be treated to a net retention of .40 pounds per cubic foot with ACQ (ammoniacal copper quaternary), Copper Azole preservation, or approved equal. The preservative shall penetrate 2.5 inches or 85% of the sapwood. All details of treatment methods, quality, control and product testing shall be in accordance with the appropriate AWWA standards.
- C. In accordance with New York State law, Bills A102 and S7167, CCA (chromated copper arsenate) treatment is prohibited as a wood preservative treatment material.
- D. If any other preservative treatment is proposed, the Contractor shall submit documentation that such treatment conforms to the AWWA Standards for treatment of the wood for the intended use.
- E. Lumber shall be dried at least thirty days after treatment and prior to installation. All fabrication shall be performed prior to treatment. Where field cuts have to be made, the cut ends shall have two coats of concentrated preservative brushed on.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All barrier rail shall be assembled and installed in accordance with the NYC DPR Standard Detail. Set all carpentry work accurately to required levels and lines, with all members plumb, true, and accurately cut and fitted. Securely attach carpentry work to substrates by anchoring and fastening as shown on drawings and as required by recognized standards. Do all cutting, fitting, and patching required to properly fit rough carpentry work. Make tight connections between members. Install fasteners without splitting wood. Deep tool marks in wood surfaces shall be considered evidence of poor workmanship and cause for rejection of the pieces affected.
- B. Contractor shall backfill surrounding area to provide positive drainage and in accordance with the drawings. All bolts shall be cut and peened as directed by the Commissioner.

END OF SECTION

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SECTION 02871 – BICYCLE RACK

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this Section, the Contractor shall furnish and erect a BICYCLE RACK, in accordance with the plans and specifications and directions of the Commissioner.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
B. Section 02750 Concrete Pavement
C. Section 02761 Unit Pavements

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site.

Provide this distance if less than 500 miles.

- 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. All submittal shall be as per General Conditions.
- C. Shop Drawings: The Contractor shall submit documentation of purchase from the NYC approved manufacturer(s) of the City Bicycle Rack, along with verification of proposed finish.

PART 2 PRODUCTS

2.1 BICYCLE RACK

- A. The City Bicycle Rack has been developed as a city wide standard by the New York City Department of Transportation, which has approved manufacturer(s) through a public bid process. Under this item, the contractor shall purchase City Bicycle Racks from the NYC approved manufacturer(s) and install them pursuant to the plans and specifications.
- B. Bicycle racks shall be fabricated from cast ductile iron. The tensile strength shall meet a minimum of 65,000 psi, in accordance with ASTM Specification A536-84, Grade 65-45-12. Bicycle rack shall be constructed from one continuous casting. No welding shall be permitted.
- C. Finish for Cast Ductile Iron Bicycle Racks: The Contractor shall be galvanized or painted with a zinc based paint. Color to be silver.
- D. Fasteners: Shall be countersunk stainless steel, 1/2" diameter, expansion bolt assemblies, 4 per rack, of sufficient length and gauge to secure the Bicycle Rack to the pavement.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Bicycle Rack shall be installed as indicated on the plans. Flange mount Bicycle Rack to Concrete Pavement as shown on the plans.

END OF SECTION

SECTION 02872 – PRECAST CONCRETE BENCH

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this Section, the Contractor shall furnish and install a PRECAST CONCRETE BENCH in accordance with the plans, specifications, and directions of the Commissioner.

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
B. Section 02761 Unit Pavements
C. Section 03700 Cement and Concrete for Exterior Improvements

1.4 SUBMITTALS:

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-

- consumer recycled content in the supplied product(s).
- 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittals shall be in accordance with General Conditions.
- C. Shop Drawings: The Contractor shall submit Shop Drawings when required, in accordance with the requirements of the General Conditions.
- D. Sample: The Contractor shall submit a sample of the precast material, showing color, aggregates and finish.

PART 2 PRODUCTS

- A. Bench Supports and Seat: The bench supports shall be constructed of cast stone, manufactured by an approved manufacturer such as Kenneth Lynch & Sons, Inc., Oxford, CT; Key Cast Stone Co., Long Island City, NY, or approved equal, having facilities for furnishing the quality of cast stone required. The cast stone shall be composed of Portland Cement and crushed aggregate combined to produce stone of maximum density and strength, matching the adjacent precast concrete pavers, Hanover Prest Paver, M1775, or approved equal. The Contractor shall not commence quantity production on the cast stone bench standards until a finished sample has been approved by the Commissioner.
- B. Portland Cement: The Portland Cement shall consist of equal parts of white Portland Cement and light gray Portland Cement.
- C. Aggregate: The aggregate shall match the aggregate used in the adjacent precast concrete pavers, Hanover Prest Paver, M1775, or approved equal.
- D. Mix Proportions: The combined aggregate shall be mixed with Portland Cement to match the adjacent pavers.
- E. Mixing: Cement, water, and aggregates shall be carefully weighed or measured. After mixing, they shall be kept constantly agitated by machinery until deposited into the molds. The final product shall attain a compression strength of at least 5000 psi at the end of 28 days.

- F. Reinforcement: The reinforcement shall be deformed steel bars. Bars shall be bent and fastened together to form a frame that will not be displaced during the pouring. Bars shall be not less than one inch (1") from the exterior surface of the stone.
- G. Casting: The cast stone shall be made by the wet poured process in sand molds or by the wet puddled process in a rigid mold. The use of glue molds will not be permitted. It must be the same composition throughout and not faced. The stone shall remain in the molds at least twenty-four (24) hours and shall be protected from changes in temperature for at least forty-eight (48) hours.
- H. Finish: After the forms have been removed, all exposed surfaces shall be rubbed with carborundum bricks and clear water only to a uniform color and finish satisfactory to the Commissioner. No chipped, broken, or checked stone will be accepted.
- I. Curing: After the cast stone standards have been removed from the forms, they shall be cured for a period of at least seven (7) days before being removed from the original pallet. Curing shall be done in a closed room that can be maintained at an even temperature. Cast stone shall be moistened every four (4) hours during the period of curing.
- J. Test: At the discretion of the Commissioner, all stone furnished may be subject to random tests. No stone will be accepted which does not show a compression test of at least 5,000 psi and must not show over seven percent (7%) absorption by weight after forty-eight (48) hours immersion in water. Test for absorption shall be made on a specimen after it has been boiled for five (5) hours, to assure the City that no waterproofing admixture has been added. The Commissioner shall have the privilege of taking one cast stone bench support delivered to the project, for the City to use as it may determine in its testing laboratory. Any cast stone support taken for testing purposes shall be replaced immediately by the cast stone Contractor at no expense to the City.
- K. Stainless Steel Dowels: Stainless steel dowels shall be cast in the concrete bench supports as shown on the Drawings with corresponding holes in the bench seat.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The bench supports shall be set in five inch (5") thick slabs, with supports vertical and true to line and position, as shown on the plans and details, or as directed by the Commissioner. Fill dowel holes in seat with epoxy cement. The seat shall be set on a 3/8" mortar setting bed, fitting the dowels into the epoxy filled holes.

END OF SECTION

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SECTION 02890 – TRAFFIC SIGNAGE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents and the New York City and New York State Departments of Transportation, and the Federal Highway Administration. The Contractor must accept the site as is and shall be deemed to have inspected the site and reviewed all Contract Documents prior to submitting a bid.

1.2 SECTION INCLUDES

- A. Overall work under this Contract shall include all labor, materials, equipment, supervision, coordination efforts, permitting costs, certificate costs, services, filing fees, testing costs, security, insurance and all other associated or related items specified herein that are necessary and are required to complete the Work. Work elements shall include, but not be limited to the following:
 - 1. Installing aluminum alloy traffic control signs as required by the Contract Documents.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Green Building Requirements – Division 1.
- B. Section 02300 – Earthwork
- C. Section 02370 – Erosion Controls
- D. Section 03700 – Cement and Concrete for Exterior Improvements
- E. Contract Documents

1.4 SUBMITTALS

- A. Product Certificates: Submit product certificate to the Commissioner which is signed by manufacturer and Contractor, certifying that products comply with, or exceed, the requirements herein.
- B. Submit shop drawings to include, but not be limited to, layout of sign fabrication showing sizes and shapes of members.
- C. Contractor shall submit production prototype samples of graphics. Submit all camera-ready proofs of typography, symbols and/or graphics prior to making screens or patterns for approval.
- D. Samples of all materials and products, color samples, and all finishes shall be submitted for approval prior to fabrication.
- E. Contractor shall submit a finished sample of each type of sign for approval prior to fabrication of all signs.

- F. The Contractor shall submit two (2) samples each of the stainless steel strap and the two (2) piece sign bracket.

PART 2 - PRODUCTS

2.1 SIGNS

- A. Signs shall be manufactured and available for purchase from Mineola Signs, Street Signs USA, Corcraft, or approved equal.
- B. Signs shall be weather-resistant, and following cleaning shall show no appreciable discoloration, cracking, blistering, or dimensional change, and retain not less than 80% of the specified minimum brightness values when exposed to accelerated weathering in accordance with ASTM D822-60.
- C. Signs shall be made of thermally stabilized aluminum alloy sign blank .080" thickness, powder coated white. Each sign blank shall be cut from one piece of aluminum, and shall be free from wind, buckle, dents or twist. Welded or jointed sign blanks will not be accepted.
- D. The face shall be substantially a plane surface. Surface finish shall be smooth, free of mill marks or other imperfections. All edges shall be filed or ground smooth, leaving the entire blank free from sharp edges and burrs. All corners shall be rounded with a one half (1/2") inch radius corner or as indicated on the plans.
- E. All signs shall be punched with three-eighths (3/8") inch diameter holes as necessary for proper center or flag-mounting according to the plans. Holes shall be a minimum of one (1") inch from the edges. The distances between holes must be accurately maintained to permit interchangeability of signs on existing sign brackets or posts.
- F. Accessible signs shall conform to the following requirements:
 - 1. Reserved accessible parking sign shall conform to M.U.T.C.D. Sign No. R7-8. Size of sign shall be 12" x 18", similar to model no. "usar7-8nra5" as manufactured by Street Signs USA, or approved equal.
 - 2. Van Accessible Parking: Van Accessible parking sign shall be 12" x 18", similar to model no. "usa-g-64ra5" as manufactured by Street Signs USA, or approved equal.
- G. Typography, color and size of signs shall be as required by the Contract Documents.
- H. For all types of signs used to convey "cautionary" messages, as defined by the Manual on Uniform Traffic Control Devices (MUTCD), shall be yellow/gold color with a one-half (1/2") inch white border all around. The yellow/gold color shall be 3M Scotch-Lite Reflective Sheeting #3271 or approved equal.
- I. Horizontal and vertical sign clearance, and sign face layout shall be as shown on the plans and in accordance with the following manuals:
 - 1. The AASHTO Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways, Latest edition including revisions and interpretations.

2. Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.
3. New York State Manual of Uniform Traffic Control Devices, latest edition.
4. Any and all other rules, laws or regulations regarding signage.

2.2 FASTENERS AND HARDWARE

- A. Any visible portion of mounting brackets and the heads of exposed fasteners shall match sign color specified.
- B. Fasteners shall be stainless steel or zinc coated and shall be 2 ½" x 5/16".
- C. Attachment and installation methods shall be in accordance with best practices using devices and fasteners to suit the conditions of the surface to receive the installation.
- D. All fasteners and hardware shall be vandal-proof.

2.3 STEEL DRIVERAIL

- A. Steel driverail shall be a single length of flanged channel section steel that shall weigh three (3) pounds per foot. Length shall be twelve (12) feet.
- B. The minimum dimensions of posts shall be as follows:
 1. Width of Flange: 3 3/8"
 2. Face Width of Back: 1 7/8"
 3. Depth from Face of Flange to Back: 1 3/4"
- C. Post shall be rolled and fabricated from billet steel in accordance with A.S.T.M. Specification A576- 79 or Rail Steel in accordance with A.S.T.M. Specification 499-81. Post shall have a ribbed back as per the drawings. Post shall be pre-punched with 3/8th inch holes on one (1") inch centers for its entire length.
- D. The finished post shall be machine straightened and have a smooth uniform finish free from cracks, flaws, injurious seams, laps, blisters, ragged, sharp and imperfect edges, or other defects affecting strength, durability or appearance.
- E. All posts shall be painted with a weather-resistant, rust-prohibitive, high-quality, dark green enamel, which shall produce a hard, mar-resistant coating, free from paint cracks, blisters or other defects.
- F. Before painting, all posts shall be thoroughly cleaned of all dirt, rust, loose scale, oil or grease. The quality of the paint and prior preparation shall be such that when the finished post is struck with a light blow with a sharp tool, the paint shall not crack or chip, and if scratched with a knife, shall not powder. The minimum thickness of the dry film enamel shall be one mil.

- G. The painted post shall pass a standard 100 hour salt spray test (203 solution by spray or fog at 21.11 degrees centigrade). Painting shall be the final process after fabrication and punching has been completed.

2.4 CONCRETE FOOTINGS

- A. Concrete for footings shall be Class B-32, Type IIA: Cement shall be Portland - Type II, Sand shall be Type 1A, Coarse aggregate shall be Type 1, grade B or type 2, size no. 57.
- B. Concrete shall include an approved air-entraining agent which shall be added at the time the concrete is mixed.

PART 3 - EXECUTION

3.1 SAMPLE INSTALLATIONS

- A. The Contractor shall install at least one sample of each typical sign for approval. Upon such approval, they shall form the standard for the installation of all signage included in this contract.

3.2 SIGN LOCATIONS

- A. Prior to installation, the Contractor shall stake out the location of all signs as shown on the plans. The Contractor shall verify sign locations with the Commissioner prior to installation.
- B. ADA signs shall be installed in accordance with ADA Standards for Accessible Design, 28CFR Part 36, and Section A4.6.4. Accessible parking spaces shall be designated as reserved by a sign showing the symbol of accessibility. Such signs shall be located so they cannot be obscured by a vehicle parked in the space.

3.3 INSTALLATION – CONCRETE FOOTINGS

- A. The Contractor shall cut a neat hole in the sidewalk or earth, and excavate to the required depth, then pour the concrete and install the sign post in the fresh concrete, as shown on the drawings. Minimum footing diameter shall be twelve (12) inches, and depth shall be forty-eight (48) inches.
- B. The concrete mix and placement shall meet the requirements of Section 03700.
- C. The exposed surface shall be troweled to a neat, smooth finish, sloped to provide drainage away from the post.

3.4 INSTALLATION – STEEL DRIVERAIL

- A. The Driverail shall be installed perfectly plumb and at the proper orientation for placement of signs.

3.5 INSTALLATION – SIGNS

- A. Ground mounted signs shall normally be erected so that the sign face is truly vertical and the intersection angle measured between the sign face and the centerline of the

travel lane, which the sign serves shall be 93 degrees. Where lanes divide or on curves, sign faces shall be oriented so as to be most effective both day and night, and to avoid the possibility of specular reflection.

- B. The erection of the sign shall include all work necessary to secure the signs in the prescribed positions on the supports including the installation of clamps and brackets; the attachment of signs to the supports; any work necessary to locate the signs in the prescribed locations; the supplying of bolts, nuts, clamps, brackets, strapping, and other necessary appurtenances, as indicated on the plans, Bureau of Traffic Operations Work Orders and Standard Drawings, or as directed by the Commissioner.
- C. Two machine bolts and nuts shall be used for each sign mounted on sign post of the steel rail type. The sign face shall be plumb and at a 45 degree angle with the curb facing the direction of traffic with the bottom of sign at seven (7') feet from finished grade.
- D. All bolts shall be cut and peened after installation is complete.

END OF SECTION

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SECTION 02910 - TOPSOIL

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Subsoil materials.
B. Planting Topsoil for Turf Lawns
C. Planting Topsoil for Planting
D. Planting Topsoil for Infiltration Swale

1.3 RELATED SECTIONS

- A. Division 1 Specifications for Green Building Requirements
B. Section 02316 Pneumatic Excavation
C. Section 02300 Earthwork
D. Section 02920 Lawns and Grasses
E. Section 02930 Planting

1.4 REFERENCES

- A. American Society of Agronomy: Methods of Soil Analysis.
B. University of Delaware: Bulletin #493. Soil Testing Procedures for the North East States.
C. Association of Official Agricultural Chemists.
D. American Society for Testing and Materials (ASTM)

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING

Submittals shall include the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittals shall be in accordance with General Conditions and Division 1.
- C. Product Data:
 1. Submit technical descriptive data for each manufactured or packaged product of this Section. Include manufacturer's product testing and analysis and installation instructions for manufactured or processed items and materials.
- D. Certificates:
 1. Submit certified analysis for each soil treatment, amendment, and fertilizer material specified and as used. Include guaranteed analysis and weight for packaged materials.
 2. Test Reports: Submit written reports of each sample tested. Soil tests must be unique and individual to each sample taken and are not be resubmitted or reused. Samples and analysis must be submitted within 14 calendar days of sampling. Each report shall include the following as a minimum and such other information required specific to material tested:
 - a. Date issued.
 - b. Project title and names of Contractor and material supplier.
 - c. Testing laboratory name, address and telephone number, and name(s), as applicable, of each field and laboratory inspector.

- d. Date, place, and time of sampling or test, with record of temperature and weather conditions.
 - e. Location of material source.
 - f. Type(s) of test.
 - g. Results of tests including identification of deviations from acceptable ranges. Identify any toxic substance(s) harmful to plant growth or life.
- E. Samples:
1. Leaf mold, each source, 5 lb. packaged.
 2. Soil mix type specified, 5 lb. packaged.
 3. Mulch material, 5 lb. packaged.
- F. Statement(s) of Qualifications:
1. Submit within 15 days of notice to proceed to confirm qualifications.
- G. Schedule and Protection Plan:
1. Submit a detailed plan for scheduling and sequencing of work and for protection of completed work including coordination with contractors requiring access through the site. Indicate with schedules and plans the utilization of erosion control (filter fabric) and protection against over compaction and contamination by means of (snow) fencing.
- H. Settlement methodology: Submit a plan with a schedule describing the proposed method intended for settling installed work.

1.6 QUALITY ASSURANCE

- A. Qualifications:
1. Installation and maintenance foreman on the job shall be competent experienced in landscape installation and maintenance. Perform work with personnel totally familiar with planting soil preparation and lawn and planting installations under the supervision of a foreman experienced with landscape work.
 2. Agricultural Chemist: Experienced person or persons employed by public or private soils testing laboratory, qualified and capable of performing tests, making soil recommendations, and issuing reports as specified. Testing Laboratory and Agricultural Chemist shall be as approved by the Architect.
 3. Inspections and Testing:
 - a. Soil, leaf mold, mulch and other material testing required in this Section shall be furnished and paid for by Contractor. Contractor shall provide labor to the Architect for taking of any tests unless otherwise provided.
 - b. Owner's Representative, and/or Architect reserve the right to take and analyze at any time such additional samples of materials as

deemed necessary for verification of conformance to specification requirements. Contractor shall furnish samples for this purpose upon request and shall perform testing as requested.

1.7 REGULATORY REQUIREMENTS

- A. Comply with all rules, regulations, laws and ordinances of local, state and federal authorities having jurisdiction. Provide labor, materials, equipment and services necessary to make Work comply with such requirements without additional cost to Owner.
- B. Procure and pay for permits and licenses required for work of this section.

1.8 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Perform both off-site mixing and on-site soil work only during suitable weather conditions. Do not disc, rototill, or work soil when frozen, excessively wet, or in otherwise unsatisfactory condition.
 - 2. Soil mixes shall not be handled, hauled or placed during rain or wet weather or when near or above field capacity.

1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials to the location where soils are to be mixed, in unopened bags or containers, each bearing the name, guarantee, and trademark of the producer, material composition, manufacturers' certified analysis, and the weight of the material. Retain packaging for the Owner's Representative.
- B. Soil, mulch, or amendment materials stored on-site temporarily in stockpiles prior to placement shall be protected from intrusion of contaminants and erosion. Owner's Representative shall approve all temporary storage means and methods.
- C. After mixing, soil materials shall be covered with a tarpaulin until time of actual use. Ensure proper drainage away from stockpile.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

- A. Suitable Soil: Suitable material shall consist of a material whose composition is satisfactory for use in backfill under this Contract if needed. The moisture content has no bearing upon such designation. In general, any well-draining mineral (inorganic) soil, maximum 3 inch size blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof, are considered as suitable materials. Determinations of whether a specific material is a suitable material will be made by the Owner's Representative on the above basis. This material shall be stockpiled as directed by the Owner's Representative.

- B. **Unsuitable Soil:** Unsuitable material is any material containing vegetable or organic matter such as muck, peat, organic silt, soft plastic clay, topsoil, or sod, that is not satisfactory for use in fill under subarticle 2.1-C, is designated as an unsuitable material. Certain man-made deposits of industrial waste, sludge, or landfill will also be classified as unsuitable materials.
- C. **Backfill:** Free of clay, rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter, meeting the following gradation requirements:

<u>Sieve</u>	<u>% Passing</u>
3"	100
1-1/2"	80-100
1/2"	50-95
#4	30-90
#40	10-40
#200	0-12

2.2 PLANTING SOIL MATERIALS

A. Topsoil for Turf Lawns

Topsoil shall be a sandy/ loam, friable soil that has been removed to a depth of one foot (1') or less, if subsoil is encountered. Topsoil shall be of uniform quality, free from hard clods, stiff clay, hard pan, sods, partially disintegrated stone, lime, cement, ashes, slag, concrete, tar residues, tarred paper, boards, chips, sticks, or any other undesirable material. No topsoil shall be delivered in a frozen or muddy condition.

1. **Organic Content:** Topsoil shall contain at least three percent (3%) organic matter determined by loss on ignition, of moisture-free samples dried in accordance with the current method of the Association of Official Agricultural Chemists. The organic content shall not exceed eight percent (8%).
2. The acidity range shall be pH 6.0 to pH 7.2 inclusive.
3. **Soil Textural Analysis:** Topsoil shall consist of the following percentages of sand, silt and clay. Any soil that does not meet the requirements below will be rejected and removed from the site. When directed by Landscape Construction, the Contractor may be granted permission to screen delivered topsoil in order to achieve particle size compliance. Additional testing at the Contractor's expense will be required to confirm compliance after completion of on-site screening.

Sand (0.05 to 2mm)	40% to 65%
Silt (0.002 to 0.05 mm)	25% to 65%
Clay (<0.002 mm)	20% maximum

4. **Electrical Conductivity** shall be maximum 1.50 mmhos/cm. A higher level would indicate excessive salt content and material will be rejected and removed from the site.

5. Nutrients: Topsoil test results shall show recommendations for soil additives or fertilizers to correct nutrient deficiencies as necessary. Soil additives and fertilizers shall be incorporated as necessary at the Contractor's expense. Follow the fertilizer recommendation as provided by the Rutgers Cooperative Research & Extension test results.

B. Topsoil for Planting

1. Imported borrow.
2. Friable loam.
3. Reasonably free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
4. Acidity range (pH) of 6 to 7.
5. Containing a minimum of 8 percent organic matter, consisting of well composted leaf mold.
6. Electrical conductivity shall be less than 3000 micromhos/cm.
7. The textural analysis of the soil shall be as follows:

<u>MATERIAL</u>	<u>PARTICLE SIZE</u>	<u>ACCEPTED RANGE</u>
Rocks and Stones	>6.30mm	0%
Gravel ³	6.30mm - 2.00mm	<10%
Sand ^{1,2}	2.00mm - 0.05mm	60% - 70%
Silt	0.05mm - 0.002mm	12% - 31%
Clay	<0.002mm	9% - 18%

¹At least fifty (50) percent of the sand fraction shall be medium sand or coarser (greater than or equal to 0.25 mm) according to U.S.D.A. particle size standards. No more than one (1) percent of the soil material may contain expandable clay minerals.

²Total percent sand, silt, & clay is to be determined on the material passing a #10 (2.00mm) sieve, which excludes gravel.

³Gravel is measured as a percentage of the total sample, and is that material retained on a #10 (2.00mm) sieve.

C. Topsoil for Infiltration Swale

1. Topsoil for Infiltration Swale shall have a sandy loam, loamy sand, or loam texture per USDA textural triangle. Maximum clay content is <5%; soil mixture shall be 50-60% sand; 20-30% leaf compost*; and 20-30% topsoil. The soil shall be a uniform mix, free of stones, stumps, roots, or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the infiltration planter that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations.
2. Leaf compost is essentially composed of aged leaf mulch and provides added organic matter to improve the health of the soil and ensure adequate soil structure.

3. Sand shall meet ASTM C33 Fine Aggregate.
4. Topsoil shall be composed of the following, by weight:
- | | | |
|---------------------------|----------|-------------|
| Sand (2.0 – 0.050 mm) | 50 – 85% | AASHTO T88 |
| Silt (0.050 – 0.002 mm) | 0 – 50% | AASHTO T88 |
| Clay (less than 0.002 mm) | 10 – 20% | AASHTO T88 |
| Organic Matter | 2 – 3% | AASHTO T194 |

5. Topsoil shall meet the following sieve analysis:

<u>ASTM E11 Sieve Size</u>	<u>Minimum PERCENT Passing by Weight</u>
2 in.	100
No. 4	90
No. 10	80

6. Topsoil shall meet the following criteria:

<u>Item</u>	<u>Criteria</u>	<u>Test Method</u>
<u>Corrected pH</u>	<u>5.5 – 7.5</u>	<u>ASTM D4972</u>
Magnesium	Minimum 32 ppm	*
Phosphorus (Phosphate - P2O5)	Not to exceed 69 ppm	*
Potassium (K2O)	Minimum 78 ppm	*
Soluble Salts	Not to exceed 500 ppm	*

2.3 SOURCE QUALITY CONTROL

- A. Testing and Analysis of Topsoil Material: Perform in accordance with methods from The American Society of Agronomy Procedures Manual Methods of Soil Analysis Parts 1 and 2; No. 9 in the Series Agronomy, and from the Soil Testing Procedures for the Northeast States, Bulletin # 493, Univ. of Delaware, as described for New York.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

Topsoil

02910-7

3.1 STOCKPILING

- A. Stockpile materials on site at locations approved by Commissioner.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Prevent intermixing of soil types or contamination.
- E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.2 PREPARATION OF SUBGRADE:

- A. Hollows, depressions, and gullies shall be filled with acceptable material free from stones over two inches (2") in diameter, cinders, rubbish, and other unsuitable material. All surplus material and debris shall be removed and disposed of as directed by the Commissioner. The use of road graders shall not be allowed on site to grade the subgrade nor to grade the topsoil.
- B. Loosen subsoil by scarifying, ripping or tilling using disks, harrows or other suitable equipment to a depth of (4"- 6") immediately before placing any topsoil. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.3 PLACEMENT AND SPREADING OF TOPSOIL

- A. No topsoil shall be handled when, in the opinion of the Commissioner, it is too wet. Place and spread approved topsoil in dry weather on dry unfrozen grade. Topsoil for groundcover and herbaceous plant areas shall be mixed with compost in the proportions of seven (7) cubic yards of topsoil to two (2) cubic yards of compost and spread to a compacted depth of nine (9"), or as indicated on the drawings. No deduction shall be made for the volume of compost in the measurement of topsoil quantities.
- B. Place topsoil in lifts not to exceed 12".
- C. Topsoil for lawns shall be compacted to 80% with a roller prior to sodding or seeding. Sodded areas shall be rolled after sod is placed as well. Topsoil for planting areas shall be allowed to settle naturally over several weeks prior to planting. Finish grades shall be adjusted to meet design elevations prior to planting with additional topsoil.
- D. Topsoil for vegetated swale shall be placed in horizontal layers not to exceed 12 inches for the entire area of the infiltration filtration. The soil mix shall be compacted by saturating the entire area of the infiltration planter after each lift of soil mix is placed until water flows from the underdrain. Water for saturation shall be applied by spraying or sprinkling. Saturation of each lift shall be performed in the presence of the Commissioner. An appropriate sediment control device shall be used to treat any sediment-laden water discharged from the underdrain. If the soil mix becomes contaminated during the construction of the facility, the contaminated material shall be removed and replaced with uncontaminated material at no additional cost to the Administration. Final grading of the soil for

infiltration planter shall be performed after a 24-hour settling period. Final elevations shall be within 2 inches of elevations shown on the Contract Plans.

3.4 PREPARATION OF FINAL GRADE:

- A. Thoroughly cultivate topsoil to minimum depth of (4") by rototilling or hand methods where compaction has occurred and to break up all soil lumps. Float until surface is smooth.

3.6 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.
- B. Repair in kind any damage caused by stockpiled materials or associated operations.

END OF SECTION

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SECTION 02920 – LAWNS & GRASSES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Provide all materials and equipment, and do all work required to complete the seeding and sodding including furnishing and placing topsoil, as indicated on the Drawings and as specified.
- B. Maintenance and Guarantee

1.3 RELATED WORK

- A. Division 1 Specifications for Green Building Requirements
- B. Section 02930 Planting

1.4 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. American Society for Testing and Materials (ASTM):
 - a. C136 Sieve Analysis of Fine and Coarse Aggregates
 - b. D422 Particle-Size Analysis of Soils
 - c. E11 Wire-Cloth Sieves for Testing Purposes

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following materials:

1. Aluminum sulfate
2. Fertilizer

C. Certificates: Labels from the manufacturer's container certifying that the product meets the specified requirements shall be submitted for the following materials:

1. Commercial fertilizer
2. Ground limestone
3. Seed mix for sod

1.6 INSPECTION AND TESTING

- A. Work will be subject to inspection at all times by the Commissioner. The Contractor shall engage an independent testing laboratory to analyze and test

materials used in the construction of the work. Where directed by the Commissioner the testing laboratory will make material analyses and will report to the Commissioner whether materials conform to the requirements of this specification.

1. Cost of tests and material analyses made by the testing laboratory will be borne by the Contractor.
 2. Testing equipment will be provided by and tests performed by the testing laboratory. Upon request by the Commissioner, the Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work and to repair damage caused thereby to the permanent work.
 3. Gradation of granular materials shall be determined in accordance with ASTM C 136. Sieves for determining material gradation shall be as described in ASTM E 11.
- B. Testing, analyses, and inspection required by the Contractor for his own information or guidance shall be at his own expense.
- C. The Contractor shall engage an independent testing agency to perform the following tests and analyses:
1. Material: Tests and Analysis Required
 2. Topsoil: Mechanical analysis of soil and determination of pH and organic matter content, and nutrient content. Recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring nutrient content and pH to satisfactory levels for seeding and sodding.
 3. Compost: Determination of moisture absorption capacity, organic matter content, and pH.
- D. Materials shall not be used in construction until test results have been reviewed by the Commissioner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Digging Sod:
1. Sod shall not be dug at the nursery or approved source until ready to transport sod to the site of the work or acceptable storage location.
 2. Before stripping, sod shall be mowed at a uniform height of 2 in.

3. Cut sod to specified thickness and to standard width and length desired.

B. Transportation of Sod:

1. Sod transported to the Project in open vehicles shall be covered with tarpaulins or other suitable covers securely fastened to the body of the vehicle to prevent injury. Closed vehicles shall be adequately ventilated to prevent overheating of the sod.
2. Evidence of inadequate protection following the digging, carelessness while in transit, or improper handling shall be cause for Commissioner's rejection.
3. Sod shall be kept moist, fresh, and protected at all times. Such protection shall encompass the entire period during which the sod is in transit, being handled, or are in temporary storage.
4. Upon arrival at the temporary storage location or the site of the work, sod material shall be inspected for proper shipping procedures. Should the sod be dried out, the Commissioner will reject the sod. When sod has been rejected, the Contractor shall at once remove it from the area of the work and replace it with acceptable material.
5. Unless otherwise authorized by the Commissioner, the Contractor shall notify the Commissioner at least two working days in advance of the anticipated delivery date of sod material. Certificate of Inspection when required shall accompany each shipment.

C. Handling and Storage of Sod:

1. Sod material shall be handled with extreme care to avoid breaking or tearing strips.
2. Sod shall not be stored for longer than 30 hours prior to installation. Sod shall be stored in a compact group and shall be kept moist. Sod shall be prevented from freezing.
3. Sod that has been damaged by poor handling or improper storage will be rejected by the Commissioner.

D. Deliver seed in original sealed containers, labeled with analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, location of packaging, and name of seed grower. Damaged packages will not be accepted.

E. Seed shall be stored under cool and dry conditions so that the endophytic seed in the mixture is capable of maintaining a high level of endophytes

- F. Deliver fertilizer in sealed waterproof bags, printed with manufacturer's name, weight, and guaranteed analysis.

1.8 PLANTING SEASON

- A. Planting season for sod shall be as follows:

<u>Item</u>	<u>Planting Period</u>	
	<u>Spring</u>	<u>Fall</u>
Sod	04/01 to 07/1	09/15 to 10/30

- B. Planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.
- C. Planting season may be extended with the written permission of the Commissioner.

1.9 ACCEPTANCE

- A. Acceptance:

1. The Commissioner will inspect all work for Substantial Completion upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.
2. Acceptance of material by the Commissioner will be for general conformance to specified requirements, and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents.
3. Upon completion and reinspection of all repairs or renewals necessary in the judgement of the Commissioner, the Commissioner will recommend to the Commissioner that the work of this Section be accepted.

- B. Sod and seed areas will be accepted when in compliance with all the following conditions:

1. Roots are thoroughly knit to the soil;
2. Absence of visible joints (sodded areas);
3. All areas show a uniform stand of specified grass in healthy condition;
4. At least 60 days have elapsed since the completion of work under this Section.

PART 2 PRODUCTS

2.1 SOD MAKEUP

A. Sod shall be a superior sod grown from high quality seed of known origin. Seed is to be inspected by a Certification Agency to assure satisfactory genetic identity and purity, overall high quality, and freedom from noxious weeds at time of harvest.

B. Grass Seed Blend: the blend/mix of grass in sod shall be one of those listed below and shall be harvested from one field to insure a uniform color and texture. Percentages of each grass type are to be within the given range for that type. **GRASS SEED MIXTURE**

PERCENT BY WEIGHT	GRASS SEED	PURITY	GERMINATION	MAXIMUM WEEDSEED
60%	TALL FESCUE	98%	85%	.25%

One or more of the following varieties: Apache II, Arid 3, Cochise III, Coronado Gold, Falcon IV, Justice, Jaguar III, Lancer (SH), Masterpiece, Rebel IV, Rebel Jr.(SH), Rebel Sentry, Rembrandt, Tomahawk E+, RTF or approved equal.

20%	BLUEGRASS	98%	80%	.10%
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One or more of the following varieties: Able 1 (SH), Blacksburg, Glade Moonlight, Midnight, America (SH) Brilliant, Ram (SH), Touchdown (SH) Warren's A-34 (SH), Bristol (SH), Lofts 1757 (SH), or approved equal.

20%	PERENNIAL RYEGRASS	98%	85%	.25%
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One or more of the following varieties: Brightstar II, Manhattan 4, Citation Fore, Elfkin or approved equal

1. NOTE: The cultivars followed by "(SH)" exhibit better shade tolerance than other varieties, under moderate shade.
2. All seed shall be interagency certified under the auspices of a State Seed Improvement Cooperative and must bear their seals of certification on each fifty pound (50 lb.) bag. All Grass Seed shall be delivered in sealed standard size bags of the vendor, showing weight, analysis, and name of vendor. It shall be stored as directed by the Commissioner, in such a manner than its' effectiveness will not be impaired.
3. Sod shall be machine cut to uniform soil thickness of five-eighths inch (5/8"), plus or minus one- quarter inch (1/4") at the time of cutting. Measurement for thickness shall exclude top growth and thatch. Individual pieces of sod shall be cut eighteen inches (18") wide by sixty inches (60") long (7-1/2 sq. ft.) or rolls four feet (4') wide by fifty feet (50') long (200 sq.

ft.). Standard sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically. Sod shall not be harvested or transplanted when the moisture content may adversely affect its survival.

4. Sod shall be harvested, delivered, and transplanted within a period of thirty six (36) hours. Before cutting, sod shall be mowed uniformly at a height of one and one-half inches (1 1/2"). The Engineer may inspect the sod before it is harvested but reserves the right to reject, on or after delivery, any sod which, in their opinion, does not meet with the specifications.
5. When sod is delivered with monofilament (plastic or similar) backing, the backing shall be removed after rolling out the sod and discarded in an approved manner.

2.2 SOD REQUIREMENTS

- A. Time Limitations: Sod shall be harvested, delivered, and transplanted within a 36 hour period unless a suitable preservation method is approved prior to delivery. Sod not transplanted within this period shall be inspected and approved by the Commissioner prior to its installation.
- B. Thatch: Sod shall be relatively free of thatch. A maximum of 1/2 in. (uncompressed) thatch will be permitted.
- C. Diseases, Nematodes, and Insects: Sod shall be free of diseases, nematodes, and soil-borne insects. State Nursery and Plant Materials Laws require that all sod be inspected and approved for sale. The inspection and approval must be made by the State Agricultural Department, Office of the State Entomologist.
- D. Weeds: Sod shall be free of objectionable grassy and broad leaf weeds. Turfgrass sod shall be considered free of such weeds if less than five such plants are found per 100 sq. ft. of area.
 1. Turfgrass sod shall not be acceptable if it contains any of the following weeds: common bermudagrass (wiregrass), quackgrass, johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel and brome grass.
- E. The Commissioner reserves the right to reject, on or after delivery, all material which does not, in their opinion, meet these specifications. The rate of seeding shall be ten pounds (10 lbs.) per one thousand (1,000) square feet.

2.3 SEEDING

- A. Topseeding with a seed mix matching the procured sod.

2.4 TOPSOIL

- A. Stockpiled topsoil shall be treated with weed killer in accordance with manufacture's printed instructions prior to mixing and spreading operations
- B. Topsoil shall conform to Section 02910 Topsoil

- C. Topsoil shall have a pH value range of 6.0 to 6.5.
 - 1. If planting soil mixture does not fall within the required pH range, limestone or aluminum sulfate shall be added to bring the pH within the specified limit.

2.4 COMPOST

- A. Compost shall be organic "AllGro" compost manufactured by AllGro, The Compost Company, Hampton, NH, or approved equal.
 - 1. Compost shall contain 3 - 6% organic matter and diverse beneficial microbial populations that can be readily incorporated with the topsoil.

2.5 LIMESTONE

- A. Lime shall be an approved agricultural limestone containing no less than 50% of total carbonates, and 25% total magnesium with a neutralizing value of at least 100%. The material shall be ground to such a fineness that 40% will pass through a No. 100 U.S. Standard Sieve, and 98% will pass through a No. 20 U.S. Standard Sieve. The lime shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any lime which becomes caked or otherwise damaged making it unsuitable for use, will be rejected.

2.6 WATER

- A. Water shall be suitable for irrigation and free from ingredients harmful to seeded or sodded areas.

2.7 ALUMINUM SULFATE

- A. Aluminum sulfate shall be unadulterated and shall be delivered in containers with the name of the material and manufacturer, and net weight of contents.

2.8 COMMERCIAL FERTILIZER

- A. Starter fertilizer shall be HD Scotts Starter Fertilizer or approved equal.
- B. Fertilizer shall conform to the following:
 - 1. When applied as a topsoil amendment, fertilizer shall have an analysis that will deliver appropriate amounts of nitrogen, phosphorus, and potassium as required to remedy deficiencies revealed by testing the topsoil.
 - 2. When used as a top dressing for the maintenance of sod, fertilizer shall conform to the following:

<u>Constituent</u>	<u>% Present by Weight</u>
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Nitrogen (N)	10
Phosphorous (P)	8
Potassium (K)	4

- a. 50% of nitrogen shall be derived from natural organic source of ureaform.
 - b. Available phosphorus shall be derived from superphosphate, bone meal, or tankage.
 - c. Potassium shall be derived from muriate of potash containing 60% potash.
- C. Fertilizer shall be delivered in manufacturer's standard container printed with manufacturer's name, material weight, and guaranteed analysis.
- D. Fertilizers with N-P-K analysis other than that stated above may be used provided that the application rate per square foot of nitrogen, phosphorus, and potassium is equal to that specified.

2.9 SUPERPHOSPHATE

- A. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes, and containing not less than 20% available phosphoric acid. The superphosphate shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any superphosphate which becomes caked or otherwise damaged making it unsuitable for use, will be rejected.

2.10 CELLULOSE FIBER MULCH

- A. Cellulose fiber mulch shall be composed of virgin wood, contain a green color additive, be weed free, and non-polluting, containing no germination or growth - inhibiting factors, similar to Hydro Mulch, manufactured by Conwed Corporation, St. Paul, Minnesota 55113.

2.13 WEED CONTROL

- A. Weed control for stockpiled topsoil shall be a non-selective weed killer for control of grassy and broadleaf weeds; weed control shall have short residual, allowing seeding or sodding operations to occur within 7 days of application.

PART 3 EXECUTION

3.1 PREPARATION OF SUBGRADE

- A. Subgrade shall be examined to ensure that rough grading and all other subsurface work in lawn areas and other areas to be seeded is done prior to start of seeding and sodding.

- B. Existing subgrade shall be loosened or scarified to a minimum depth of 3 in. prior to spreading topsoil. Subgrade shall be brought to true and uniform grade, and shall be cleared of stones greater than 3 in., sticks, and other extraneous material.

3.2 SPREADING OF TOPSOIL

- A. Topsoil shall not be spread until it is possible to follow immediately or within 24 hours with seeding or sodding operations. If topsoil is spread prior to this time it shall be cultivated to loosen soil prior to seeding or sodding.
- B. Topsoil shall not be placed when subgrade or topsoil material are frozen, excessively wet, or excessively dry.
- C. Topsoil shall be spread in a uniform layer, to a thickness which will compact to the depth required to bring final lawn and grass surfaces to required elevation. Unless otherwise indicated minimum depth of topsoil shall be 6 in.
- D. Surfaces shall be graded and smoothed, eliminating all sharp breaks by rounding, scraping off bumps and ridges, and filling in holes and cuts.

3.3 APPLICATION OF FERTILIZER AND CONDITIONERS

- A. Fertilizer and conditioners shall be applied at the following rates:
 - 1. Compost - as required by test results of topsoil.
 - 2. Limestone - as required by test results of topsoil.
 - 3. Fertilizer - as required by test results of topsoil.
- B. Mixing with topsoil:
 - 1. Fertilizer and conditioners shall be spread over the entire lawn areas at the application rates indicated above.
 - 2. Materials shall be uniformly and thoroughly mixed into the top 4 in. of topsoil by discing, rototilling, or other approved method.

3.4 FINISH GRADING

- A. Final surface of topsoil immediately before seeding shall be within $\pm 1/2$ in. of required elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Stones, roots, and other debris greater than 1 in. in any dimension, which are visible at the surface, shall be removed and the resulting holes filled with topsoil, leaving a uniform planar surface.
- B. Finish grade surface with a drag or rake. Round out all breaks in grade, smooth down all lumps and ridges, fill in all holes and crevices. Rolling with a light roller is acceptable, if the surface is scarified afterward.
- C. In the event of settlement, the Contractor shall readjust the work to required finished grade.

3.5 SOIL STABILIZATION FABRIC

- A. Place soil stabilization fabric in all slopes of 3:1 or steeper grade.
- B. Pin in place in accordance with the manufacturer's directions.

3.7 SODDING

- A. Edges of the sodded areas shall be smooth, and all sodded areas shall conform to the design cross sections and grade. At edges adjacent to curbs, paved areas, etc., top surface of earth in sod shall be 1/2 in. below adjacent hard surface.
- B. Sod shall be placed and all sodding operations completed within 72 hours following stripping from sod source bed.
- C. On slopes steeper than 3 to 1, sod shall be fastened in place with suitable wood pins or other approved methods, spaced at not less than 1 pin per square foot.
- D. Surface of completed sodded area shall be smooth. Sod shall be laid edge-to-edge, with tight-butted, staggered joints. Sod shall be carefully placed to insure that it is neither stretched or overlapped. Immediately after laying sod shall be pressed firmly into contact with sod bed by tamping or rolling, to eliminate air pockets. Following compaction, topsoil shall be used to fill all cracks, and excess soil shall be worked into grass with rakes or other suitable equipment. Sod shall not be smothered with excess fill soil.
- E. Immediately after sodding operations have been completed, entire surface shall be compacted with a cultipacker roller or other approved equipment weighing 100 to 160 lb./ft. of roller.
- F. Completed sod shall immediately be watered sufficiently to uniformly wet the soil to at least 1 in. below the bottom of sod bed.

3.8 MAINTENANCE

- A. Except as otherwise specified below, maintenance shall include all operations required to produce an established lawn, including but not limited to:
 - 1. Fertilizing
 - 2. Mowing
 - 3. Replanting
 - 4. Resodding
 - 5. Watering
 - 6. Weeding

- B. Provide & maintain plastic fencing and/or rope barricades at perimeters of seeded areas immediately after seeding of lawns.
- C. Maintenance of sodded areas shall begin upon completion of sodding and shall continue for 45 days thereafter, unless sodding is not completed until after September 15, in which case maintenance shall continue until the June 15 following.
 - 1. Watering
 - a. Week No. 1: Provide all watering necessary for rooting of sod. Soil on sod pads shall be kept moist at all times. Perform watering daily or as necessary to maintain moist soil to a depth of 4 in. Watering shall be done during the heat of the day to prevent wilting.
 - b. Week No. 2 and Subsequent Weeks: Water as necessary to maintain adequate moisture in the upper 4 in. of soil to promote deep root growth.
 - 2. Mowing
 - a. Mowing shall not be attempted until the sod is firmly rooted and securely in place. Not more than 40% of the grass leaf shall be removed during the first or subsequent mowings.
 - b. Bluegrass and other cool season grasses shall be maintained between 1-1/2 in. and 2-1/2 in.
 - c. All clippings shall be removed.
 - d. After 2 mowings, the Contractor shall top dress the sod with an application of fertilizer at the rate of 1 pound of actual nitrogen per 1000 square feet.
 - 3. Scattered bare spots, shall not exceed 15 sq. in. each.
- D. First mowing shall be done when average height of grass is 2-1/2 in., with mower set to cut at a height of 1-1/2 in. Subsequent mowings shall be made at not over two week intervals, with the height of cut set at 1-1/2 in. With prior permission of the Commissioner, mowings during periods of slow growth or dormancy may be spaced at greater intervals.
- E. Weeds and growth other than varieties of grass named in grass seed formula shall be removed. Removal may be accomplished by use of suitable herbicides or by physical removal, in which case top growth and roots shall both be removed, and bare spots exceeding specified limits shall be reseeded.
- F. Topseed bare patches per direction of Commissioner.

- G. If lawn or grass is established in the fall and maintenance is required to continue into spring months, lawn and grass shall receive an application of lime and fertilizer in the spring. Lime and fertilizer shall be spread in a uniform layer over the entire lawn surface, at the following rates.

<u>Material</u>	<u>Application Rate</u>
Lime	100 lb./1000 sq. ft.
Fertilizer	20 lb./1000 sq. ft.

- H. Remove any fencing and rope barricades only after second cutting of lawns.

3.9 GUARANTEE

- A. The Contractor hereby guarantees that all work specified in this Section will be free from defects of materials and workmanship for a period of:

1. LAWN: two (2) years beginning at the date of acceptance of substantial completion, per Addenda to General Conditions

- B. The following types of failure will be adjudged as defective work:

1. LAWN
 - a. Failure in planting.
 - b. No bare spots larger than 3 square feet.
 - c. Not more than 10% of total area with bare spots larger than one square foot.
 - d. Not more than 15% of total area with bare spots larger than 6 inches square.

- C. Operations: The Contractor shall, during the entire guarantee period, cultivate, weed, and, if necessary, water all lawn and meadow grass areas under this contract to the satisfaction of the Commissioner. The Contractor shall replace, according to the original specifications, any lawn areas adjudged to be dead or in a dying condition at the request of the Commissioner. The Commissioner shall be the sole judge as to the condition of the lawn. The guarantee and maintenance applies to all lawn and meadow grass areas.

END OF SECTION

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SECTION 02930 – PLANTING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SUMMARY

- A. Under this Section, the Contractor shall excavate all plant pits and furnish, plant, maintain, and replace all PLANT MATERIAL specified in the following plant schedule, in accordance with the plans and specifications, or as directed by the Commissioner.
- B. The Contractor shall coordinate plant tagging of all plant material by the Commissioner or his designated representative.
- C. The Contractor shall be liable for any damages to property caused by planting operations, and all areas and construction disturbed shall be restored to their original conditions, to the satisfaction of the Commissioner.

1.3 RELATED SECTIONS

- A. Division 1 General Requirements
- B. Section 02375 Boulders
- C. Section 02910 Topsoil
- D. Section 02931 Vertical Wall Planter Panels

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
- a. For all installed products and materials of this Section, complete the

ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the product site. Provide the distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. All submittals shall be as per General Conditions.
- C. State Certification (in quarantine zone only): The Sub/Contractor shall submit a copy of a valid Compliance Agreement issued by the State of New York Department of Agriculture and Markets, Division of Plant Industry for review and approval prior to performing work.
- D. Invoice: The Sub/Contractor shall submit an original invoice for all plant material delivered to the site. The invoice(s) must be on the Nursery letterhead and must indicate genus and species along with the quantity and size for each individual plant material delivered to the site.

PART 2 PRODUCTS

2.1 NAMES:

- A. Plant names, size, and grading standards shall conform to those prepared by the American Association of Nurserymen Horticultural Standards, 1996 Edition, unless otherwise specified. No substitution shall be permitted, except with the written permission of the Commissioner and the approval of the Design Division.

2.2 ASIAN LONGHORNED BEETLE QUARANTINE ZONE REGULATIONS:

- A. Due to current Federal, State and NYC DPR policy, the following host species may not be planted in the quarantine zone. Host species are as follows: Acer-

Maple, Aesculus-Horsechestnut/Buckeye, Salix-Willow, Betula-Birch, Populus-Poplar, Ulmus-Elm, Albiza-Mimosa/Silk Tree, Celtis-Hackberry, Fraxinus-Ash, Platanus-London Planetree, Sycamore, Sorbus-Mountain Ash.

- B. In addition, Nurseries located within the quarantine zone shall comply with State and Federal Law and all Contractors and/or Subcontractors shall be Certified by the New York State Department of Agriculture and Markets to perform work within the Quarantine Zone (see Submittals section below). For additional information, including the extent of the quarantine zone.

2.3 QUALITY:

- A. All plants shall be typical of their species or variety. They shall have normal, well-developed branches and vigorous fibrous root systems. They shall be sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, dead or broken branches, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plant material shall be tagged by the Director of Landscape Construction, who shall reject all plant materials not meeting the above specifications, and trees having damaged or missing leaders, multiple leaders, Y-crotches, or indications of topping or heading back.
- B. All plants shall be nursery-grown, unless otherwise stated. All trees and shrubs shall have been growing under similar climatic conditions as the project site two (2) years prior to the date of the contract. Plants held in storage will be rejected if they show signs of growth during storage. Collected plants shall be taken from a soil favorable to good root development. All collected material shall be clean sound stock, free from decaying stumps.
- C. Herbaceous plants, vines, and groundcover shall be vigorous healthy plants, a minimum two (2) years old, from cuttings, seed, or division, with well-developed root systems and crowns, as specified in the Plant Schedule. Bulbs, corms, tubers and rhizomes shall be firm, non-desiccated, and certified free of disease and viral infection, of the sizes, grades, and varieties indicated in the Plant Schedule.

2.4 PLANT SOURCES FOR NATIVE PLANTS ONLY, WHERE APPLICABLE:

- A. Native plant material must be derived from the local genotypes of the native Plants specified. For purposes of this native plant material paragraph, "local" shall mean within 150 miles from the planting site. However, a reasonable effort shall be made to obtain sources of plant material as close to the planting site as possible. All plants must have been grown in a hardiness zone no warmer than Zone 7 or colder than Zone 6 as determined by the USDA Agricultural Research Service, Plant Hardiness Zone Map. Plant quality shall be typical of their species. Plant material should exhibit the range of variation typical of local genotypes of the species as determined by the Commissioner. They shall have normal branching and vigorous fibrous root systems. They shall be sound, healthy plants, free from sunscald injuries, or other mechanical injury, plant diseases, insect eggs, borers and all forms of infestations. All plants shall be nursery grown unless otherwise stated. Collected material will not be accepted. Except as may otherwise be specified in this native plant material paragraph, all

other sections of this Plant Material specification shall also apply to the Native Plants. The native plant material, subject to availability and adherence to the requirements of this paragraph, may be purchased from the following nurseries or approved equal nurseries as determined by the Commissioner:

1. Greenbelt Native Plant Center, Staten Island, NY
2. Pineland's Nursery, Columbus, NJ
3. Wild Earth, Freehold, NJ
4. Sylva Native, New Freedom, PA

B. Plant Sources For Moss:

1. Moss Acres, Honesdale, PA.

2.5 ORDERING PLANT MATERIALS:

- A. The Contractor shall notify the Commissioner of the unavailability of any tree, shrub, herbaceous plant, or bulb species designated in the contract, as well as provide confirmation to the Commissioner of all orders from all sources of supply. Any request for species substitution due to unavailability must be submitted in writing to the Commissioner, within fifteen (15) days of the award of contract. The Contractor must include the names and addresses of at least ten (10) nurseries they have contacted in an effort to locate these species, and the list shall be submitted to the Commissioner. All nurseries supplying material shall be required to have a registration certificate from the Department of Agriculture and Markets, Division of Plant Industry, New York, or any other state where plant material is obtained, certifying that plant material is apparently free of injurious insects and diseases.

2.6 DIMENSIONS:

- A. A plant shall be dimensioned as it stands in its natural position. Trees up to and including four-inch (4") caliper size shall be measured six inches (6") above ground level. Trees over four inches (4") in caliper size shall be measured twelve inches (12") above ground level. Stock furnished shall be a fair average of the minimum and maximum sizes specified. Larger plants cut back to sizes specified will not be accepted.
- B. Container grown herbaceous plants, groundcover, and vines shall be well rooted in the container size indicated on the Plant Schedule, grown in the container at least one year prior to planting. Bulbs, corms, tubers and rhizomes shall be Top Size, or as indicated on the Plant Schedule. Annual flowering plants shall be vigorous, well rooted, with no indications of disease or stress.

2.7 PREPARATION OF PLANTS:

- A. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. All plants shall be dug immediately before moving unless otherwise specified. All plants shall be dug to retain as many fibrous roots as possible. Balled and burlapped and balled and platformed plants shall have a solid ball of

earth of minimum specified size, securely held in place by burlap and stout rope or twine. Oversized or exceptionally heavy plants are acceptable if the size of the ball or spread of roots is proportionately increased, to the satisfaction of the Commissioner. Loose, broken, or manufactured balls will be rejected. Bare root plants shall be puddled immediately after digging by immersing the roots in a hydrogel slurry, so as to completely coat the roots.

2.8 DELIVERY:

- A. Plants shall be packed, transported, and handled with utmost care to insure adequate protection against injury. When transported in closed vehicles, plants shall receive adequate ventilation to prevent sweating. When transported in open vehicles, plants shall be protected by tarpaulins or other suitable cover material. All bare root plants shall be adequately protected from drying out by covering the roots with a plastic bag and planting within 2 weeks of being dug. Balled and burlapped plants shall be set on the ground and the ball covered with soil. Until planted, all material shall be properly maintained and kept adequately moist, to the satisfaction of the Commissioner.

2.9 INSPECTION:

- A. Inspection may be made before digging if the Commissioner directs, but no plant material shall be planted by the Contractor until inspected by the Commissioner at the site of the work. Plant material will be rejected if delivered with broken or damaged root balls, or if damaged on site by rough handling. All rejected material shall be immediately removed from the site and replaced with acceptable material at no additional cost. Final inspection shall be made upon completion of the contract.

2.10 PLANT SCHEDULE

- A. Plant Schedule shall include Key, Common Name, Latin Name, Size and/or Caliper, Rootball, and Specific Characteristics. The Plant Schedule is included in the drawings.
- B. ABBREVIATIONS
 1. Cal. Indicates the caliper of the trunk of the tree.
 2. B & B Indicates tree or shrub to be balled and burlapped.
 3. B.R. Indicates a tree or shrub to be delivered "bare root".
 4. O.C. Indicates "on center" or spacing between plants in all directions.
 5. Ht. Indicates overall height of tree.
 6. CA Indicates key for specific species of plant material.

Each Plant Species shall be considered an Item.

2.11 TREES:

- A. All trees shall be B&B, major trees branched 6-7' from the ground, minor trees as

specified. Sizes shall be as indicated. Rootball size shall correspond to American Association of Nurserymen Standards for the corresponding caliper size. Well-branched top and fibrous root system essential.

2.12 SHRUBS:

- A. Sizes shall be as indicated. Rootball or container sizes shall correspond to A.A.N. Standards for the corresponding shrub height. Heavy root system, all shrubs shall be well branched to the ground. Sizes shall be as indicated.

2.13 VINES, GROUNDCOVER, AND HERBACEOUS PLANTS:

- A. Container size shall be as indicated on the plans. All plants shall have vigorous root systems and have grown in the container for at least one year prior to planting.

2.14 PLUGS:

- A. Plugs shall have vigorous root systems.

2.15 MOSS

- A. Moss shall be supplied in sheets and clumps depending on the specified species.

2.16 ANNUALS:

- A. Annual flowering plants shall be vigorous, well rooted, with no indications of disease or stress.

2.17 BULBS, CORMS, TUBERS AND RHIZOMES:

- A. All bulbs, corms, tubers and rhizomes shall be top size, firm, and non-desiccated.

PART 3 EXECUTION

3.1 PLANTING OPERATIONS:

A. TIME OF PLANTING:

1. Unless otherwise directed by the Commissioner, deciduous material shall be planted from March 1st to May 1st and from October 15th to December 15th. Evergreen material shall be planted from April 1st to May 15th and from September 1st to October 15th, or as approved by the Commissioner.
2. Planting shall not take place until substantial completion of pavements adjacent to or surrounding plant materials.

B. LOCATION:

1. Site characteristics, such as overhead power lines, existing vegetation, and infrastructure items, such as curbs and sidewalks, shall be considered. Trees that grow taller than thirty feet (30') should not be planted directly under power lines. When the design allows, the tree leader shall be offset from

power lines.

C. EXCAVATION OF PLANT PITS:

1. Sizes of plant pits shall be as shown on the planting plan. Planting soil shall be unamended existing soil excavated from the planting pit, unless amendments or topsoil are specified elsewhere in the contract. When subsurface obstructions are encountered during excavation, the Contractor shall restore the disturbed area to its original condition.
 - a. When planting in Structural Soil and the depth of the rootball exceeds the depth to the filter fabric underlying the Structural Soil installation, the Contractor shall score the filter fabric in an 'X' and excavate sufficiently to permit the top of the ball to rest at finished grade. All plant material in all planting applications should be checked to ensure the crown hasn't been buried during containerization or balling and burlapping. If so, the additional soil should be removed and the plant set at the correct finished grade.
 - b. Each tree shall be planted in an individual pit as specified. Pits for balled and burlapped material shall be dug three (3) times the size of the root ball in diameter and only deep enough so that the root ball sits on undisturbed subgrade, except in situations where curbs and/or adjacent pavements prevent achievement of planting pit dimensions. Sizes of restricted planting pits (i.e. street trees) shall be at the maximum width allowed, and the same depth as the root ball being planted. Any changes in the planting pit sizes shall be broad enough to accommodate the roots fully extended and only deep enough so that the uppermost roots will be just below the original grade.
 - c. No plant pits shall be dug until the proposed locations have been staked on the ground by the Contractor and approved by the Commissioner. No plant pits shall be backfilled until planting is approved by the Commissioner. All pits shall have sloped sides unless otherwise directed. Excavated material, when found to be unsuitable, shall be removed from the site and replaced with topsoil, as directed by the Commissioner. Any amendment will be as directed and determined by the Commissioner.
 - d. Extreme care shall be taken not to excavate to a depth greater than required. The subgrade below the root ball shall be tamped slightly to prevent settlement. Where, in the opinion of the Commissioner, the subgrade material is unsuitable, the size of the plant pits shall be dug one-half (1/2) wider than normally required. The bottom and sides of the pit shall be backfilled with the existing soil, without amendments, and thoroughly worked into place to remove air pockets and voids.
 - e. Planting beds for Shrubs, Vines, Herbaceous, and Groundcover plants shall be excavated to the dimensions and depths indicated on the plans and backfilled with approved topsoil. Bulbs, Corms, Tubers, Rhizomes and Annuals shall be planted in the existing unamended soil or prepared planting beds with improved soil

and/or a water absorbent medium, as designated on the drawings.

- f. Planting beds that are installed within tree protection zones, as shown on the drawings, can only be done in the presence of the Commissioner or his designated representative. All excavation and plant installation is to be done by hand, with minimal soil disturbance. No roots over 1" in diameter shall be cut. Plants shall not be placed within (three) 3 feet of the tree trunk.
- g. Mycorrhizal Fungi Inoculant: Shall be applied by means of a three ounce (3 oz.) premeasured dry formulation packet, such as Mycor Tree Saver Transplant, as manufactured by Plant Health Care, Inc., Pittsburgh, PA. Rhizanova Tree Transplant, as manufactured by Becker Underwood, Inc., Ames, IA, or approved equal. Packets shall contain, as a minimum: one thousand (1000) live spores of Vesicular-Arbuscular fungi, including: *Entrophosphora columbiana*, *Glomus clarum*, *Glomus etunicatum*, and *Glomus sp.*; seventeen million five hundred thousand (17,500,000) live spores of Ectomycorrhizal fungi (*Pisolithus tinctorius*); Biostimulant ingrediants including *Yucca schidigera* extract; soluble sea kelp extract derived from *Ascophylum nodosum*; humic acids; and acrylamide copolymer gel as a water absorbent medium. Mycorrhizal fungi inoculant shall be added to the top six to eight inches (6-8") of backfill soil in each planting pit and thoroughly mixed to distribute the inoculant. The material shall be applied according to the following chart:

Size of rootball or container	Ounces per plant
1 gallon	1
2 gal.	2
3 gal.	3
5 gal.	3
7 gal.	3
10 gal.	3
15 gal.	3
20" B&B	6
24" B&B	9
30" B&B	9
36" B&B	12
12" B&B	12

- h. Water Retention Additive: Water Retention Additives shall be a granular polyacrylamide polymer of a potassium base and not a sodium base that slowly releases moisture into the root zone such as Terra Sorb, as manufactured by Plant Health Care, Inc., Pittsburgh, Pa., or approved equal. It shall be applied at the time of planting during a dry planting as defined by NYC Parks and Recreation. When planting trees, each tree shall receive three (3) ounces or amount specified by product instructions. Half should be added at a depth of 8-10 inches and the other half just below the finished surface. When planting shrubs, perennials or annuals,

the product should be applied as per product instructions.

- i. **Tree Irrigation Bags:** When planting trees, the Contractor shall provide irrigation bags and fill them so as to provide a minimum one inch (1") rainfall equivalent per week after the initial planting saturation. The irrigation bags shall be one hundred percent (100%) reinforced UV stable polyethylene, at least ten (10) mils. thick with a polyester scrim lining, such as TreeGator, as manufactured by Spectrum Products, Raleigh, NC, or approved equal. The irrigation bags shall have a minimum twenty-gallon (20 gal.) capacity, and the Contractor shall fill the bags to capacity at least once per week during the contract period. The bags shall be installed with two (2) holes open to provide a drip time of six to ten hours (6-10 hrs.). Damaged Tree Irrigation Bags shall be replaced at no cost to the City, during the contract period and guarantee period. Bags shall be removed in winter and replaced in spring, or as directed by the Director of Landscape Construction. Bags in functional condition shall be turned over to the City of New York at the conclusion of the guarantee period. All other bags shall become the property of the Contractor.
- j. **Shrub Irrigation Bags:** When planting specimen shrubs, where directed by the City of New York, the Contractor shall provide irrigation bags with a maximum fourteen-gallon (14gal.) capacity. All provisions listed above under Tree Irrigation Bags are applicable.
- k. **Range Fence:** When planting trees in lawn areas, the Contractor shall provide range fencing, in an area approximately five feet (5') square, in order to protect the trees from lawn mowers and trimmers. Fence shall be installed according to the method outlined in the Section 02825 Range Fence.
- l. **Planting:** Shall be performed by an approved Sub/Contractor. No planting shall be done except in the presence of the Commissioner. All material shall be inspected by the Commissioner as it is removed from the truck, prior to placing in an approved storage area or the designated planting site. All rejected material shall be removed from the site and replaced with acceptable material at no additional cost to the City.
 - 1) Bare root material shall be adequately protected from drying out. It shall be removed from its plastic bag and planted immediately after inspection. The bundles of heeled-in plants shall be set upright on the ground, covered with mulch, and kept adequately moist until the time of installation. Until the time of planting, all plant material shall be stored in an approved location, securely fenced and maintained, to the satisfaction of the Commissioner, at no additional cost to the City. All plants not planted immediately shall be watered as necessary to maintain optimal health until planting.
 - 2) Place balled and burlapped material in the prepared

planting pit by lifting, and carry it by the rootball. Set the tree or shrub straight and in the center of the pit, with the most desirable side facing toward the predominant view. All material shall set, after settlement, at the same level at which they have grown in the nursery. Care shall be exercised in setting the plants plumb. All ropes, stones, etc. shall be removed from the pit before backfilling. Soil for backfill shall be loose and friable and not frozen or compacted.

- 3) Cut and remove rope or wire from the top fifty percent (50%) of the rootball and cut off the burlap back to the edge of the ball. Remove as much woven product and twine as possible. All plastic or synthetic fabric must be removed from the ball at the time of planting. Any wire basket enclosed root ball will need to have at least two-thirds (2/3) of the wire basket cut away from the sides and top of the ball and removed. Remaining lateral wires must be cut to prevent future root interference. Wire must not be galvanized or aluminum wire.
- 4) Balled and burlapped plants shall be handled so that the ball will not be loosened. After the soil has been thoroughly firmed under and around the ball, the burlap shall be cut away from the upper half of the ball, and the remaining burlap adjusted to prevent the formation of air pockets. Where directed by the Commissioner, the burlap shall be entirely removed. Soil shall be firmed at six to eight inch (6-8") intervals and thoroughly settled with water. Plants with exposed roots shall be placed in the proper position in the center of the pit after the soil in the bottom of the pit has been firmed. Roots shall be arranged in their natural position and existing soil worked in among them, firmed at intervals, and mycorrhizal inoculant and water retention additive worked into the top eight inches (8") of backfill soil in the correct proportions. The plants shall then be thoroughly settled in with water. Care shall be taken to avoid bruising or breaking the roots when tamping the soil. All large and fleshy roots that are bruised or broken shall be pruned, making a clean cut before planting.
- 5) Vines, Herbaceous, and Groundcover plants shall be carefully removed from containers or flats immediately prior to planting and set to the same depths as they were grown in the nursery bed or container, to the correct spacing indicated on the plans. Roots shall be arranged in their natural position and topsoil worked in among them, taking care to avoid bruising or damaging the roots, and fertilizer tablets added to the top four inches (4") of backfill soil in the correct proportion for the respective pot size. No later than one hour after planting, all plants shall be thoroughly settled in with water.

- 6) Moss sheets clumps shall be delivered to the site and immediately planted. Prior to planting mineral soil shall be mixed with Water Retention per paragraph 3.1, C-1 h. Moss sheets and clumps shall be shaped to mineral soil areas between stones firmly pressed to the ground. Water well to ensure maximum contact with soil profile. Moss plantings shall be misted regularly per suppliers recommendations.
- 7) Annual flowering plants shall be carefully removed from the flats or cell-packs to avoid damaging roots or stems and planted in prepared planting beds at the same depth they were growing in the containers. Soil shall be thoroughly firmed around each crown, and plants thoroughly watered in no longer than one hour after planting.
- 8) Bulbs shall be planted in the locations indicated on the plans and to the depths and spacing indicated on the Plant Schedule. Spring Flowering Bulbs, Corms, Tubers, and Rhizomes shall be planted in late September or October, no more than six (6) weeks before frost. Summer and Fall Flowering Bulbs, Corms, Tubers, Rhizomes and Plugs shall be planted in spring, after the last killing frost, or as directed by the Commissioner. All of the above shall be planted according to best horticultural practice. Prior to planting, bulbs shall be stored in a cool, dry, well-ventilated location for no longer than two (2) weeks before planting.

2. FINISHING SURFACE AFTER BACKFILLING:

- a. The Contractor shall cultivate and rake over finished planting areas and shall leave the site in an orderly condition. On level ground or slight slopes, a shallow basin a little larger than the diameter of the plant pit shall be left around each plant, as shown on the plans, or as directed by the Commissioner. On steep slopes, the soil on the lower side of the plant shall be graded in such a manner that it will catch and hold water, as shown on the plans, or as directed by the Commissioner. Upon completion of planting, all debris and waste material resulting from the planting operation shall be removed from the project area, and the affected area raked and cleaned as necessary.
 - 1) All work done in preparing shallow basins or grading of plant pits on steep slopes and regrading and reseeded of plant saucers shall be deemed included in the unit price per plant. All berms raised for shallow basins in level or gently sloping grass areas shall be removed at the end of the guarantee period, as well as tree stakes and irrigation bags, if present. This topsoil shall be cast evenly over the surrounding grass areas and grass seed sown over the removed berms.
 - 2) After the shallow tree basins and plant saucers and shrub

beds have been prepared, they shall be mulched, three to four inches (3-4") in depth, inside and along the outside edge of the basins/saucers. Perennial beds shall be mulched to a two inch (2") depth. Mulch shall consist of shredded bark not exceeding three inches (3") in length and one inch (1") in width. Mulch contaminated with leaves, twigs, and/or debris shall not be acceptable. Only mulch derived from tree material, not from wood waste products like sawdust, shall be acceptable. Mulch for tree pits and shrub and/ or perennial beds shall be included in the bid price. After placing mulch on tree pits, the tree irrigation bags shall be installed and filled as per manufacturer's recommendations. Tree irrigation bags shall be included in the bid.

3. STAKING:

- a. All staking shall be done immediately after planting and all stakes and wire shall be maintained. Plants shall stand plumb after staking. Stakes shall be of white cedar with bark attached. They may have a maximum allowable deflection of ten percent (10%). Stakes of the dimensions shown on the plans and details shall be placed outside the root ball and shall be driven to the depths indicated on the plans and details.

- 1) Stakes shall be fastened to the tree with double No. 12 gauge annealed galvanized steel wire run through a suitable length of new reinforced one-half inch (1/2") rubber hose or with a suitable length of 3/4" wide, flat, woven polypropylene material as manufactured by DeepRoot, San Francisco, CA or approved equal, that is knotted and nailed to the stakes with 1" galvanized roofing nails as directed by the Commissioner. Stakes shall be set parallel to the contours, curbs, or walks, unless otherwise directed by the Commissioner. The length of doubled wire between the tree and stakes shall be hand twisted several times prior to fastening to the stakes. The wires shall be tied off firmly at the stake, not crank twisted at the center. Trees shall stand plumb after staking. Stakes, wires and hoses shall be removed at the end of the two year guarantee period, unless directed otherwise by the Commissioner and shall become the property of the Contractor. At the time the stakes are removed any holes left by the stake shall be filled with topsoil as specified in the "Topsoil" specification. If directed by the Commissioner, Tree irrigation bags shall be removed by the Contractor at the end of the guarantee period and, if they are in functional condition, shall become the property of the New York City Parks Department.

4. PRUNING:

- a. Broken or badly bruised branches shall be removed with a clean

cut. Do not cut leaders or use wound paint or dressing to treat cut areas. Crossed branches shall be pruned with a sharp tool in such a manner as to preserve and encourage the plant's natural growth form. The crowns of young trees should not be cut back to compensate for root loss.

5. EDGING OF PLANTING AREAS:

- a. The Contractor shall establish a neat edge where planting areas meet grass areas, as shown on the plan or as directed by the Commissioner. Edging shall be done by competent mechanics in a workmanlike manner with a spade or edging tool immediately after all planting and seeding is completed. Particular care shall be exercised in edging to establish good flowing curves, as shown on the plan or as directed by the Commissioner. Edging shall be maintained by the Contractor until final acceptance of the contract.

6. MAINTENANCE:

- a. At the time of planting, the soil around each plant shall be thoroughly saturated with water, and as many times later as reasonable conditions require, until final acceptance of the plant materials. Where water is supplied from City hydrants, the Contractor shall obtain a free hydrant permit from the Department of Environmental Protection, Bureau of Consumer Service, (718 595 6699). Permits are issued for a 30 day period, and the Contractor is responsible for keeping the permit current. The permits are available from each borough office.
 - 1) The Contractor must have all tools necessary for using city hydrants in his possession at time of planting to ensure that this specification is adhered to. If conditions do not allow the use of New York City water sources, the Contractor must obtain their own source of water. No direct payment shall be made for water obtained from other than city sources, but the cost thereof shall be deemed included in various items of the contract.
 - 2) Maintenance shall include watering, including filling tree irrigation bags to capacity at least once per week, weeding, cultivating, edging, control of insects, fungal infections, and other diseases by means of spraying with an approved insecticide or fungicide, pruning, adjustment and repair of stakes, anchors, and wires, repair of minor washouts and gullies up to twelve inches (12") in depth, and other horticultural operations necessary for the proper growth of all trees, as well as replacement of plants stolen or vandalized prior to the Final Inspection, to a degree judged sufficient for replacement by the Commissioner and/or Director of Landscape Construction. The Contractor shall also be responsible for keeping the entire area within the contract limits neat in appearance until the final acceptance and completion of the whole work of this contract. All planting areas shall be watered, cultivated,

and weeded with hoes or other approved tools within the growing season extending from May 1st to October 1st, and such cultivating and weeding shall be repeated at least once a week. Under no condition shall weeds be allowed to attain more than six inches (6") of growth. The cost of such maintenance shall be included in the bid price.

7. REPLACEMENT:

- a. The Contractor shall replace, in accordance with the contract plans and specifications, any plant material that is dead or, in the opinion of the Commissioner, in an unhealthy or unsightly condition, and/or have lost their natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or other causes, including vandalism, prior to final acceptance, in the next planting season. There shall be a two (2) year guarantee on plant material commencing after the final acceptance and the completion of the whole work of this contract. When instructed by the Commissioner, plant material that has died after final acceptance shall be replaced in the next appropriate planting season, even when the next planting season falls outside the two year period. Plant material that dies within the two (2) year guarantee period shall be replaced as many times as necessary. The cost of replacements(s) shall be included in the bid.
 - 1) Where vandalism or related causes are agreed by the Commissioner as the cause for plant material replacement, the Contractor shall be responsible for *one* replacement during the two-year guarantee period after final acceptance.
 - 2) Where dead plant material has been identified, whether due to natural causes or vandalism, the Contractor shall remove the dead material, including stakes, and wire (if applicable) within three (3) weeks of notification.
 - 3) Where dead plant material has been identified, whether due to natural causes or vandalism, the Contractor shall remove the dead plant material, including stakes, burlap, tree irrigation bags, if any, and wire. Earth will be leveled and new topsoil and seed, or appropriate paving material, added at the direction of the Commissioner to eliminate any hazardous conditions.
 - 4) The Contractor shall maintain Replaced Plant Material to the standards outlined in the "Maintenance" section above.

END OF SECTION

SECTION 02931 – VERTICAL WALL PLANTER PANELS

PART 1 GENERAL

1.1 GENERAL

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.3 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the installation of the modular vertical wall planter panels as shown on the drawings and/or specified herein. Soil and plants are specified in other sections.

1.4 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Irrigation and Controller System – Section 02810
- C. Planting – Section 02930, for plants to be used in planter pockets.
- D. Cement Board Rainscreen System - Section 07450.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for all wall panel required.
- B. Certifications: Provide information certifying compliance with FMVSS 302 flammability tests.
- C. Samples: Submit one standard panel. Where normal color variations are to be expected (such as felt) , include 4 (four) or more 6" square samples showing the limits of such variations.

D. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.6 LEED PERFORMANCE REQUIREMENTS

1. Vertical Wall Planter Panels shall contain a minimum of 75% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.

1.7 WARRANTY

1. Provide labor and materials warranty that vertical wall planter systems used in this contract will be free from defects and the installation will be functional for a period of one (1) year from the date of completion of the Contract, provided the

D. Fasteners: Provide structural performance requirements of all proposed fasteners to be used to connect VWPP to cement board substrate /wood furring, taking into account weight of product fully saturated with mature plantings. See also Cement Board Rainscreen System - Section 07450 for additional information.

E. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
- d. 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.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.6 LEED PERFORMANCE REQUIREMENTS

1. Vertical Wall Planter Panels shall contain a minimum of 75% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.

SECTION 02931 – VERTICAL WALL PLANTER PANELS

PART 1 GENERAL

1.1 GENERAL

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.3 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the installation of the modular vertical wall planter panels as shown on the drawings and/or specified herein. Soil and plants are specified in other sections.

1.4 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Irrigation and Controller System – Section 02810
- C. Planting – Section 02930, for plants to be used in planter pockets.
- D. Cement Board Rainscreen System - Section 07450.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for all wall panel required.
- B. Certifications: Provide information certifying compliance with FMVSS 302 flammability tests.
- C. Samples: Submit one standard panel. Where normal color variations are to be expected (such as felt), include 4 (four) or more 6" square samples showing the limits of such variations.

1.7 WARRANTY

1. Provide labor and materials warranty that vertical wall planter systems used in this contract will be free from defects and the installation will be functional for a period of two (2) years from the date of completion of the Contract, provided the installation was used as was intended when the Contract was designed, and was not misused.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following:
 1. Florafelt Vertical Garden Planters, model F12 Full-Pocket Planter, gray felt, manufactured by Plants on Walls, San Francisco, CA. System consists of pleated and folded PET plastic felt stapled to a fluted extruded polyethylene (HDPE) plastic backer board. Standard pocket sizes are 10" wide by 6" high. Provide planter panels without irrigation tube, which is specified elsewhere.
 2. Or approved equal.
- B. Accessories
 1. Felt Planter Pocket or Root Wrapper insert (one per pocket)
 2. Stainless Steel fasteners and fender washers.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where products to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install items included in this Section in locations indicated and at heights to achieve comply with applicable regulations of governing authorities.
 1. Cut or trim panels in field into various sizes shown.
 2. Space panels on walls in a way to maximize coverage.
 3. Where indicated, top row of plant pockets shall be screwed flat, to allow fitting under shingled cement-board panel above.
 4. Securely fasten panels to substrate with fasteners and fender washers, square and plumb, Locate fasteners carefully to allow soil and plants to be inserted properly, except where noted on drawings. Locate fasteners through cement board into wood furring or blocking below.

5. Review cuttings or discards with Commissioner, and salvage for City of New York's future use if appropriate. Salvaged materials shall be neatly bundled.

6. Install with full compliance with manufacturer's instructions.

B. Coordinate with irrigation piping to avoid damage. Assure panel is located properly to receive drip water from irrigation pipes. line. Adjust irrigation pipes if required.

3.3 SALVAGE

A. Collect all trimmings where pockets are undamaged. Review cuttings or discards with Commissioner, and salvage those selected for City of New York's future use if appropriate. Salvaged materials shall be neatly bundled and delivered to City of New York at completion..

END OF SECTION

SECTION 03300 - CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to the work of this Section.

1.2 SUMMARY

- A. Section includes but is not limited to the following as shown on the drawings and as specified herein:
 1. Foundation systems including footings, pile caps, walls, beams, piers, pilasters, pits and similar concrete.
 2. Slabs on grade.
 3. Structural slabs on grade.
 4. Cast-in-place slabs, beams, walls, and columns.
 5. Topping slabs
 6. Stair pan fills.
 7. Furnishing and installing all required anchors and inserts.
 8. Placing in the forms all inserts, anchors, anchor bolts, bearing plates and the like furnished by other trades for casting into the concrete and cleaning of same after stripping of forms.
 9. Protection of all inserts, anchors, hangers, sleeves and supports furnished and set by others for the attachment of other work to the concrete, or required to permit the passage of other work through the concrete.
 10. Supply, fabricate and place all required reinforcing bars, mesh and other reinforcement for concrete where shown, called for, and/or required complete with proper supporting devices.

11. Erection and removal of all formwork and waffle slab forms required to properly complete the work.
12. Finishing of all concrete work as hereinafter specified.
13. Curing and protection of all concrete work.
14. Site concrete consisting of curbs, walks, pads, boxes and the like as shown on the drawings.
15. Floor sealers and dust-proofing of all areas exposed and/or covered with carpet.
16. Cutting, patching, grouting, repairing and pointing up as required.
17. Vapor barrier system below slabs on grade.
18. Under slab drainage course.
19. Dewatering.
20. Waterproofing.
21. Grouting of all beam bearing plates and column base plates.
22. Embedded plates in all foundation walls.
23. Equipment pads as required.
24. All other work and materials as may be reasonably inferred and needed to make the work of this section complete.
25. Waste Management

B. Related Requirements:

1. Green Building requirements – Division 1.
2. Earthworks – Section 02300.
3. Timber Piles –Section 02455.
4. Trench Drains – Section 02631.
5. Concrete Floor Topping – Section 03320.
6. Cement and Concrete for Exterior Improvements – Section 03700.
7. Autoclaved Aerated Concrete Units – Section 04225.
8. Miscellaneous Metals – Section 05500.
9. Wood trusses – Section 06126.
10. Carpentry – Section 06200.
11. Sheet Membrane Waterproofing – Section 07130.
12. Building Insualtion – Section 07210.
13. Joint Sealers – Section 07900.
14. Painting and Fishing – Section 09900.

1.3 SUSTAINABLE DESIGN REQUIREMENTS

- A. The Contractor is to implement practices and procedures to meet the Project's Sustainable Design goals, which include achieving LEED Silver. The Contractor shall ensure that the requirements related to these goals, as defined in this Section and in Related Sections of the Contract Documents, are implemented. Substitutions, or other changes to the Work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's Sustainable Design goals.
- B. The Contractor is to efficiently use resources and energy while executing the Work of this Section. Resource efficient aspects to be considered in completing this Project include the use of techniques that minimize waste generation, reuse of construction materials on site where possible, and recycling of waste generated during the construction process.
- C. Performance Requirements: The following criteria are required for the products included in this section
1. The Contractor must track and quantify all material purchases for percentages of raw materials extracted, processed and manufactured regionally (by cost, within 500 miles), per LEED 2.2 guidelines, as specified in Section 01330-LEED Requirements. There is no project requirement for providing locally-manufactured products, only tracking and quantifying.
 2. All reinforcing steel, steel anchors, welded wire fabric, and other steel items required by the work of this section shall contain a minimum of 50% (combined) pre-consumer/post-consumer recycled content.
 3. Adhesives, sealants, paints and coatings used for the work of this section shall meet the Volatile Organic Compound (VOC) limits specified in Division 1, where applicable.
- D. LEED Performance Requirements:
1. Certification of recycled content, sourcing of materials, and VOC content shall be in accordance with the LEED Submittals requirements of this section.
 2. There is no requirement for Certified Wood for this project.

1.4 LEED SUBMITTALS

A. Submit LEED Certification items as follows:

1. LEED Materials Certification Form: For all installed products and materials of this Section, complete the "Environmental Materials Reporting Form" (attached to end of Section 01332 "LEED Submittals"). Information to be supplied for this Form shall include:
 - a. Cost breakdowns for materials included in the Contractor or sub-contractor's Work. Material cost does not include costs associated with labor and equipment.
 - b. The percentages (by weight) of pre-consumer and/or post-consumer recycled content in the supplied product(s).
 - c. Indication of whether the raw materials have been extracted, harvested or recovered, as well as the final product has been manufactured (location of final assembly), within 500 miles of the project site.

B. VOC Reporting Form: For all installed products and materials of this Section, complete the "VOC Reporting Form" (attached to end of Section 01335). Information to be supplied for this Form shall include:

1. Provide generic name by means of product type or application of all field-applied interior adhesives, sealants, paints, and coatings in this Section.
2. Provide corresponding referenced standard limits.
3. Provide full name of supplied product(s) and vendor or manufacturer for each product in this Section.
4. For all field-applied interior adhesives, sealants, paints, and coatings in this Section, provide Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.

C. Letters of Certification: Provided by the manufacturer on the manufacturer's letterhead, verifying the amount of recycled content.

D. Product Cut Sheets: For all materials that meet the sustainable design performance criteria as per the LEED Performance Requirements of this section.

- E. Material Safety Data Sheets (MSDS): For all applicable products. Applicable products include, but are not limited to, adhesives, sealants, paints, and coatings applied to the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) content of products submitted. If an MSDS does not indicate VOC content, then product data sheets, manufacturer's literature, or certification letter indicating a product's VOC content can be submitted with the MSDS.
- F. Assemble required LEED Submittal information into one (1) package for each Specification Section or sub-contractor. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submittal products or assemblies.

1.5 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including the following:
 - 1. Reinforcement and forming accessories
 - 2. Admixtures
 - 3. Patching compounds
 - 4. Waterstops
 - 5. Joint systems
 - 6. Curing compounds
 - 7. Dry-shake finish materials
 - 8. Others items as requested by Commissioner.
- B. Shop Drawings; Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. The shop drawings shall be prepared only by competent detailers, checked by the contractor prior to submission.
 - 1. The shop drawings shall show construction, contraction and isolation joint locations and the added reinforcement required at same.
 - 2. Obtain and coordinate information for sleeves and openings in concrete, which are required for the work of other trades. Make coordinated drawings showing

- size and location of openings and sleeves and incorporate this information on the reinforcing drawings.
3. Only those splices indicated on the approved shop drawings will be permitted.
 4. Provide elevations of all foundation walls and other structural elements to a minimum 1/4" scale.
- C. Shop Drawings Formwork: Submit shop drawings for fabrication and erection of specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually. Commissioner's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility, prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
1. Location of construction joints is subject to approval of the Commissioner.
- E. Contraction Joint Layout: Indicate proposed contraction joints required per applicable codes and drawings.
1. Location of contraction joints is subject to approval of the Commissioner.
- F. Samples: Submit samples of materials as requested by Commissioner, including names, sources and descriptions.
- G. Laboratory Test Reports: Submit laboratory test reports for concrete materials, mix design test and microwave test.
- H. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Commissioner. Manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements shall sign

material certificates. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

- I. Cold Weather and Hot Weather Concreting Procedures: Submit written descriptions of contractor's proposed cold weather and hot weather concreting procedures, when applicable.
- J. Certification that pozzolanic materials conforms to ASTM C 618-01 (noting class C or class F), ASTM C 989 or ASTM C1240.
- K. Certified recycled steel content. Provide cut sheets clearly indicating whether the rebar used meets the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.
- L. Formwork: Specify whether reusable, permanent, salvaged or new wood forms are to be used.
- M. Recycled Aggregate: Provide laboratory reports indicating that aggregate conforms to ASTM C33 for structural concrete or ASTM D1241-00 for sub-base material. Provide cut sheets clearly indicating the source, total weight and volume of the recycled aggregate. If aggregate provided is a mix of virgin and recycled aggregates obtain a written affidavit from the manufacturer stating the recycled content percentage
- N. VOC content for curing compounds, sealants and release agents: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each curing compound, sealant, hardener and release agent used highlighting VOC contents. VOC content must be less than or equal to limits stated under "PRODUCTS".

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. New York City Building Code, Latest Edition
 2. ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary."
 3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and mass concrete."
 4. ACI 211.2, "Standard Practice for Selecting Proportions for Structural Lightweight Concrete."
 5. ACI 214R, "Evaluation of Strength Test Results of Concrete."
 6. ACI 232.2R, "Use of Fly Ash in Concrete."
 7. ACI 233R, "Guide to Use of Slag Cement in Concrete and Mortar."
 8. ACI 234, "Guide for the Use of Silica Fume in Concrete."
 9. ACI 301 "Specifications for Structural Concrete."
 10. ACI 302.1R "Guide for Concrete Floor and Slab Construction."
 11. ACI 304R, "Guide for Measuring, Mixing, Transporting and Placing Concrete."
 12. ACI 305R "Hot Weather Concreting."
 13. ACI 306.1-90 "Standard Specification for Cold Weather Concreting."
 14. ACI 308.1 "Standard Specification for Curing Concrete."
 15. ACI 309R, "Guide for Consolidation of Concrete."
 16. ACI 311.4R, "Guide for Concrete Inspections."
 17. ACI 315, "Details and Detailing of Concrete Reinforcement."
 18. ACI 318 "Building Code Requirements for Structural Concrete and Commentary."
 19. ACI 347 "Guide to Formwork of Concrete."
 20. Concrete Reinforcing Steel Institute, (CRSI) "Manual of Standard Practice."
 21. CRSI-WCRSI, "Placing Reinforcing Bars."
 22. AWS D1.4, "Structural Welding Code Reinforcing Steel."
 23. The ACI Field Reference Manual, SP-15 shall be kept at the job site, and the practices set forth therein shall be strictly adhered to.

24. ASTM Standards as applicable in the building code of the local jurisdiction and as noted in this specification.
- E. Concrete Testing Service: Owner will engage a testing laboratory acceptable to Commissioner and Engineer of Record to perform material evaluation tests and to design concrete mixes.
- F. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
- G. Preconstruction Meeting:
1. At least 35 days prior to the start of the concrete construction schedule, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction. The Contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
 2. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
 - a. Contractor's superintendent
 - b. Laboratory responsible for the concrete design mix
 - c. Laboratory responsible for field quality control
 - d. Concrete subcontractor
 - e. Ready-mix concrete producer
 - f. Admixture manufacturer(s)
 - g. Concrete pumping equipment manufacturer.
 3. Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by him to all parties concerned within 5 days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Commissioner or owner's representative, Architect, and Engineer of Record.

4. The minutes shall include a statement by the concrete contractor indicating that the proposed mix design and placing can produce the concrete quality required by these specifications.
5. A minimum of a 4 cubic yard trial mixture containing all required admixtures shall be placed at the job site using the accepted methods of placing, finishing and curing. All applicable tests including slump, strength, air content, permeability, and air content will be performed. This shall occur at least four weeks before actual concreting operations with particular admixture begins. The admixture manufacturer(s) and inspectors shall be present. The same testing should be done in the laboratory at the same time for comparison. A test sample should be done for each condition that is to be placed.
6. The Commissioner will be present at the conference. The Contractor shall notify the Commissioner at least 10 days prior to the scheduled date of the conference.

1.7 PROJECT CONDITIONS

- A. The Contractor, before commencing work, shall examine all adjoining work on which this work is in any way dependent for proper installation and workmanship according to the intent of this specification, and shall report to the Commissioner any condition which prevents this contractor from performing first class work.
- B. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- C. Protect adjacent finish materials against spatter during concrete placement.
- D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, etc., to prevent injury to workmen and others within and about the premises. Also provide all safeguards as required by the Building Code, OSHA, or any other departments having jurisdiction. Take full responsibility for all safety precautions and methods.
- E. Procedure of Work: The contractor shall keep himself constantly informed as to the progress of the work in the field, materials and men ready to start work immediately when conditions of preceding work are available or ready, wholly or in part, so as not to

delay the progress of building work or to interfere with the progress of work of other contractors, and in any event he shall, within 24 hours after notice from the Commissioner, proceed with such work as directed to maintain the uninterrupted progress of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct of plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.
 - 1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better mill oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Preference shall go to salvaged or re-used Dimensional Lumber. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide VOC compliant commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and

will not impair subsequent treatments of concrete surfaces. Use biodegradable form release agent listed below or equivalent made from soy or rapeseed oil.

- | | | |
|----|-------------------|-------------------------------------|
| 1. | "Bio-Release EF" | Dayton Superior |
| 2. | "Soy Form Away" | Cure & Seal by Natural Soy Products |
| 3. | "Bio-Form" | Leahy-Wolf Company |
| 4. | "Duogard II" | W. R. Meadows, Inc. |
| 5. | "Atlas Bio-Guard" | Atlas Construction Supply, Inc. |

- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Form Ties: Form ties and spreaders: prefabricated assemblies by Richmond; Superior, Dayton or approved equal. Wire ties shall not be used. Ties for foundation work shall be of snap design with removal cones and water seal washer.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60.
- B. Galvanized Reinforcing Bars: ASTM A 767, Class II (2.0 oz. zinc psf) Class I (3.0 oz. zinc psf) hot-dip galvanized, after fabrication and bending.
- C. Epoxy-Coated Reinforcing Bars and Wire Welded Fabric: ASTM A 775 (as noted on plan and/or in section).
- D. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric, Galvanized.

- F. Welded Deformed Steel Wire Fabric: ASTM A 497, Galvanized.
- G. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- H. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.
- I. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- J. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- K. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.
 - 1. For epoxy coated reinforcement provide plastic protected chairs and plastic ties. All imperfections in the epoxy coating are to be repaired prior to placement of concrete.
 - a. Use recycled plastic rebar supports (give preference to local supplier if available). Subject to compliance with requirements, provide one of the following:
 - 1) International Plastics Group
 - 2) Eclipse Plastic
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2), at a spacing not to exceed 4'-0" on center in either direction.

2.3 CONCRETE MATERIALS

- A. Portland cement: ASTM C 150, Type I. Total percentage of Portland Cement is NOT to exceed 75% of the cementitious mix. Use one brand of cement throughout project, unless otherwise acceptable to Commissioner.
- a. Fly Ash: Cast-in-place concrete shall incorporate fly ash as a replacement for at least 25% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Commissioner. Fly Ash shall not be used in conjunction with Ground Granulated Blast Furnace Slag.
 - b. Ground Granulated Blast Furnace Slag (GGBF): Cast-in-place concrete shall incorporate GGBF as a replacement for at least 40% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Commissioner. GGBF shall not be used in conjunction with Fly Ash.
 - c. Pozzolans and Slags: These must be completely accounted for in the design mix. Mix design must meet minimum design requirements set in the contract documents. Additional admixtures may be required to meet early strength requirements and alternative cementitious material goals. If a "blended cement" is used which already contains a certain percentage of Pozzolans or Slags this content may offset or entirely satisfy the minimum percentage required.
 - 1) Coal Fly Ash: ASTM C 618 (Class C or Class F): ASTM C 618 (Note: Class F fly Ash will require higher amounts or air entraining admixtures than class C).
 - 2) Blast Furnace Slag: ASTM C989
 - 3) Silica Fume: ASTM C 1240
 - 4) Rice Hull (or "husk") Ash: ASTM C 618 Blended hydraulic cement, as defined by ASTM C 595 or ASTM C 1157

- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
1. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Commissioner.
 2. Normal weight Fine Aggregate: washed, inert, natural or manufactured or combination thereof, sand conforming ASTM C33 gradation.
 3. Normal weight Coarse Aggregate: well graded crushed stone or washed gravel conforming to ASTM C33, sizes 57 for foundations and 67 for slabs and structure.
 - a. Recycled crushed concrete aggregate in concrete mixes is only to be used with approval of Commissioner. Recycled aggregate shall be used only as a substitute for coarse aggregate and must also be washed and well-graded, conforming to ASTM C33.
 - b. For sub-base, slabs on grade and non-structural applications and Recycled Aggregate Materials are NOT required to meet the ASTM C 33 standard. In addition to concrete rubble, glass, porcelain, and tire chips can be used as filler material. Any inert material conforming to ASTM D1241 is acceptable for the applications described in this paragraph.
- C. Lightweight Aggregates: Well-graded crushed expanded shale produced by rotary kiln method. Solite or equal, conforming to ASTM C330.
- D. Water: Free from oils, acids, alkali, organic matter and other deleterious material to conform to ASTM C94. ASTM C94 for gray water use in the production of ready mixed concrete per approval by the Engineer of Record.
- E. Air-Entraining Admixture: Any material proposed for use as an air-entraining admixture should be tested in conformance with ASTM C 260.
1. Liquid air-entrainment: Use only agents derived from salts of wood resins. Select from products listed below or approved equal conforming to ASTM C-260.
 - a. "Airmix" Euclid Chemical
 - b. "Darex AEA" W. R. Grace

- c. "MB-VR" Master Builders
- d.
- e.
- f.

F. Water-Reducing Admixture: ASTM C 494.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Polyheed 997" Master Builders
 - b. "Euclid MR" Euclid Chemical
 - c. "WRDA 64" W. R. Grace.

G. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Eucon 37, 1037 or Plastol 5000" Euclid Chemical Co.
 - b. "Rheobuild 1000" Master Builders
 - c. "Glenium 7500" Master Builders
 - d. "Daracem-100" W. R. Grace

H. Water Reducing, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C 494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Accelerating admixtures are not to be used as antifreeze agents. Accelerating admixtures are permitted only upon review by Engineer of Record.

- 1. Products: Subject to compliance with requirements, provide the following:
 - a. "Accelguard 80" Euclid Chemical Co.
 - b. "Daraset" W. R. Grace
 - c. "Pozzutec 20" Master Builders.

- I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.05 percent chloride ions.
1. Products: Subject to compliance with requirements, provide one of the following:
- | | | |
|----|---------------------|---------------------|
| a. | "Eucon Retarder 75" | Euclid Chemical Co. |
| b. | "Pozzolith 100XR" | Master Builders. |
| c. | "Plastiment" | Sika Chemical Co. |
| d. | "Daratard" | W.R. Grace. |
- J. Microsilica Admixture shall be dry densified or slurry formed. Microsilica shall come from the same source throughout the project. If a single source cannot be maintained, laboratory testing of each new source shall be required before acceptance by the Engineer of Record at no cost to the owner.
1. Products: Subject to compliance with requirements, provide one of the following:
- | | | |
|----|----------------|----------------------|
| a. | "Emsac F 100" | Elkem Chemical, Inc. |
| b. | "Eucon MSA" | Euclid Chemical Co. |
| c. | "Force 10,000" | W. R. Grace |
- K. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.
- L. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Engineer of Record.
- M. Macro-Fibers: Engineered macro-synthetic fibers.
1. Products: Subject to compliance with requirements, provide one of the following:
- | | | |
|----|-----------------|-------------------------|
| a. | "Tuf-Strand SF" | Euclid Chemical Co. |
| b. | "Fibermesh 650" | Propex Concrete Systems |
| c. | "Forta-Ferro" | Forta |
- N. Micro-Fibers: Engineered micro-synthetic fibers.

1. Products: Subject to compliance with requirements, provide the following:

- | | | |
|----|------------------|-------------------------|
| a. | "Fiberstrand N": | Euclid Chemical Co. |
| b. | "Fibermesh 150": | Propex Concrete Systems |
| c. | "Ultra-Net" | Forta |

O. Natural Fiber Reinforced Concrete: Natural fiber reinforced concrete is permitted only upon review by Engineer of Record. Refer to ACI 544.1R, chapter 5

P. Corrosion Inhibitor: 30% calcium nitrite (where called for in the specifications or on the drawings). Subject to compliance with requirements, provide the following at 3 gal/cy:

- | | | |
|----|-----------------|------------------|
| 1. | "Eucon CIA | Euclid Chemical |
| 2. | "DCI" | W. R. Grace |
| 3. | "Rheocrete CNI" | Master Builders. |

Q. Contractor will be required to provide information demonstrating successful use in prior placement involving all admixtures.

2.4 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- | | |
|----|-------------------------|
| a. | Greenstreak |
| b. | Williams Products, Inc. |

2. Profile: Ribbed with center bulb or as indicated.
3. Dimensions: 6 inches by 3/8 inch thick ; nontapered.

- B. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BoMetals, Inc.
 - b. Greenstreak
 - c. Paul Murphy Plastics Company
 - d. Vinylex Corp.
 2. Profile: Ribbed with center bulb or as indicated.
 3. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick; nontapered).
- C. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP
 - b. CETCO; Volclay Waterstop-RX
 - c. Concrete Sealants Inc.; Conseal CS-231
 - d. Greenstreak; Swellstop
 - e. Henry Company, Sealants Division; Hydro-Flex
 - f. JP Specialties, Inc.; Earth Shield Type 20

2.5 GROUT

- A. Non-Shrink, Non-Metallic Grout: The non-shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 4' x 4' base plate.

1. Products: Subject to compliance with requirements, provide one of the following:

- | | | |
|----|-------------------|---------------------|
| a. | "Euco-NS" | Euclid Chemical Co. |
| b. | "Five Star Grout" | U.S. Grout Corp. |
| c. | "Masterflow 713" | BASF |

B. High Flow Grout: Where high fluidity and/or increased placing time is required, use high flow grout. The factory pre-mixed grout shall conform to ASTM C1107, "Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 18" x 36" base plate.

1. Products: Subject to compliance with requirements, provide one of the following:

- | | | |
|----|-----------------------------|---------------------|
| a. | "Euco Hi-Flow Grout" | Euclid Chemical Co. |
| b. | "Masterflow 928" | BASF |
| c. | "Five Star Fluid Grout 100" | Five Star |

2.6 RELATED MATERIALS

- A. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 1241, Size 57, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 1241, Size 10, with 100 percent passing a 3/8 inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.
- C. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.

- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- E. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Waterproof paper
 - b. Polyethylene film
 - c. Polyethylene-coated burlap
- F. Curing Compounds: The compound shall conform to ASTM C 309. Limit VOC content to 130 g/L. Use water-based curing compound. For surfaces receiving both a curing compound and additional flooring, verify that the curing compound and additional flooring are compatible.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. SealTight 1100 W.R. Meadows
 - b. Kurez W VOX Euclid Chemical Co.
 - c. Luster Seal WB STD Euclid Chemical Co.
 - d. VOCOMP-25 W.R. Meadows
- G. Curing & Sealing Compounds: Only specify for slabs that will remain exposed, i.e. will not receive additional flooring. The compound shall conform to ASTM C1315. Limit VOC content to 130 g/L. Use water-based curing compound.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Luster Seal WB STD Euclid Chemical Co.
 - b. VOCOMP-25 W.R. Meadows
- H. Sealers/Hardeners: For use on concrete surfaces that will remain exposed. Slabs that will receive additional flooring do not require sealing or hardening. Sealers and hardeners must conform to ASTM D1546, not yellow under ultra violet light after 500 hours of test in accordance with and have a maximum moisture loss of 0.039 grams

per sq. cm. when applied at a coverage rate of 250 sq. ft. per gallon. Limit VOC content to 130 g/L. Use water- or vegetable-based product.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Kure-N-Harden BASF
- I. For concrete floors subjected to heavy vehicular traffic use a Liquid Sealer/Densifier: The product must be a high performance, deeply penetrating concrete densifier conforming to ASTM C836; odorless, colorless, VOC - compliant, non-yellowing silicate based solution designed to harden, dustproof and protect and to resist black rubber tire marks on concrete surfaces. The compound must contain a minimum of 20% solids content of which 50% is silicate
- J. Evaporation Retardant:
 1. Products Subject to compliance with requirements, provide one of the following:
 - a. "Eucobar" Euclid Chemical Co.
 - b. "Confilm" BASF
- K. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F 710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. Insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive. Reactivity releases VOCs and /or other toxic fumes.
- L. Crack Sealer: Elastomeric liquid crack sealer resistant to water, gasoline, oil and salts.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Plasti-seal" Euclid Chemical Co.
- M. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound.

1. Products: Subject to compliance with requirements, provide the following:
 - a. "Flo-Top 90 or Super Flo-Top" Euclid Chemical Co.
 - b. "Ardex" Ardex Co.
 - c. "Underlayment 110" Master Builders

- N. Bonding Admixture: The compound shall be a latex, non-rewettable type.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Flex-Con" Euclid Chemical Co.
 - b. "Daraweld C" W.R. Grace
 - c. "SBR Latex" Euclid Chemical Co.

- O. High Strength Polymer Repair Mortar: For form and pouring or large horizontal repairs, provide the flowable on-part, high strength repair mortar.
 1. Products: subject to compliance with requirements, provide the following:
 - a. "Eucocrete" The Euclid Chemical Co.
 - b. "Euco Speed MP" (Cold Weather) The Euclid Chemical Co.
 - c. "Emaco R" Master Builders.

- P. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

- Q. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Type IV for bonding hardened concrete to hardened concrete, and Type V for bonding freshly mixed concrete to hardened concrete.

- R. Reglets: Fabricate reglets of not less than 0.022 inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

- S. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- T. Expansion Joint Filler: ASTM D 1751.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Homex 300" Homasote Company
 - b. "Standard Cork Expansion Joint Filler" A.P.S. Cork
 - c. "Fibre Expansion Joint" W.R. Meadows
- U. Water: Potable.

2.7 PROPORTIONING AND DESIGN OF MIXES

A. Preparation of Design Mixes

1. All mix designs shall be proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and prepared by a licensed testing laboratory approved by the City of New York, but paid for by the contractor. Submit mix designs on each class of concrete for review.
2. If previously used mixes are submitted, all materials shall be from the same sources and with the same brand names as the previously utilized mix.
3. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1400 psi when concrete strengths of 5000 or more are used.
4. The proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test data.
5. The Contractor shall be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for form TR-3: "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 New York City Department of Buildings requirements for each concrete design mix.

- B. Submit each proposed mix to the Commissioner for review at least 5 days prior to the pre-concrete conference. Do not begin concrete production until Commissioner has reviewed and approved mixes.
1. Submit Test reports for any pozzolans or slags indicating compliance with ASTM C 618 or ASTM C 989, respectively.
 2. Provide cut sheets clearly indicating the percentages of pozzolans or slags used in the mix design as replacement for Portland cement. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the percentage.
 3. Test reports for recycled aggregate indicating compliance with ASTM C 33. Provide cut sheets clearly indicating the percentage of aggregates used that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
 4. Provide cut sheets clearly indicating the percentage of sub-base and filler aggregate materials that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
- C. Design mixes to provide concrete with strength as indicated on drawings and schedules.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by 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 Commissioner before using in work.
- E. Admixtures:

1. Use water-reducing admixture or high range water-reducing admixture (superplasticizer) in all concrete as required for placement and workability.
2. Use non-corrosive, non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
3. Use high-range water-reducing admixture in pumped concrete, architectural concrete, parking structure slabs, fiber concrete, concrete required to be watertight, concrete with ultimate strength of 5,000 psi or more, and concrete with water/cement ratios below 0.50.
4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2 percent within following limits:
 - a. Concrete structures and slabs exposed to freezing and thawing or deicer chemicals.
 - 1) 4.5 percent (moderate exposure); 5.5 percent (severe exposure) 1-1/2" max. aggregate 4.5 percent (moderate exposure); 6.0 percent (severe exposure) 1" max. aggregate.
 - 2) 5.0 percent (moderate exposure); 6.0 percent (severe exposure) 3/4" max. aggregate.
 - 3) 5.5 percent (moderate exposure); 7.0 percent (severe exposure) 1/2" max. aggregate.
 - b. Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.
 - c. Interior concrete subjected to vehicular traffic: 3 percent maximum.
5. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

- F. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
1. Concrete for precast slabs, precast beams, structural topping slab, caisson caps, caissons, poured in place slabs and grade beams, columns and walls, over water, on ground or exposed to weather: W/C 0.40.
 2. Concrete on metal deck:
 - a. With specified minimum compressive strength not greater than 5,000 psi: 0.40.
 - b. With specified minimum compressive strength not greater than 7,000 psi: 0.35.
 3. "Quick Dry" Concrete: 0.40.
 4. Subjected to freezing and thawing; W/C 0.50.
 5. Subjected to deicers/watertight: W/C 0.45.
 6. Reinforced concrete subjected to brackish water, salt spray or deicers; W/C 0.40.
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramp slabs and sloping surfaces: Not more than 3".
 2. Reinforced foundation systems, including mud slabs below hydrostatic slabs: Not less than 1" and not more than 3".
 3. Concrete containing HRWR admixture (superplasticizer): Not more than 9" unless otherwise approved by the Commissioner. The concrete shall arrive at the job site at a slump of 2" to 3" (3" to 4" for concrete receiving a "shake-on" hardener or lightweight concrete), be verified, then the high-range water-reducing admixture added to increase the slump to the approved level.
 4. Other Concrete: Not less than 1" or more than 4".
- H. Chloride Ion Level: Chloride ion content of aggregate shall be tested by the laboratory making the trial mixes. The total chloride ion content of the mix including all constituents shall not exceed the limitations set forth in Table 4.4.1 of ACI 318 for concrete subjected to deicers or exposed to chloride in service (0.15% chloride ions by weight of cement).

2.8 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
- B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce maximum mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce maximum mixing and delivery time to 60 minutes.
- D. No water shall be added after mixing to concrete containing HRWR (Superplasticizer). If loss of slump occurs, the concrete treated with HRWR may be redosed as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Engineer of Record and the manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.2 INSPECTION

- A. Examine all work prepared by others to receive work of this section and report any defects affecting installation to the Contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.3 CONCRETE

- A. Concrete shall develop the minimum compressive strengths shown on drawings at 28 days when sampled and tested in accordance with ASTM C 31 and C 39 with the maximum slump in accordance with the approved mix design.
- B. Concrete shall be in accordance with the requirements and specifications of "Building Code Requirements for Structural Concrete" as modified by the building code noted above.
- C. Fly Ash Concrete & Slag Concrete: Concrete mixes containing high volumes of fly ash or Slag have slower set times and may take up to 56 days to reach full strength. The Commissioner, agency responsible for concrete mix design, and the concrete subcontractor must coordinate to ensure that the form stripping schedule is consistent with the ability of the structure to support itself and all imposed construction loads.

3.4 FORMS

- A. Design formwork to maximize its reusability, reduce resources devoted to formwork construction and minimize waste generated. Where appropriate choose alternative formwork systems (refer to sections listed above).
- B. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shapes, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347. Provide Class A tolerances for concrete exposed to view. Provide Class C tolerances for other concrete surfaces.
- C. Design formwork to be readily removable without impact, shocks or damage to cast-in-place concrete surfaces and adjacent materials.
- D. Construct forms to size shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features

required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back- up at joints to prevent leakage of cement paste.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, recesses, and the like, to prevent swelling and for easy removal.
- F. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.5 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.
- F. Micro-Fibers: All concrete where indicated on the drawings shall contain the specified micro-fibers. Length shall be per the manufacturer's specification. The dosage rate shall be 1.0 – 1.6 lbs per cubic yard per the manufacturer's specification. Submit proposed dosage rate to Commissioner for review prior to concrete placement.
- G. Macro-Fibers: All concrete where indicated on the drawings shall contain the specified macro-fibers. Length shall be per the manufacturer's specification. The dosage rate shall be 3.0 – 5.0 lbs per cubic yard per the manufacturer's specification. Submit proposed dosage rate to Commissioner for review prior to concrete placement.
- H. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars where specified by the Commissioner shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material.
- I. Epoxy-coated reinforcing bars shall be fastened with nylon- , epoxy- , or plastic-coated tie wire, or other acceptable materials.
- J. Repair of damaged epoxy-coating: When required, damaged epoxy-coating shall be repaired with patching material conforming to ASTM A775. Repair shall be done in accordance with the patching material manufacturer's recommendations.

- K. Unless permitted by the Commissioner, epoxy-coated reinforcing bars shall not be cut in the field. When epoxy-coated reinforcing bars are cut in the field, the ends of the bars shall be coated with the same material used for repair of coating damage.

3.6 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Commissioner.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.
- D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions, using manufacturer's specified welding irons.
- E. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals and elsewhere as indicated.
 - 1. Joint filler and sealant materials are specified in the section for "Related Materials"
- F. Contraction (Control) Joints in Slabs-on-Ground: Maximum joint spacing shall be 36 times the slab thickness unless otherwise noted on the drawings. The dry cut saw shall be used immediately after final finishing and to a depth of 1-1/4". A conventional saw shall be used as soon as possible without dislodging aggregate and to a depth of 1/4 slab thickness.

1. Joint sealant material is specified in the section for "Related Materials".

3.7 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
- C. Embedded Plates at Foundation Walls: Install plate at top of forms so that exterior face of steel plate is level and plumb. Use construction documents for locations, sizes and elevations.

3.8 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. If form-release compound is required, coat contact surfaces of forms with a form-coating compound *before* reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.9 CONCRETE PLACEMENT

- A. Ready-mix concrete shall comply with the requirements of ASTM C 94 and ACI 304. All plant and transporting equipment shall comply with the concrete plant standards and truck mixer and agitator standards of the National Ready Mix Concrete Association.
- B. Cold weather mixing procedures shall be submitted to the Commissioner for approval.
- C. Notify Commissioner and Owner's Inspector at least 36 hours (1 1/2 regular working days) before each pour so that forms and reinforcing may be examined. Do not place concrete until inspection has been made or waived.
- D. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.
- E. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
 - 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Use internal vibrators penetrating both the top and preceding layers.

- G. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- H. Use and type of vibrators shall conform to ACI 309 "Recommended Practice for Consolidation of Concrete." Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Slabs: Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedge, bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. See also "MONOLITHIC SLAB FINISHES" below.
- L. Maintain reinforcing in proper position during concrete placement operations.
- M. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Use only a non-corrosive, non-chloride accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.
 4. Care must be taken to store water-based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- N. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90-F (32-C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

3.10 FINISH OF FORMED SURFACES

- A. Concrete mixes containing pozzolans or slags do not set at the same rate or with the same bleed water characteristic as plain Portland cement. Therefore attention must be directed to the proper procedures. Refer to ACI 232.2R and ACI 301.
- B. Rough Form Finish: For formed concrete surface not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- C. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing

material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed. Follow all requirements in ACI 301, Chapter 10 for smooth form finish. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction.

3.11 FLOOR FLATNESS/LEVELNESS TOLERANCES

- A. FF defines the maximum floor curvature allowed over 24 in. Computed on the basis of successive 12 in. (300 mm) elevation differentials, FF is commonly referred to as the "Flatness F-Number".
- B. FL defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 ft. (3.05 m) distance commonly referred to as the "Levelness F-Number".
- C. All floors shall be measured within 72 hours of being poured and in accordance with ASTM E 1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number" System (Inch-Pound Units).
- D. All slabs shall achieve the specified overall tolerance. The minimum local tolerance (1/2 bay or as designated by the Commissioner) shall be 2/3 of the specified tolerances.

3.12 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to slabs at crawl spaces, unless otherwise noted. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface shall achieve an FF 20 - FL 17 tolerance.

- B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system, unless otherwise noted. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance and with a surface leveled to an FF 25/ FL 20 tolerance (FL17 for elevated slabs). Grind smooth surface defects, which would telegraph through applied floor covering system.
- C. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated, apply single trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction
- D. Sealers, Hardeners and Liquid Densifiers: Apply a coat of the specified compound to all EXPOSED interior concrete floors where indicated on the drawings. This surface must be continuously moist cured by a method satisfactory to the Commissioner. Apply and mechanically scrub compound into the floor in strict accordance with the manufacturer's printed instructions.

3.13 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
 - 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
 - 3. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather, ACI 302 and ACI 308 shall be followed using wind breaks and sun

- shades when recommended. Evaporation retardant shall be as specified in Section 2.04.
4. Care must be taken to store water based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- B. Curing Methods: Perform curing of concrete by moisture curing, moisture-retaining cover curing, curing and sealing compound, and by combinations thereof, as herein specified.
1. Provide moisture curing by following methods.
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 2. Provide moisture-retaining cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Provide curing and sealing compound to exposed interior slabs not receiving additional flooring. A clear curing and sealing compound shall be used on exterior slabs, sidewalks and curbs not receiving a penetrating sealer.
 4. Use the specified curing compound on surfaces to be covered with finish or coating material applied directly to concrete, such as liquid densifier/sealer, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials. Apply compound in accordance with manufacturer's direction.
- C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place

for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of the specified curing compound or a continuous moist curing method approved by the Commissioner.
- E. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. In addition, insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive.

3.14 SHORES AND SUPPORTS

- A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.
- B. Extend shoring from ground to roof for structures 4 stories or less, unless otherwise permitted.
- C. Extend shoring generally at least 4 floors under floor or roof being placed for structures over 5 stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this levels in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure. Contractor shall provide the services of a registered Professional Engineer to design the shoring, and determine timing of removal.
- D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

- E. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.15 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50-F (10-C) for 12 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.16 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are intended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Commissioner.

3.17 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in- place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Grout base plates and foundations as indicated using specified free-flowing non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
- E. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout shall be used for all base plates larger than 10 square feet.
- F. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.18 CONCRETE SURFACE REPAIRS

- A. Prior to all repairs, an as-built condition sketch and method of repair must be submitted to the Commissioner and Engineer of Record for review and approval.
- B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Commissioner.
- C. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with a bonding grout containing the

specified bonding admixture. Place patching mortar after while bonding grout is still tacky.

- D. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- E. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Commissioner. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discoloration's that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or pre-cast cement cone plugs secured in place with bonding agent.
- F. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- G. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for tureens of slope, in addition to smoothness, using a template having required slope.
- H. Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- I. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days, except at hydrostatic slabs.
- J. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete.

Finish repaired areas to blend into adjacent concrete. The specified underlayment compound or repair topping may be used when acceptable to Commissioner.

- K. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- L. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- M. Structural Repair: All structural repairs shall be made with prior approval of the Engineer of Record as to method and procedure, using the specified polymer repair mortar and/or specified epoxy adhesive. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified shall be used. In addition, all cracks shall be filled with the specified crack sealer or other method as approved by the Engineer of Record. All garage slabs shall be repaired prior to the slab being treated with the specified penetrating anti-spalling sealer.
- N. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material. Underlayment application shall achieve the tolerances specified in "MONOLITHIC SLAB FINISHES" above.
- O. Specified Polymer Horizontal Repair Mortar: All exposed floors shall be leveled, where required, with the specified self-leveling repair topping.

- P. Repair Methods not specified above may be used, subject to acceptance of Commissioner.

3.19 FOUNDATION WALLS

- A. The contractor shall form and leave openings in walls as shown on drawings and approved shop drawings for work of other contractors. These openings shall be temporarily closed and when so directed, the contractor shall point up in solid and neat manner with waterproofed cement.

3.20 WORK IN CONNECTION WITH OTHER TRADES AND CONTRACTS

- A. Sleeves, pockets, openings, etc., shall be set in the concrete walls and arches as required for the mechanical trades as shown on approved shop drawings; these shall be encased or built into the concrete work and shall be properly placed and secured in position in the forms before concrete is placed.
- B. Provide all chases, pipe slots, etc., required for the mechanical trades (see mechanical drawings), constructed as shown on the approved shop drawings.
- C. Leave temporary access panels where required to install mechanical equipment as required by trade affected. Panels shall be formed with construction joints as specified. Details for such panels shall be submitted to Commissioner for approval.
- D. Coordinate all penetrations, cutting, and patching with waterproofing contractor.

3.21 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The City of New York will employ a testing laboratory to perform tests and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by the Commissioner.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of discharge for each truck; additional tests when concrete consistency seems to have changed.
3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each truck of air-entrained concrete.
4. Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens made.
5. Compression Test Specimen: ASTM C 31; one set of 5 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
6. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 25 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimens tested at 7 days, three specimens tested at 28 days, and one specimens retained in reserve for later testing if required.
 - a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - c. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
7. Water Cement Ratio Test: Check water content of concrete in accordance with 'Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying, AASHTO DESIGNATION: TP 23, SHRP DESIGNATION: 2027' for testing procedure.
8. Test results will be reported in writing to Commissioner, Engineer of Record, 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.

- a. Non Compliance: All test reports indicating non-compliance shall be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.
 - b. Nondestructive Testing: Windsor probes, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
9. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Commissioner. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

3.22 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the Section 01506 Construction Waste Management and to the maximum extent feasible.
- B. Collect cut off steel and discarded reinforcement steel and place in area for recycling.
- C. Place materials defined as hazardous or toxic waste in designated containers.
- D. Use trigger operated spray nozzles for water hoses and closed loop system to reduce water consumption.
- E. Reusable forms should be cleaned immediately after removal and non-reusable forms recycled to the maximum extent economically feasible.

- F. Incorporate crushed concrete or masonry materials in sub-base to the maximum extent feasible in accordance with sub-base specifications.
- G. Before concrete pours, designate location or uses for excess concrete. Options include:
 - 1. Additional paving
 - 2. Post footing anchorage
 - 3. Landscaping -- site concrete features
 - 4. Flowable fill
- H. To avoid contamination of the local landscape, before concrete pours, designate a location for cleaning out concrete trucks where run-off can be contained, reused or incorporated. Options include:
 - 1. Company owned site for that purpose
 - 2. On-site area to be paved later in project

END OF SECTION*

SECTION 03320 - CONCRETE FLOOR TOPPING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the concrete floor topping as shown on the drawings and/or specified herein, including but not limited to the following:
1. Concrete topping slabs with polished finishes, including trowel smooth finish and sealant.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast in place concrete – Section 03300.
- C. Carpentry – Section 06200.
- D. For hydronic piping- Division 15.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: ACI 301 "Specifications for Structural Concrete Buildings"; ACI 318, "Building Code Requirements for Reinforced Concrete"; and ACI 302; comply with applicable provisions.

- B. Comply with ACI 302 section 7.7.2 and 7.8.

C. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
 3. Regional Materials Content: For all concrete mixes, provide the following for each mix component accounting for more than 1% the mix by weight, letters indicating the following information:
 - a. Indication of the distance from the project site to the point of extraction and from the project site to the point of processing.
 - b. Indication of the percentage, by weight, represented by the component in the mix.
 - c. Indication of unit cost (per cubic yard of similar units) of all components used in the mix.
- D. Manufacturer's Data: Submit manufacturer's product data with installation instructions for materials including reinforcement, admixtures, joint materials, curing materials and others as requested by Design Consultant.
- E. Laboratory Reports: Submit 2 copies of laboratory test or evaluation reports for concrete materials and mix designs. Do not use mix until approved by Engineer.
1. Mix Proportions and Design: Proportion mixes complying with mix design procedures specified in ACI 301.

- F. Shop Drawings: Include concrete floor topping fabrication and installation requirements. Include plans, elevations, sections, component details, and attachments to other Work.
- G. Samples: Submit 12-inch-square by full profile samples of each different pattern, finish, mix, coarse and fine-aggregate gradations, and type of concrete required. Provide minimum 12-inch-long samples of each type accessory item required.
- H. Maintenance Instructions: Submit 2 copies of written instructions for recommended periodic maintenance of concrete finish provided.
- I. Submit batch ticket information for each truck mix with certification that batch complies with final approved design mix.

1.5 QUALITY ASSURANCE

- A. ACI Standards: Comply with ACI 301, "Specification for Concrete"; and ACI 117, "Specifications for Tolerances for Concrete Construction and Materials," unless more stringent provisions are indicated.
- B. Manufacturer Qualifications: A firm experienced in manufacturing concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer's Instructions: In addition to specified requirements, comply with manufacturer's instructions and recommendations for substrate preparation, materials storage, mixing application and finishing.
- C. Applicator/Installer Qualifications: Engage an experienced Applicator who has complete concrete polishing applications similar in material and extent to that indicated for Project and that has resulted in construction with a record of successful in-service performance.
- D. Mock-Up: Prior to start of work, provide mock-ups of each type and finish of specified assemblies, including each type of accessory to be used in the finished Work. Provide off-site mock-ups of scope and location as selected by the Architect. Mock-ups shall be a 15 ft x 15 ft sq. selection within specified joint strips, showing the full range of variation of texture and finish of approved batch design mix. Include in mock-up, multiple pours from separate proposed design mixes until approved by Architect. Obtain Architect's acceptance of mock-up's material quality and workmanship before start of work. Retain accepted mock-ups as a standard for judging Work of this Section.
- E. Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to concrete flooring including, but not limited to, the following:
 - 1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review special concrete floor designs and patterns.
 - 4. Review preparation plan for base slab.

5. Review proposed protection procedures during curing and subsequent work of other trades.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number, if any.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Maintain temperatures above 50 deg F for 48 hours before and during installation.
- B. Control and collect dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.
- C. Provide dustproof partitions and temporary enclosures to limit dust migration and to isolate areas from noise. Comply with all Contract requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III.
- B. Standard Aggregate: ASTM C 33.
- C. Standard Topping: Design mix to produce topping material with following characteristics:
 1. Compressive strength, 3500 psi minimum.
 2. Slump, 4" maximum.
 3. Cement per cu. yd., 590 lb. minimum.
 4. W/C ratio, 0.51 maximum.
- D. Mixing: Provide batch type mechanical mixer for mixing topping material at project site. Equip batch mixer with a suitable charging hopper, water storage tank, and a water-measuring device. Use mixers which are capable of mixing aggregates, cement and water into a uniform mix within specified time, and of discharging mix without segregation.
 1. Mix each batch of 2 cu. yds., or less, for at least 1-1/2 minutes after ingredients are in mixer. Increase mixing time 15 secs. for each additional cu. yd. or fraction thereof.
- E. Fiber Mesh Reinforcement: Fiber mesh 300 (1-1/2 lbs. Per cy), or approved equal.

1. No exposed fiber on finished surface.
 2. Coordinate sealer and finishes.
- F. Joints: Provide control and construction joints as indicated or required. Use standard pre-molded joint filler at perimeters finished with backer rod and sealant.
- G. Reinforcing
1. 0 - 3" depth of topping slab: Fiber mesh reinforcement.
 2. 3" - 7" depth of topping slab: Wire mesh reinforcement.
 3. Temperature reinforcement where recommended by Structural Engineer.
- H. Bonding Agent: Larsens (or equal), for intended purpose.
- I. Penetrating Liquid Hardener: Chemically reactive, waterborne solution of inorganic silicate or silicon ate materials and propertied components.
- J. Interior Floor Sealer: Seal 341 by Hillyard or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where concrete floor topping is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.

3.2 INSTALLATION

- A. Topping Applied to Hardened Concrete: Remove dirt, loose material, oil, grease, paint or other contaminants, leaving a clean surface.
1. Base slab surface shall be brushed with a coarse wire broom and roughened by chipping or scarifying before cleaning a minimum of 1/16" in depth.
- B. Placing and Compacting: Spread topping mixture evenly over prepared base, bring to required level with straight-edge and strike-off. After placement, do not work surface further until ready for floating. Begin floating when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power driven floats. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units.
- C. Slab Finishes
1. Screed to true and level alignment unless indicated sloped on drawings, then uniformly slope as indicated.
 2. Tool all salient edges of concrete.
 3. Do not absorb water with neat cement.

4. Make sharp arrises at wall to floor conditions unless otherwise indicated.
 5. Finish/steel trowel.
- D. Check and level surface plane to tolerance not exceeding 1/4" in 10' when tested with a 10' straightedge. Cut down high areas and fill low areas. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth finish.
1. Wet cure topping after refloating surface.
- E. Performance: Failure of concrete topping to bond to substrate (as evidenced by a hollow sound when tapped), or disintegration or other failure of topping to perform as a floor finish, will be considered failure of materials and workmanship. Repair or replace toppings in areas of such failures.

END OF SECTION

SECTION 03700 – CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Overall work under this Contract shall include all labor, materials, equipment, supervision, coordination efforts, permitting costs, certificate costs, services, filing fees, testing costs, and all other associated or related items specified herein that are necessary and are required to complete the Work. Work elements shall include, but not be limited to the following:

- 1. Installation of average strength concrete for miscellaneous exterior site improvements.

1.3 RELATED SECTIONS AND DOCUMENTS

- A. Green Building requirements – Division 1.
- B. Section 02205 – Protection, Demolition, and Relocation of Existing Utilities
- C. Section 02370 – Erosion Controls
- D. Section 02510 – Water Distribution
- E. Section 02530 – Sanitary Sewerage
- F. Section 02630 – Storm Drainage
- G. Section 02890 – Traffic Signage
- H. Contract Documents

1.4 GENERAL REQUIREMENTS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents. The Contractor must accept the site as is and shall be deemed to have inspected the site and reviewed all Contract Documents.

1.5 QUALITY ASSURANCE

- A. The Contractor shall submit the required submittals to the Commissioner at least one week prior to the start of construction for approval.

1.6 SUBMITTALS

- A. Concrete Formula: Before the contractor begins to manufacture concrete, he shall secure the Commissioner's approval of the formula he proposes to use. He shall

submit for this purpose a statement, in writing, of the sources of all ingredient materials, the type and brand of the cement and the number of pounds of each of the materials in a saturated surface-dry condition making up on cubic yard of concrete. The range of water-cement ratios within which the concrete will be manufactured and the method of mixing to be employed shall also be stated. The approved formula shall not be changed without written permission of the Commissioner.

- B. Material Certificates: Submit materials certificate to the Commissioner which is signed by material producer and Contractor, certifying that materials comply with, or exceed, the requirements herein.

PART 2 - PRODUCTS

2.1 AVERAGE CONCRETE

- A. Cement: Air Entraining Portland Cement shall comply with the ASTM Specification for Portland Cement, Designation C150. It shall be Type IIA, Moderate Sulfate Resistant.
- B. Concrete: Concrete shall be placed as shown. Concrete shall conform to N.Y.C. Dept. Of Transportation class B-32, Type II A, air entrained, moderate sulphate resistant. The batch shall contain a minimum of six (6) bags of cement per cubic yard of concrete, maximum of 6¼ gallons of water per bag, a maximum of three (3") inch slump, and compressive strength of 3200 psi. Large aggregate shall be limited to one (1") inch.
- C. Maximum size aggregate is limited to a mixture of AASHTO #7 and smaller particles.

2.2 FORMS

- A. The Contractor shall furnish and place forms as required and shall remove them as directed by the Commissioner.

2.3 CURING

- A. All finished concrete shall be protected and kept moist in accordance with ACI 308R-01 and as directed by the Commissioner.

2.4 SURFACE FINISH

- A. Immediately after removing forms, cut back all metal form ties wet and fill all voids and honeycombing with mortar, 1:2 mix.
- B. Unless otherwise indicated on the contract plans, the concrete surfaces shall be rubbed smooth with carborundum bricks to the satisfaction of the Commissioner.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install as required by the Contract Documents and as directed by the Commissioner.

END OF SECTION

SECTION 04225 - AUTOCLAVED AERATED CONCRETE UNITS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the AAC work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
1. Fabrication, transportation, and erection of Autoclaved Aerated Concrete (AAC) units and associated components.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast In Place Concrete - Section 03300.
- C. Miscellaneous Metals - Section 05500.
- D. Cement Board Rainscreen System – Section 07450.
- E. Waterproofing System for Walls – Section 07542.
- F. Firestops and Smoke seals - Section 07840.
- G. Joint Sealers - Section 07900.

1.4 REFERENCES

- A. American Concrete Institute (ACI):
1. ACI 318: Building Code Requirements for Structural Concrete.
 2. ACI 530: Building Code Requirements for Masonry Structures.

3. ACI 530.1: Specifications for Masonry Structures.

B. ASTM:

1. ASTM C 1386: Standard Specification for Precast Autoclaved Aerated Concrete (PAAC) Wall Construction Units.

2. ASTM C 1555: Standard Practice for Autoclaved Aerated Concrete Masonry.

C. Underwriters Laboratories, Inc. (UL):

1. UL 263 (ASTM E 119): Fire Tests of Building Construction Materials.

1.5 DEFINITIONS

A. AAC Unit: Autoclaved Aerated Concrete Unit or Autoclaved Aerated Concrete Block.

B. Bed Joint: Horizontal mortar joint between two AAC units.

C. Head Joint: Vertical joint between two AAC units.

D. AAC Masonry Block System: Combination of AAC units and thin-bed mortar bonded together vertically and horizontally to form complete assembly; for load-bearing and non-load-bearing applications.

E. Strength Class: AAC-2, AAC-3, AAC-4, or AAC-6.

1.6 PERFORMANCE REQUIREMENTS

A. Conform to standards and recommendations of the Autoclaved Aerated Concrete Products Association (AACPA) and the manufacturer.

B. AAC manufacturer shall be a current member of the Autoclaved Aerated Concrete Products Association (AACPA).

C. The components and assemblies of the AAC system shall comply with the Codes and regulations of all Governing Agencies having jurisdiction. When applicable Codes or specified requirements differ, the more stringent conditions shall be provided. Except when applicable codes make other provisions, or as otherwise noted herein, the loads shall act in combinations that provide the most unfavorable conditions.

1.7 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data:
1. Manufacturer's product data for the AAC Integrated Construction System, including AAC units and thin-bed mortar. Provide actual AAC unit dimensions.
 2. Material Safety Data Sheets (MSDS) for AAC, thin-bed mortar and finish materials.
 3. Finishes: Submit manufacturer's full range of colors, textures and finish patterns for selection by the Commissioner.
- C. Quality Control Submittals:
1. Certificate from the AAC manufacturer indicating AAC product is manufactured in accordance with ASTM C 1386.
 2. Current Legacy Report number or Evaluation Report number for the AAC manufacturer.
 3. Mix designs for grout.

- D. Shop Drawings: Submit fully engineered shop drawings showing sizes, dimensions, sections and profiles of AAC units, arrangement and provision for jointing, anchoring, reinforcement and fastening, supports and other necessary details for reception of other work. Include the following:
- E. Engineering Calculations: Submit engineering and design calculations to substantiate the anchoring methods, design of vertical and horizontal reinforcement and fastening devices for all AAC elements indicated on the submitted shop drawings.
1. Calculations shall establish compliance with specified stress at all principal elements and the structural analysis of all connections. If calculations indicate any deficiencies, provide all items necessary to comply with the performance requirements without cost to the Owner.
 2. Calculations shall be submitted on 8-1/2" x 11" sheets and shall be signed and sealed by a professional engineer registered in the State of New York.
 3. Design wind pressures shall be 45 psf Overall Building Wind Pressure, negative and positive.
 4. Design computation to include additional stresses due to change in temperature within a range +/-700F.
- F. The manufacturer shall not proceed with fabrication of any products prior to receiving approval of samples and erection drawings by the Commissioner.

1.8 QUALITY ASSURANCE

- A. Quality Control: The Commissioner shall have the right to reject components and assemblies during assembly and erection of AAC if the workmanship and intent are not in strict accordance with the approved samples, shop drawings, field mock-ups, documentation and certifications. The Commissioner retains the right to be considered the sole judge of the quality of AAC.
- B. Installer Qualifications: Engage an AAC trained installer who has the necessary equipment and experience in AAC system handling, placement and installation.
- C. Mock-ups:
1. Lay 6'-0" long by 4'-0" high sample wall with AAC units. Orient wall as directed by Commissioner.
 2. The following items are to be approved:
 - a. Mortar joints.
 - b. Control joint complete with joint sealant.
 - c. Patching of chips and corners.
 - d. Workmanship.
 - e. Reinforcement, if required.
 3. Prepare sample wall at least 14 days prior to beginning AAC unit work. Should wall be disapproved, prepare additional walls until approved by Commissioner.

4. Maintain wall throughout work as standard of AAC unit work. Do not destroy wall until directed by Commissioner.

1.9 PERFORMANCE REQUIREMENTS

- A. LEED Performance Criteria: Autoclaved aerated concrete units and associated products shall contain post-industrial and/or post-consumer recycled content as specified below. Certification of recycled content shall be in accordance with the LEED Submittal Requirements of this Section.
- B. Recycled Steel: Reinforcing bar, steel wire, welded wire fabric and miscellaneous steel accessories shall contain a minimum of 75 percent (by weight) recycled content, calculated by adding the post-consumer recycled content percentage to one-half of the post-industrial recycled content percentage.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and handling:
 1. Deliver AAC products and accessory items to the designated storage area.
 2. Designated storage area shall be located at or near the staging areas, minimizing excessive handling of AAC material.
- B. Storage and protection:
 1. Offload AAC units with appropriate equipment and store pallets of AAC material on dry, level ground or surface. Placing AAC units in direct contact with earth is prohibited.
 2. AAC units shall be stored in an area and manner to prevent breakage, cracking, chipping, spalling or other damage.
 3. Protect AAC units from oil and chemical staining.
 4. Protect AAC material from the weather and keep covered until ready for installation.
 5. Packaged materials shall be delivered in the original, unopened containers of the manufacturers and stored in water protected areas.
 6. Store and protect reinforcement and anchors so that when placed, they will be free of soil, dirt, ice, loose rust scale, grease or other coatings which would destroy or reduce bond with mortar.

1.11 PROJECT CONDITIONS

- A. Cold Weather Construction: When ambient air temperature is below 40° F, implement cold weather procedures and comply with the following:
 1. Preparation: Comply with the following requirements prior to conducting AAC masonry work:

- a. Do not lay AAC units having either a temperature below 20° F or containing frozen moisture, visible ice, or snow on their surface.
 - b. Remove visible ice and snow from the top surface of existing foundations to receive new construction and AAC units. Heat these surfaces above freezing, using methods that do not result in damage.
2. Construction: These requirements apply to work in progress and are based on ambient air temperature. Do not heat water or aggregates used in mortar or grout above 140° F. Comply with the following requirements during construction during the following ambient air conditions:
- a. 40° F to 32° F: Heat sand or mixing water to produce mortar temperature between 40° F and 120° F at the time of mixing. Grout does not require heated materials, unless the temperature of the materials is below 32° F.
 - b. 32° F to 25° F: Heat sand and mixing water to produce mortar temperature between 40° F and 120° F at the time of mixing. Maintain mortar temperature above freezing until used in AAC masonry. Heat grout aggregates and mixing water to produce grout temperature between 70° F and 120° F at the time of mixing. Maintain grout temperature above 70° F at the time of grout placement. Heat AAC units to a minimum temperature of 40° F before installing thin-bed mortar.
 - c. 25° F to 20° F: Comply with Section 1.08.A.2.b and the following: Heat AAC masonry surfaces under construction to 40° F and use wind breaks or enclosures when the wind velocity exceeds 15 mph. Heat AAC masonry to a minimum of 40° F prior to grouting.
 - d. 20° F and Below: Comply with Section 1.08.A.2.c and the following: Provide an enclosure and auxiliary heat to maintain air temperature above 32° F within the enclosure.
 - e. Apply finish base coating or textured coating when temperatures are above 45° F. Do not apply to frozen surfaces.
3. Protection: These requirements apply after AAC masonry is placed and are based on anticipated minimum daily temperature for grouted AAC masonry and anticipated mean daily temperature for ungrouted AAC masonry. Maintain the temperature of AAC masonry above 32° F for the first 4 hours after thin-bed mortar application. Protect completed AAC masonry in the following manner during the following ambient air conditions:
- a. 40° F. to 25° F: Protect newly completed AAC masonry by covering with a weather-resistive membrane for a minimum of 24 hours after completion of work.
 - b. 25° F to 20° F: Cover newly constructed AAC masonry completely with weather-resistive insulating blankets, or equal protection, for 24 hours after completion of work. Extend time period to 48 hours for grouted AAC masonry, unless the only cement in the grout is Type III Portland cement.
 - c. 20° F and Below: Maintain newly constructed AAC masonry temperature above 32° F for at least 24 hours after being completed by using heated enclosures, electric heating blankets, infrared lamps, or other acceptable methods. Extend time period to 48 hours for grouted AAC masonry, unless the only cement in the grout is Type III Portland cement.

- B. Hot Weather Construction: Implement approved hot weather procedures and comply with the following provisions:
1. Preparation: Prior to conducting AAC masonry work:
 - a. When the ambient air temperature exceeds 100° F or exceeds 90° F with wind velocity in excess of 8 mph:
 - 1). Spread mortar beds no more than 4'-0" ahead of AAC units.
 - 2). Set AAC unit within one minute after spreading mortar.
 - b. When the ambient air temperature exceeds 115° F, or exceeds 105° F with a wind velocity greater than 8 mph, implement the requirements of Section 1.08.B.1.a and shade materials and mixing equipment from direct sunlight.
 2. Construction: While AAC masonry work is in progress:
 - a. When the ambient air temperature exceeds 100° F or exceeds 90° F with a wind velocity greater than 8 mph:
 - 1). Maintain temperature of mortar and grout below 120° F.
 - 2). Flush mixer and mortar transport container with cool water before they come into contact with mortar ingredients or mortar.
 - b. When the ambient temperature exceeds 115° F, or exceeds 105° F with a wind velocity greater than 8 mph, implement the requirements of Section 1.08.B.2.a and use cool mixing water for mortar and grout. Ice is permitted in the mixing water prior to use. Do not permit ice in the mixing water when added to the other mortar to grout materials.
 - c. Do not apply base coating or textured coating when ambient temperatures are over 90° F. Protect base coating from excessive evaporation during hot, windy, or dry conditions by pre-wetting substrate. Protect from rain.
 - d. Do not apply joint sealant when ambient temperatures are over 100° F.
 3. Protection: When the mean daily temperature exceeds 100° F, or exceeds 90° F with a wind velocity greater than 8 mph, fog spray newly constructed masonry until damp, at least three times a day until the AAC masonry is three days old.

1.12 SEQUENCING AND SCHEDULING

- A. Loading AAC unit walls or columns is prohibited prior to the following:
1. Uniform Floor or Roof Loads: 12 hours, minimum.
 2. Concentrated Loads: Three days, minimum.
- B. Construction activities coordination specified in other Sections for work built into walls:
1. Work required under this Section includes chase and routing coordination with construction activities specified in other Sections.
 2. As walls are completed, coordinate with work required in other Sections for chases or routing areas required in AAC walls for electrical, plumbing, and other items.

3. Request relevant construction activities to mark actual routing or chase locations; include required depth.
4. Fill in chases and routed areas as specified in other Sections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. AAC Manufacturers:

1. AERCON Florida, LLC, Haines City, FL.
2. E-Crete, LLC, Scottsdale, AZ.
3. Texas Contec, Inc., San Antonio, TX.
4. TruStone America, Providence, RI.
5. Or approved equal.

2.2 MANUFACTURED UNITS

A. AAC Units:

1. Composition: Autoclaved aerated concrete mixture consisting of quartz / sand / silica source, lime, cement, proprietary additives, and water.
2. Nominal dimensions: As shown on drawings.

B. Compression Strength and Density: In accordance with ASTM C 1386.

C. Fire Ratings: In accordance with UL 263 or ASTM E 119.

D. Acoustical Ratings: In accordance with ASTM E 90.

2.3 ACCESSORIES

A. Mortar Materials:

1. AAC Unit Head Joint and Bed Joint Mortar; Products:

- a. AERCON Florida, LLC, AERCON Thin Bed Mortar.
- b. E-Crete, LLC, E-Crete AAC Block Mortar.
- c. Texas Contec, Inc., Contec Mexicana Thin Bed Mortar.
- d. Elite Cement Products, Inc., Thin Bed Mortar.
- e. Sider-Oxydro, Inc., Thin Bed Mortar.
- f. Or approved equal.

2. Leveling Bed Mortar: ASTM C 270, Type M or Type S.

3. Aggregate:

- a. Leveling Bed Mortar: Clean, hard, natural, washed sand in accordance with ASTM C 144.
 - b. Masonry Grout:
Fine Aggregate: ASTM C 404, Size No. 1
Coarse Aggregate: ASTM C 404, Size No. 89.
4. Water: Clean, potable, free from deleterious amounts of alkalies, acids, and organic materials.
- B. Bond Beam and Grouted Cell Reinforcement: ASTM A 615, Grade 40 or 60 deformed type for #3 and larger bars; actual sizes indicated on Contract Drawings.
 - C. Backer Rods and Sealants: Specified in Joint Sealants Section.
 - D. Fire-Rated Insulation for Penetrations of Rated Walls: Specified in Firestopping Section.
 - E. Fasteners and Anchors: Compatible with AAC materials. Allowable loading determined by independent laboratory or manufacturer's testing. The use of powder-actuated fasteners in AAC is strictly prohibited.
 - F. Gauge Metal Anchors: Galvanized steel, bent per drawings with factory-drilled holes to accept screws and anchor.

2.4 MIXES

- A. Mortar proportions:
 1. AAC Unit Head Joint and Bed Joint Mortar: Mix in accordance with manufacturer's mixing instructions.
 2. Proportion materials by volume in accordance with ASTM C 270 for leveling course only. Use AAC thin-bed mortar for head and bed joints and other joints in AAC work.
- B. Grout proportions:
 1. Fine and Coarse Grout: Proportion materials by volume in accordance with ASTM C 476.
 2. Slump: 8" to 11" measured in accordance with ASTM C 143.

2.5 FINISHES

- A. All paints, stuccos, coatings, etc., indicated on drawings shall be specifically formulated for use with AAC. Vapor permeability (PERM rating of the coating) as determined in accordance with ASTM E 96 shall not be less than 5.
- B. All colors and aggregate for finish coat shall be factory mixed from the same production run to assure consistent installed color and texture.
- C. Finish Accessories: Corner reinforcement, expansion joints, casing beads and the like shall be made of rigid vinyl designed for exterior use.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection:

1. Keep walls dry during erection by covering at end of each work period with non-staining waterproof membrane covering.
2. Protect partially completed walls not being worked on with non-staining waterproof membrane until construction activities specified in other sections completes protection of walls.
3. Covering: Overhang at least 2'-0" on each side of wall; anchor on each side of wall.
4. Protect finished exposed work from stains.
5. Take particular care to keep AAC units clean.
6. Brace walls during construction to protect from wind or seismic damage.

3.2 INSTALLATION

A. Workmanship:

1. Lay AAC units plumb, level, and true to line for range.
2. Lay units in running bond with 4" minimum head joints lap in alternate courses. Align units to allow cores and openings to be filled with grout, when required.
3. Cut AAC units with unit manufacturer recommended hand type saw or electric bandsaw specially designed for cutting AAC units. Lay out units to minimize cutting.
4. Prepare AAC bearing surfaces required to receive other structural work at the specified elevation. Adjust height of bearing course and/ or starter course by cutting, sanding, rasping AAC units as necessary to achieve proper elevations. Bearing surfaces shall be level and smooth.

B. Building in Other Work:

1. Install work of other sections required to be incorporated with AAC units as work progresses; include anchors, and accessories. Space and align built-in parts; exercise care not to disturb other materials from position.
2. Coordinate with sequencing and scheduling for required routing and chases.
3. Fill in interior spaces around built-in items with fine grout or interior plaster.
4. Fill in exterior spaces around built-in items with fine grout or stucco.

5. Fill hollow metal frames in AAC unit walls with fine grout as wall is laid. Rake back joint between hollow metal frame and adjacent AAC unit to receive sealant at butt type frames.
- C. Mortar Joints:
1. Head and Bed Joints:
 - a. Lay first course in full bed of leveling bed mortar in thickness necessary to level AAC unit top; not less than 1/4".
 - b. Clean head joint and bed joint of dust and loose particles and apply AAC unit head joint, if specified, and bed joint mortar on full face of AAC unit already laid.
 2. Place each block as close to head joint as possible before lowering the block onto the bed joint. Avoid excessive movement along bed joint. Make adjustment while mortar is still soft and plastic by tapping to plumb and bringing to alignment.
 3. Check each AAC unit as laid with mason's level for level and plumb with wall below. Rasp top of block course, if necessary, to ensure a level bed joint for the next course.
 4. Remove and replace mortar with fresh mortar, where adjustment must be made after mortar has started to set.
 5. Keep bed and head joints uniform in width, approximately 3/8" maximum, tooled cove.
 6. Take particular care to avoid spreading mortar on exposed face of AAC unit. Only normal mortar droppings will be accepted on face of AAC unit; remove only after mortar has dried enough not to smear.
- D. Prior to grouting operations, thoroughly wet all cells and grout contact surfaces.
- E. Joint treatment: Remove excess extruded mortar immediately after laying AAC unit; tooling joints is not required.
- F. Control Joints:
1. Make joint 3/8" wide, unless indicated otherwise, rake out control joints to depth of 3/8" while mortar is still plastic.
 2. Provide joints at 24'-0" o.c. unless otherwise indicated.
 3. Leave joint open and clean for caulking in accord with Joint Sealants Section.
- G. Tolerances:
1. Maximum variation from plumb: 1/4" in 10'-0"; not exceeding 3/8" in 20'-0".
 2. Maximum variation from level: 1/4" in 20'-0", not exceeding 3/8" in 49'-0" or more.
 3. Maximum variation in linear building line from location indicated: 3/8" in 20'-0".

3.3 CLEANING AND PATCHING

- A. Keep AAC unit work free of mortar droppings as work progresses and, at completion of work, rasp AAC unit to remove excess mortar
- B. Patch AAC units with excessive chips.

END OF SECTION

SECTION 05450 - CHAIN LINK MECHANICAL ENCLOSURE

PART 1 GENERAL

1.1 WORK

- A. Under these Items, the Contractor shall furnish and erect powder coated chain link fence mechanical enclosure and gates of the height and size shown on the drawings, in accordance with the plans and specifications and directions of the Engineer.

1.2 INTENT

- A. It is the intent of these items to effectively enclose the mechanical equipment shown on the plans, and the clear spaces between the fence and roof shall not exceed four inches (4") inches. Closures, if necessary, shall be made by the Contractor in a manner approved by the Commissioner and provide operable or removable portions (doors/swing gates/panels) to allow maintenance.

1.3 RELATED SECTIONS

- A. Roof Waterproofing System - Section 07541.
B. Mechanical - Division 15.

1.4 SUBMITTALS

- A. All submittals shall be in accordance with the requirements of the General Conditions.
- B. Certification: The Contractor shall submit, at his own expense, a certification from the supplier for the following:
1. All castings are made from malleable iron.
 2. All hot-dipped galvanized items have met the ASTM serial designations as indicated in this specification.
 3. All powder coating meets the ASTM serial designations as indicated in these specifications.
- A. Shop Drawings: Before the work in the shop is started, the Contractor shall submit shop drawings for approval. Include complete details of fence and gate construction, fence height, post spacing, dimensions and unit weights of framework and base plates. Coordinate all post and gates with rooftop mechanical equipment.
- B. Samples: Prior to erection of the fence the following shall be submitted:
1. Fence framework: One piece of each pipe size, twelve (12") inches long.
 2. Fence Fabric: One piece twelve (12") inches square.
- C. Shipping Lists: The shipping list for the materials furnished shall be endorsed with the manufacturer's voucher certifying that the materials used comply with these specifications.

PART 2 MATERIALS

2.1 COMPONENTS

- A. All fittings, hardware and equipment shall be designed to carry one hundred percent (100%) overload.
- B. Malleable iron castings shall be powder coated after hot dipped galvanizing in accordance with ASTM Serial Designation: A-153-82.
- C. Pressed steel fittings and appurtenances shall be powder coated after hot dipped galvanizing in accordance with ASTM Serial Designation: A-123-89.
- D. All fittings, hardware and equipment shall be powder coated of a color to match the framework and shall be of the materials listed in the following schedule:

1. FENCE/GATE PART	MATERIAL
2. Boulevards, Corner (Split)	Malleable Iron or Pressed Steel-3/16" thick
3. Fittings and End Fittings	Malleable Iron or Pressed Steel-3/16" thick
4. Post Caps and Post Line Tops	Malleable Iron or Pressed Steel - 3/16" thick
5. Couplings	Galv. Steel Pipe - 1/8" thick with 1/4" Dia. Full Depth Rivet
6. Gate Hinges	Malleable Iron or Pressed Steel-1/4" thick with 1" Dia. Stainless Steel Pin Welded to 1/2" thick Pin Support
7. Bolts and Nuts	Galv. Steel or Stainless Steel as indicated on Plans
8. Tension Bars	1/4" x 3/4" Galv. Steel for 2" and 1-3/4" Mesh, 3/16" x 3/8" Galv. Flat Steel for 1" Mesh
9. Tension Bands	1/8" x 1" Pressed Steel
10. Truss Rods	1/2" Dia. Galv. Steel
11. Truss Tightener	3/8" x 1" Galv. Steel
12. Truss Clamp	1/4" Pressed Steel
13. Locking Device	Outer Housing - Malleable Iron Inner Parts, including Bolt- Stainless Steel, 18-8, 14 gauge
14. Gate Stop	7/16" malleable iron
15. Drive Pins and Set Screws	Stainless Steel, 18-8

E. POSTS AND RAILS

1. TYPE I - Posts and rails shall be standard weight galvanized steel pipe of the sizes shown on the plans and shall conform to ASTM Serial Designation F-1083 Schedule 40. Posts and rails shall be hot dip galvanized inside and outside in accordance with ASTM Serial Designation F-1083 or:
2. For fence up to and including ten (10) feet height, posts and rails may be TYPE II, SS-40 steel tubing as manufactured by Allied Tube and Conduit Corp. of Harvey, Illinois, or approved equal. Tubing must conform to ASTM A-569, cold rolled steel pipe and coated with a minimum of 0.9 ounces of zinc per square foot, a minimum of 15 micrograms of zinc chromate per square inch. Steel pipe supplied under this option shall be of the same outside diameter as Schedule 40 pipe and achieve a minimum yield strength of 50,000 p.s.i.

F. SURFACE COATINGS

3. All posts, rails and fittings shall be powder coated with either polyvinyl chloride (PVC) or TGIC-Polyester (with the exception of the turnbuckles and threaded ends of the truss rods, both of which shall be sprayed with powder coat touch-up after installation).
2. Galvanizing of all components shall provide an acceptable substrate for applied powder coatings. No lacquer, urethane or other coatings which would prevent proper adhesion of powder coating shall be applied to the pipe.
3. The powder coating shall be applied to the galvanized surfaces in such a manner that the coating will not peel off. Insure surfaces to be coated are clean and dry and free of grease, dust, rust, etc. All coated parts shall first receive phosphating and chromating treatments to improve the adhesion of the surface coating. Color to be black unless otherwise indicated on the plans.
4. The entire fence installation shall be coated with one of the two following types of powder coating, (with the exception of gates, all of which shall be TGIC-Polyester and fabric which shall always be PVC). All Fence components shall be coated on all surfaces, of a color to match the framework. All coated surfaces shall comply with the adhesion specifications listed in ASTM F1043.
 - a. TYPE A - Polyvinyl Chloride Powder Coating: PVC Powder coating shall be applied to the galvanized steel or iron by the fluid bed method to a preheated base which has been cleaned and primed prior to submersion in vinyl, resulting in a firm bond between the PVC and the metal. PVC shall be applied to a film thickness of 10 to 15 mils on framework and fittings, and 7 to 12 mils on fabric without voids, tears or cuts that reveal the substrate and shall thoroughly adhere to the metal without peeling when scratched with a pick device or knife blade point.
 - b. TYPE B - TGIC-Polyester Powder Coating: TGIC-Polyester Powder shall be applied to the galvanized steel or iron in such a manner that the coating will not peel off. The TGIC-Polyester shall be applied at a film thickness of 3 to 6 mils by electrostatic spray process and bake finished per manufacturer's directions. The TGIC-Polyester shall be applied without voids, tears or cuts that reveal the substrate and shall thoroughly

adhere to the metal without peeling when scratched with a pick device or knife blade point.

1. TESTS:

- a. Field Test For PVC Powder Coating: As per ASTM F668, three sample sections of the PVC powder coated fence shall be tested for bonding of the powder coat to the metal. Each test will consist of making two cuts parallel to the axis of the pipe or fitting, through the coating, appx. 1/16 inch (1.6 mm) apart, at least 1/2 inch (12.7 mm) long. With a knife peel back a section of the coating between 1/8 inch (3.2 mm) and 1/4 inch (6.4 mm) long to produce a tab. Attempt to remove the 1/16 inch strip of coating by pulling the tab. The fence shall be deemed acceptable if the coating breaks rather than separates from the metal on all three samples.
- b. Laboratory Test For TGIC-Polyester Powder Coat: At the discretion of the Engineer, a sample of the TGIC-Polyester powder coated fence shall be laboratory tested for bonding of the powder coating to the metal. Test shall be the Cross Hatch test per ASTM D3359, Method B. Failure to satisfactorily pass this test shall be a basis for rejection.

2. TOUCH-UP & REPAIR

- a. For minor damage caused by installation, transportation, field welding and cutting of metal powder coated surfaces: clean welds, bolted connections, abraded or sawcut areas, then:
- b. On welded and cut surfaces, apply organic zinc repair paint complying with ASTM A780, then repair powder coating per number 2 below. Galvanizing repair paint shall have 65 percent zinc by weight. Thickness of repair paint shall be not less than that required by ASTM A123.
- c. On damaged powder coated surfaces, touch-up finish in conformance with manufacturer's recommendations. Provide touch-up such that repair is not visible from a distance of six feet (6').

G. FABRIC

1. Fabric shall be hot dip galvanized steel wire mesh as per ASTM A641, with a thermally fused polyvinyl chloride powder coating of 7 to 12 mils thick as per ASTM F668 class 2b. Color to match framework. Fabric shall be produced by methods recognized as good commercial practices. Core wire tensile strength shall be 75,000 psi (517 MPa).
2. Wire used for the manufacture of fabric shall meet the requirements of ASTM F668 and shall be capable of being woven into fabric without the PVC coating cracking or peeling. PVC coating shall be a dense, impervious covering free of voids. Excessive roughness, bubbles, blisters, bruises and flaking will be a basis for rejection. PVC shall be thermally fused. Bonded or extruded and glued surface coating will not be permitted. Fabric shall be stretched to provide a smooth, taut, uniform appearance free from sag.
3. Field Test: PVC coating on fabric shall be field tested for adherence to the metal as outlined elsewhere in this specification.
4. Thickness of Fabric: One (1) Inch Mesh: Uncoated wire dimension shall be .120

- inches in diameter (11 gauge). Zinc coating shall be 0.30 ounces per square foot of wire surface.
5. One and Three Quarter (1-3/4) Inch and Two (2) Inch Mesh: Uncoated wire dimension shall be .148 inches in diameter (9 gauge). Zinc coating shall be .3 ounces per square foot of wire surface.
 6. Selvages: Fabric shall be barbed at the top and knuckled at the bottom on fences over 6'-0" high. Fabric on fences 4'-0" and 6'-0" shall be knuckled top and bottom. Loops of knuckled fabric shall be closed or nearly closed. The wire ends of barbed selvages shall be twisted in a closed helix of 1- matching turns and cut at an acute angle. The length of the ends beyond the twist shall be at least 1/4 inch long. One (1) inch mesh shall be knuckled both top and bottom.
- H. TIES: Tie-wire core thickness shall be 9 gauge (.148") wrought aluminum alloy 1100-H16 wire with an extruded vinyl coating in accordance with ASTM A641 Class 3. PVC shall be applied to a film thickness of 20 to 22 mils. Ties shall be spaced fifteen (15) inches apart on rails and twelve (12) inches apart on posts. The ends of ties shall be wound in a telegraph twist two and one half turns. Color to match mesh. Contractor shall touch-up PVC coating on ties damaged as result of installation.
- I. GATES: Gates shall be furnished and installed where indicated on the plans or directed by the Engineer. All gates shall be galvanized steel and shall be TGIC-Polyester powder coated after fabrication per requirements for fence framework outlined elsewhere in this specification. Welded joints shall have a suitable rust preventive coating applied to the welds prior to powder coating. Gate fabric shall match line fabric adjacent to gate opening. Gates shall be installed plumb, level and secure for full opening without interference. The hinges shall be so designed to permit the gate to swing a full 180 degrees.
- J. Gate Locking Device: Install heavy-duty stainless steel chain and compatible padlock.
- K. PADLOCK: The Contractor shall furnish one (1) padlock for each single gate and each leaf of double gates. The padlocks shall be American No. 5571 as manufactured by American Lock Co. of Crete, Illinois, or approved equal. All padlocks for the same park facility shall be keyed alike, with two (2) inch width by three-quarter (3/4) inch thick brass body, maximum security, five (5) pin tumblers with hardened alloy steel chrome plated shackle no less than three-eighths (3/8) inch diameter and two (2) inch clearance (elongated shackle). A galvanized steel chain, nine (9) inches long shall be fastened to the gate and body of each lock. The chain shall be five-sixteenths (5/16) inch by one and three-eighths (1-3/8) inch. The Contractor shall furnish two (2) keys for each padlock.

PART 3 INSTALLTION

3.1 ERECTION

- A. The posts shall be set on plates fastened to roof deck. After the posts have been set in place and properly supported to hold them in line and grade, coordinate bottom rail height with the roof membrane installation. All gates and all end, corner and gateposts, regardless of height of fence shall have a 1/2" diameter

truss rod and turnbuckle. Rod shall be tied to the mesh every 12 inches on center with tie-wires. Bolts on the turnbuckle shall be tack welded to prevent loosening. The only exception to the above is that truss rods are not required for end, corner and gateposts for fences 4'-0" ht. and under. Utilize appropriate fastener depth to avoid penetrating roof decking.

- B. Chain link fabric shall be attached to line and corner posts and top, intermediate and bottom rails. Maintain a min. 1" (inch) clearance between finished grade and fence fabric. Posts shall be set plumb and true to line and grade. Any post not set true to line and grade shall be removed and replaced at the Contractor's expense. Bending posts to make them plumb will not be permitted.
- C. Coordinate waterproofing at all post and plate connections to roof deck, as shown on drawings.
- D. The Contractor shall maintain the chain link fences and gates during the life of the contract and shall repair and replace all members that are disturbed, damaged, or destroyed from any cause at no cost to the City of New York.

END OF SECTION

SECTION 05500 - MISCELLANEOUS METALS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the miscellaneous metal work as indicated on the drawings and/or specified herein, including but not limited to, the following:
1. Rough hardware.
 2. Steel fencing and gates, with mesh infill (i.e. green screen).
 3. Handrails.
 4. Window security bars and grilles (at roof monitors).
 5. Stainless steel window and door surrounds.
 6. Ladder at roof hatch.
 7. Loose steel lintels.
 8. Masonry support steel.
 9. Light steel framing and supports, not included as part of work of other trades.
 10. Sleeves in concrete walls and slabs.
 11. Interior bollards.
 12. Exterior bollards, fixed and removable.
 13. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.

14. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
15. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Waterproofing System For Walls- Section 07542, for waterproofing of below-grade plates and vertical posts of the green screen.
- C. Sheet Metal Work – Section 07600.
- D. Finish Hardware – Section 08700.
- E. Painting and Finishing - Section 09900.

1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- C. Reference Standards: The work is subject to requirements of applicable portions of the following standards:
 1. "Manual of Steel Construction," American Institute of Steel Construction.
 2. AWS D1-1 "Structural Welding Code," American Welding Society.
 3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning," Steel Structures Painting Council.
 4. SSPC PA-1 "Painting Application Specification," Steel Structures Painting Council.
 5. "Handbook on Bolt, Nut and Rivet Standards," Industrial Fasteners Institute.
- D. Steel Materials: For steel to be hot dip-galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.
- E. Engage the services of a galvanizer who has demonstrated a minimum of 3 years' experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and

coatings within the same facility as outlined herein. The Commissioner has the right to inspect and approve or reject the galvanizer/galvanizing facility.

- F. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program which has been in effect for a minimum of five years and shall provide the Commissioner with process and final inspection documentation. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.
- G. Inspection and testing of hot-dip galvanized coating shall be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. **Manufacturer's Literature:** Submit manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.
 - C. **Shop Drawings:** Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items. Show all finish hardware.
 - D. **Engineering Data**
 1. Before any miscellaneous metal work is fabricated, submit engineering data drawings to the Commissioner for review indicating how performance standards specified here shall be met. The Contractor is responsible for the structural design and supports for these systems and must show the proposed systems on these drawings.
 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared, signed and sealed by a Structural Engineer licensed in the State of New York.
 - E. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, weld and tack weld are not acceptable.
 - F. **Certification:** For items to be hot-dip galvanized, identify each item galvanized and to show compliance of application. The Certificate shall be signed by the galvanizer and shall contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.
- 1.6 LEED BUILDING PERFORMANCE CRITERIA
- A. The following criteria are REQUIRED for the products included in this section:
 1. Every effort shall be made to maximize post industrial/post consumer waste but miscellaneous metals shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements. This minimum is for the overall miscellaneous metal, i.e. not every component has to achieve 50% recycled content target individually but the overall percentage of metal submitted under this Section has to be minimum 50% recycled content target, on a material cost basis.

2. Miscellaneous metals manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

1.7 STRUCTURAL PERFORMANCE STANDARDS

- A. Railings and ladders shall be constructed to conform to the following performance standards:
 1. Railings and ladders shall support a live load of one hundred (100) psf and a concentrated live load of three hundred (300) lbs. and shall have a live load deflection limited to 1/360 of the span. Loads shall not apply simultaneously.
 2. Railings shall be designed to resist loads as specified in Article 3, Section 27-558 of the New York City Building Code. At a minimum, handrails shall be capable of resisting a 200 lb. force applied to rail from any direction and a uniformly distributed load of 50 lbs. per linear foot applied downward or horizontally, loads not to act simultaneously.
 3. Structural performance of ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

PART 2 PRODUCTS

2.1 MATERIALS

A. Metals

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Steel Plates, Shapes and Bars: ASTM A 36.
3. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
4. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
5. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.
6. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
7. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
8. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
9. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

10. Stainless Steel: Comply with the following standards for the forms and types of stainless steel for the required items of work:

- a. Sheet, Strip, Flat Bar and Plate: ASTM A 666, Type 316.
- B. Grout: Non-shrink, non-metallic grout conforming to the requirements of CSI Section 03300.
- C. Fasteners
 1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
 2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
 3. Anchor Bolts: ASTM F 1554, Grade 36.
 4. Lag Bolts: ASME B18.2.1.
 5. Machine Screws: ASME B18.6.3.
 6. Plain Washers: Round, carbon steel, ASME B18.22.1.
 7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
 8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
 9. Lock Washers: Helical spring type carbon steel, ASME B18.21.1.
- D. Shop Paint: Shop prime all non-galvanized miscellaneous metal items using Series 88 Azeron Primer made by Tnemec or approved equal.
- E. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.
- F. Galvanize Repair Coating: For touching up galvanized surfaces after erection, provide repair coating conforming to ASTM A 870 equal to Z.R.C. Cold Galvanizing Compound made by Z.R.C. Chemical Products Co. or approved equal.

2.2 PRIME PAINTING

- A. Scope: All ferrous metal (except galvanized steel) shall be cleaned and shop painted with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.
- B. Cleaning: Conform to Steel Structures Painting Council Surface Preparation Specification SP 3 (latest edition) "Power Tool Cleaning" for cleaning of ferrous metals which are to receive shop prime coat.
- C. Application
 1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces shall be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.

2. Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures shall be only as stated in said instructions.
 3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall be shipped until the shop prime coat thereon has dried.
- D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.
- E. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 GALVANIZING

- A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, shall be cleaned and then hot-dipped galvanized after fabrication as provided by Duncan Galvanizing or approved equal.
- B. Avoid fabrication techniques that could cause distortion or embitterment of steel items to be hot-dip galvanized. Fabricator shall consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.
- C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.
- D. Application: Hot-dip galvanizing shall be applied in accordance with:
1. ASTM A 143: Safeguarding Against Embitterment of Hot-Dip Galvanized Structural Steel.
 2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware - Table 1.
 4. ASTM A 385: Practice for Providing High Quality Zinc Coatings.
 5. ASTM A 924: Galvanized Coating on Steel Sheets.
 6. Minimum weight of galvanized coating shall be 2 oz. per square foot of surface.
- E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.

- G. To minimize surface imperfection (eg: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.
- H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.
- I. Galvanized surfaces, where exposed to view, must have a smooth, level surface finish. Where this does not occur, piece shall be rejected and replaced to the acceptance of the Commissioner.

2.4 PROTECTIVE COATINGS

- A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

2.5 WORKMANSHIP

A. General

1. Miscellaneous metal work shall be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.
 2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.
 3. All work shall be accurately and neatly fabricated, assembled and erected.
- B. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Shop-assemble work in largest practical sizes to minimize fieldwork. It is the responsibility of the miscellaneous metal subcontractor to assure himself that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item shall be returned to the shop for correction.
 - C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.
 - D. Holes: Drill or cleanly punch holes; do not burn.
 - E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to weather. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide expansion and

contraction joints to allow for thermal movement of metal at locations and by methods approved by Commissioner.

1. Welding
 - a. Shall be in accordance with "Standard Code for Welding in Building Construction" of the American Welding Society, and shall be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
 - b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welds are required to be flush.
 - c. All welds on or behind surfaces which will be exposed to view shall be done so as to prevent distortion of finished surface. Remove weld spatter and welding oxides from all welded surfaces.
2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads exposed to view shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent metal.
- F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.
- G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- I. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- J. Exposed Work
 1. In addition to requirements specified herein and shown on drawings, all surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs, and other defects which mar appearance of finished work.
 2. Metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.

3. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- K. Preparation for Hot-Dip Galvanizing: Fabricator shall correctly prepare assemblies for galvanizing in consultation with galvanizer and in accordance with applicable Reference Standards and applicable AGA publications for the "Design of Products to be Hot-Dip galvanized After Fabrication." Preparation shall include but not be limited to the following:
1. Remove welding flux.
 2. Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

2.6 MISCELLANEOUS METALS ITEMS

A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in CSI Section 06200 "Carpentry".
2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood connections; elsewhere, furnish steel washers.

B. Loose Steel Lintels

1. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise indicated.
2. At columns or vertical surfaces where lintels cannot bear on masonry, provide clip angles sized for structural capacity of lintel.

C. Steel Fencing / Green Screen: Fabricate fencing and gates to design indicated from galvanized steel bars and shapes of sizes and profiles indicated. Interconnect members with full-length, full-penetration welds, unless otherwise indicated. Use welding method that is appropriate for metal and finish indicated and that develops full strength of members joined. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.

1. Provide steel mesh infill as indicated. Attach to fencing and gates by bolting or welding, unless otherwise indicated. Furnish all required heavy-duty gate hardware as approved by the Commissioner.
2. Furnish inserts and other anchorage devices to connect fencing to concrete work. Coordinate anchorage devices with supporting structure.

3. Provide all steel members with a factory-applied galvanized finish.

D. Miscellaneous Light Steel Framing

1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and shall be provided with all necessary supports and reinforcing such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.
2. All light steel framing steel shall be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction and as specified herein.

E. Stainless Steel Window and Door Surrounds

1. Provide stainless steel sheets formed to the profiles and thicknesses shown on the drawings.
2. Remove or blend tool and die marks and stretch lines into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
3. Finish to be satin, directional polish: No. 6 finish.
4. When polishing is complete, passivate and rinse surfaces. Remove foreign matter and leave surface chemically dry.

F. Masonry Support Steel

1. Provide galvanized steel, relieving angles, plates, accessories and other steel shapes for masonry support steel; for lintels refer to "Loose Lintels" above.
2. Fabricate masonry support steel to allow final adjustment with the closest tolerances possible. Relieving angles which require cutting to fit masonry flashing shall be straightened without deflections.
3. Coordinate masonry support system with concrete work for locations of wedge inserts.
4. Install to meet requirements of building masonry work, face brick coursing and stone placement. Coordinate final adjustments with masonry work as work progresses.

G. Ladders

1. Vertical steel ladders shall be 18" wide with $\frac{3}{4}$ " diameter non-slip steel rungs spaced 12" o.c.
2. Stringers shall be $\frac{3}{8}$ " thick by 2- $\frac{1}{2}$ " wide steel bars; rungs welded to bars.

3. Attach ladder to walls 6" from top and bottom and maximum 36" o.c. from these points.

H. Steel Pipe Handrails

1. Steel pipe of size shown on drawings, schedule 40 galvanized or stainless steel as indicated.
2. Construction: Form direction changes in rails with shop-welded connections whenever feasible, ground smooth and flush. Field connections must be welded and ground smooth and flush.
3. Installation: For steel pipe posts where indicated, anchor posts in concrete by means of pipe sleeves set and anchored in to concrete. Provide sleeves of galvanized steel pipe, not less than 6" long and having an inside diameter not less than $\frac{1}{2}$ " greater than the outside diameter of the inserted pipe. Provide steel plate closure secure to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joints with a round steel flange welded to posts. Posts shall be set plumb within $\frac{1}{8}$ " vertical tolerance. Install railings with top of handrail 34" to 36" above stair nosing, per NYCBC.
4. Provide top landing handrail extension of 12" minimum, a bottom landing handrail extension of 12" plus one tread, minimum, and install top of handrail at 34" to 36" above top of stair nosing.

I. Interior Steel Bollards:

1. Provide extra-strong (schedule 80) steel pipe, concrete filled, welded to inner pipe sleeve and steel base plate, anchored to concrete with four stainless steel threaded rod anchors bolts.
2. Rabbet top of steel pipe and insert $\frac{1}{4}$ " steel plate cap, flush with top of pipe. Weld top of cap to pipe and grind smooth and flush.
3. See drawings for sizes.
4. Prime and finish paint per Section 09900 Painting and Finishing. See drawings for color.

J. Exterior Steel Bollards (fixed and removable):

1. Provide extra-strong (schedule 80) galvanized steel posts, concrete filled.
2. Sleeves shall be standard weight galvanized steel pipe (schedule 40).
3. Post caps shall be malleable iron, $\frac{3}{16}$ " minimum thickness.
4. All drive pins, set screws and other fastening accessories to be 18-8 stainless steel.
5. Provide one padlock per removable bollard, Master Pro Series 6125LJ, manufactured by Master Lock Company, or approved equal. All padlocks shall be

keyed alike, with two and three-eighth inch (2 3/8") width, by three-quarter inch (3/4") thick laminated steel body, maximum security, five (5) pin tumblers with hardened boron alloy shackle no less than three-eighth inch (3/8") diameter, two and one-half inches (2-1/2") vertical clearance and 29/32" inches horizontal clearance. The Contractor shall supply three (3) keys for each padlock.

6. The posts for the fixed bollards shall be set in concrete footings shown on the plans. The sleeves for the removable bollards shall be set in concrete footings shown on the plans.
7. Provide powder coating on all exterior bollards, TGIC-Polyester or equal. The powder coating shall be applied to a properly-prepared galvanized substrate at a film thickness of 3 to 4 mils by electrostatic spray process and bake finish per manufacturers' direction. Color selected from manufacturers' standard colors at submittal phase.
8. See drawings for sizes and locations of components.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where miscellaneous metal is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 ERECTION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
- C. Fitting Connections: Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance, and quality of welds made, and methods used in correcting welding work.

- E. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- F. Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.
- G. Field Touch-Up of Powder Coated Surfaces (bollards): Touch-up finishes in conformance with manufacturers' recommendations. Provide touch-up such that repair work is not visible from a distance of 6 (six) feet.

END OF SECTION*

SECTION 06126 – WOOD TRUSSES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this section shall be governed by the contract documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.
- B. The work shall include but not be limited to the following:
 - 1. Shop fabricated wood trusses
 - a. Light metal plate connected wood trusses
 - 2. Truss connector plates
 - 3. Anchoring means and methods
 - 4. Bridging, bracing

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Green Building requirements –Division 1.
- B. Carpentry- Section 06200.
- C. Architectural Woodwork – Section 06400.
- D. Painting and Finishing – Section 09900.

1.3 QUALITY ASSURANCE

- A. Reference Standards
 - 1. National Design Specification for Stress Grade Lumber and its Fastenings by National Forest Products Assoc.
 - 2. Timber Construction Standards - American Institute of Timber Construction.
 - 3. Truss Plate Institute - Design Specifications for Light Metal Plate Connected Wood Trusses
 - 4. Bracing Wood Truss Commentary (BWT - 76) or HFT - 80 by Truss Plate Institute.
- B. Manufacturer Qualifications
 - 1. The qualified component manufacturer shall be a member of the Truss Plate Institute and participate in the Quality Control Test Criteria Program, or show to the Architect a quality assurance program comparable to the TPI Testing Criteria Program. That Quality Assurance Program shall include, but not be limited to, the inspection of all phases of truss operations including: Lumber storage, handling, cutting procedures, presses or rollers, fabrication procedures and computer design programs specifically relating to the specific truss being fabricated for the project as approved in the truss design calculation sheet or printout.

C. Design

1. Wood trusses shall be designed by an approved member of the Truss Plate Institute and contain the following: Design and fabrication data: metal connectors, their gauge thickness, nominal sizes and exact placement locations at all joints; design criteria such as pitch, span, spacing of trusses and the species and stress grades of lumber to be used for members; design loading of trusses and allowable stress increase; camber; and permanent bracing required to prevent compression buckling of individual truss members.

1.4 SUBMITTALS

A. Shop Drawings

1. Submit shop drawings to the Architect for review in accordance with the requirements of the Contract Documents.
2. Shop drawings shall include plans, elevations, sections, and details noting dimensions, sizes of wood members, species, connectors, plates and anchoring means and methods.
3. Submit truss design drawings and calculations which shall be in accordance with Truss Plate Institute design, by computer method and signed and sealed by a licensed, qualified, engineer registered in the state of this project's location.

- B. Submit manufacturer's literature and catalog cuts, including method of calculating capacity of metal plate truss connectors.

- C. Submit appropriate EMRF per Green Building requirements. There is no Certified Wood requirement for this project.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Fabricated trusses and sub-assemblies shall be handled with care so that they are not subject to damage. If the trusses are to be stockpiled or stored prior to erection, they shall be set in horizontal position, resting upon temporary bearing supports and braced so they will not be subjected to no unusual bending or tipping over.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber

1. Lumber used for the truss members shall conform to the published stress ratings for the species and grades as set out in the official grading rules of the appropriate lumber association or as listed in the reference specifications: except that, wherever this specification, or notes on the plans or truss engineering design calls for lumber which exceeds the minimum set forth therein, the specifications, plans, and or truss engineering design shall be applicable.
2. The moisture content of all lumber shall be within the proper limits, as stated in the reference specifications, but shall not, in any case, exceed 19% nor be less than 7% at the time of fabrication.

B. Connectors

1. Truss connector plates shall be manufactured from only prime commercial quality galvanized sheet metal of no less than 20 ga. thickness with a minimum yield strength of 33,000 psi and a minimum ultimate tensile strength of 48,000 psi. The corrosion-resistant coating shall be G-60 commercial grade, hot-dipped galvanized before stamping.
2. Metal connectors shall be manufactured by a licensed member of the Truss Plate Institute. The connectors shall have a series of nail-like projections, which are designed to separate the fibers of the wood into which they are pressed, in accordance with accepted nailing practices.

2.2 FABRICATION

- A. Trusses specified herein shall be fabricated by a licensed member of the Truss Plate Institute or a franchisee of such a member.
- B. Trusses shall be fabricated in a properly equipped manufacturing facility of a permanent nature. They shall be manufactured by experienced workmen, using precision cutting and truss assembly methods and under the direct supervision of a qualified foreman. All trusses shall be fabricated under the strict rules of the Truss Plate Institute (TPI).
- C. Truss members shall be accurately cut to length and angle from straight lumber to assure tight joints for finished truss.
- D. Truss members and connector plates shall be properly placed in jigs and the members tightly clamped in place by means of pneumatic or hydraulic presses, remaining in that position until the connector plates have been pressed or rolled into the lumber simultaneously on both sides of the joints. Plates shall be placed symmetrically on both sides of each joint. Where trusses are to be exposed and placement of plates is critical, special care shall be exercised to align the plates with edges of lumber and to otherwise follow details shown on the drawings.
- E. Dead load camber shall be built into the trusses, as noted on the reviewed truss designs, by properly positioning the members in the fabricating jig. Floor truss camber shall be designed to $L/40$ where L is in span feet.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Study the contract drawings and specifications with regard to the work as shown and required under this Section so as to insure its completeness.
- B. Examine surfaces and conditions to which this work is to be attached or applied and notify the Architect if conditions exist which are detrimental to the proper and expeditious installation of the work. Starting on the work shall imply acceptance of the surfaces and conditions to perform the work as specified.

- C. Verify dimensions taken at the job site affecting the work. Bring field dimensions, which are at variance to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of installation.
- D. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

3.2 ERECTION AND INSTALLATION

- A. During erection exercise care to keep horizontal bending of the trusses to a minimum and to install trusses right side up and to have trusses positioned at their respective bearing points as indicated on the truss drawings.
- B. The permanent structural cross bracing, to insure the overall rigidity of the truss system, shall be in accordance with the manufacturer's requirements and the applicable building code.
- C. Install proper erection bracing to hold the trusses true and plumb and in safe condition until permanent truss bracing and bridging can be solidly nailed in place to form a structurally sound framing system. Erection and permanent bracing shall be installed and all components permanently fastened before the application of any loads to the trusses.
- D. Prefabricated wood trusses shall be installed in accordance with Bracing Wood Trusses Commentary (BWT-76) or HFT-80 as published by the Truss Plate Institute.
- E. Field erection of the trusses, including items such as proper handling, safety precautions, temporary bracing to prevent toppling or dominoing of the trusses during erection, and other safeguards or procedures consistent with good workmanship and good building erection practices, shall be the responsibility of the Contractor and the framing Subcontractor.
- F. Framing anchors and truss hangers shall be provided.
- G. Temporary construction loads shall be spread out over the truss members so as not to cause members stress beyond the limits of unit design.
- H. Installed trusses shall be plumb, rigid and secure, parallel to one another at proper spacing and rigidly anchored to the building structure and to each other.

END OF SECTION

SECTION 06200 - CARPENTRY

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the carpentry work as shown on the drawings and/or specified herein, including but not limited to, the following:
1. Blocking and miscellaneous wood.
 2. Rough hardware.
 3. Installation only of finish hardware.
 4. Installation only of hollow metal doors and frames.
 5. Plywood backing and sheathing.
 6. HDPE backing.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Architectural Woodwork - Section 06400.
- C. Steel Doors and Frames - Section 08100.
- D. Finish Hardware - Section 08700.

1.4 QUALITY ASSURANCE

- A. Lumber Standard: Comply with PS 20.
- B. Shop-fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.

- C. Grade Marks: Identify lumber and plywood by official grade mark.
1. Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
 - a. S-Dry: Maximum 19 percent moisture content as per ASTM D 2016.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.
- C. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.

1.6 LEED PERFORMANCE REQUIREMENTS

- A. Performance Requirements: The following criteria are required for the products included in this Section:
 - 1. All composite wood, engineered wood, or agrifiber products (e.g. plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Submit certificate substantiating meeting criteria.
 - 2. Field applied adhesives or sealants used for work in this Section shall meet the requirements of Green Building specifications in Division 1, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants and Architectural Coatings," where applicable.
 - 3. Engineered wood (except certified or salvaged wood) shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
 - 4. There is no requirement for Certified Wood on this project.
- B. Prohibited Carcinogenic Compounds (Pressure-Treated Wood): Contact International Agency for Research on Cancer (IARC), Lyon, France for list of prohibited compounds.

1.7 PRODUCT HANDLING

- A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.
- B. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.
- C. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of 6" above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.
- D. Do not store seasoned lumber in wet or damp portions of the building.
- E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.
- F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.

- G. All items specified in CSI Section 08700 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.
- H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

1.8 JOB CONDITIONS

- A. Contractor must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Resident Engineer in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Architect.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 PRODUCTS

2.1 WOOD MATERIAL

A. General

- 1. All wood shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
- 2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of 19 percent. Wood shall be S4S, S-Dry, complying with PS-20.

B. Wood Treatment

- 1. All interior wood material specified herein shall be fire retardant treated to comply with the AWPA standards (C20 for lumber, C27 for plywood) for pressure impregnation with fire retardant chemical to achieve a flame spread rating of not more than 25 (UL Class "FR-S") when tested in accordance with UL Test 723 or ASTM E 84. The fire retardant chemicals used to treat the lumber must comply with FR-1 of AWPA Standard P17 and be free of halogens, sulfates and ammonium phosphate.
 - a. After treatment, kiln dry to a moisture content of 15 percent; if wood is to be painted or finished, kiln dry to a moisture content of 12 percent. Treatment shall be equal to "Dricon" made by Arch Wood Protection Inc. or approved equal. Provide UL approved identification on treated materials.
- 2. For exterior blocking, furring, roofing and sheet metal, pressure treat wood with copper azole, Type A (CBA-A); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative shall

comply with AWPB Standard C-2 for lumber and C-9 for plywood, (0.25 lbs./cubic foot of chemical in wood).

- a. After treatment, kiln dry to a maximum moisture content of 15 percent. Treatment shall be equal to "Wolmanized Natural Select" made by Arch Wood Protection Inc. or approved equal.
3. Treated wood, which is cut or otherwise damaged, shall be further treated in accordance with the AWPB Standard M-4.

2.2 HARDWARE

- A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.
- B. Nails: Common steel wire, untreated for interior work as per Fed. Spec. FF-N-105.
- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:
 1. Bolts: FS-FF-B-575 and 584.
 2. Nuts: FF-N-836D.
 3. Expansion Shields: FS-FF-B-561.
 4. Toggle Bolts: FS-FF-B-588.
 5. Lag Screws and Bolts: FS-FF-B-561.
- D. Wood Screws: FS-FF-S-111D.
- E. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Architect.

3.2 HDPE BACKING PANEL

- A. Provide fire-rated HDPE backing panel on furring for wall-mounted equipment in Boat Storage. Color to be white, standard 4' x 8' sheets, 5/8" thick, manufactured by Altec Plastics, Boston, MA or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION OF FINISH HARDWARE

- A. All finishing hardware specified in CSI Section 08700 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.
- B. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.
- C. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.
- D. Unless otherwise noted, mount hardware units at heights established in CSI Section 08100.
- E. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- G. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- H. Cut and fit threshold and floor covers to profile of doorframes, with mitered corners and hairline joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- I. All keys used shall be construction keys, which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the Owner.
- J. Adjusting and Cleaning
 - 1. Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units that cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
 - 2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.3 INSTALLATION OF DOORS AND FRAMES

A. Preparation

1. Remove welded-in shipping spreaders installed at factory.
2. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16", measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16", measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16", measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16", measured at jambs on a perpendicular line from head to floor.
3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

B. Installation

1. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install standard steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. Install frames in accordance with ANSI 250.11-2001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
 - b. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Frames set in masonry walls shall have door silencers installed in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.

- a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to Section 04225 - "Autoclaved Aerated Concrete Units" for installation of frames in masonry walls.
5. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16", measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16", measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16", measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16", measured at jambs at floor.
7. Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - a. Non-Fire-Rated Standard Steel Doors:
 - 1). Jambs and Head: 1/8" plus or minus 1/16".
 - 2). Between Edges of Pairs of Doors: 1/8" plus or minus 1/16".
 - 3). Between Bottom of Door and Top of Threshold: Maximum 3/8".
 - 4). Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4".
- C. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed or otherwise unacceptable.

3.4 BLOCKING AND MISCELLANEOUS WOOD

A. General

1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.
2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.
3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

B. Blocking and Miscellaneous Wood

1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous wherever required, whether or not so indicated.
2. Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.
3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

C. Rough Lumber for Roofing and Sheet Metal

1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.
2. Wood blocking shall be of sizes and shapes as indicated on the drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.
3. All nailing strips and blocking shall be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of the roofing materials, and in coordination and cooperation with the sheet metal work trades.
4. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings, or secured by any other proposed flush surfaced fastenings.
5. Wood nailing strips or blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacings of nailing strips or blocking shall be performed in coordination with the concrete trades, as required for respective installations.

3.5 ROUGH HARDWARE

- A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.
- B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.

- C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than 16" apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than 16" apart.
- D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.
- E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding 30" o.c.
- F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.
- G. Detailed instructions with sketches of necessary requirements shall be given to the masonry trade showing the location and other details of such nailing devices.

3.6 CLEANING UP

- A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.
- B. Sweeping
 1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
 2. Remove the refuse to the area of the job site set aside for its storage.
 3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

SECTION 06400 - ARCHITECTURAL WOODWORK

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural woodwork as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Wood trim, moldings, base, frames and rails.
 2. Wood windowsills.
 3. Wood casework (millwork) and counters.
 4. Hardware for casework.
 5. Recycled glass/concrete countertops.
 6. Wood shelving and clothes rod.
 7. Wood framing and rough lumber as required for work of this Section.
 8. Wood T&G decking, including finishing.
 9. Wood grounds, blocking, nailers, electrical equipment panels, furring as required for work of this Section.
 10. All rough hardware and fastenings for work of this Section.
 11. Drilling concrete and masonry, drilling and/or tapping metal work, as required, for the installation of work of this Section.
 12. Back painting as specified herein.
 13. Shop finish of work of this Section, except items indicated herein to be shop primed only.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Carpentry - Section 06200.
- C. Caulking between architectural woodwork and any wall, floor, or ceiling joints - Section 07900.
- D. Painting and Finishing -Section 09900.

1.4 QUALITY STANDARDS

- A. The quality standards of the Architectural Woodwork Institute, "Quality Standards Illustrated," latest edition, shall apply to all workmanship for architectural woodwork and by reference are made a part of this specification. All work shall conform to "Premium" grade requirements of the AWI "Quality Standards Illustrated," unless otherwise modified herein.
- B. In the event of a dispute as to the quality grade (or grades), all parties involved will (1) call upon the Architectural Woodwork Institute for an inspection under AWI's established inspection procedures, and (2) agree to abide by the decision of AWI. The cost of said inspection shall be borne by the Contractor.
- C. Employ only tradesmen experienced in the fabrication and installation of architectural woodwork.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included

in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.

- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Shop Drawings

1. Submit shop drawings of all woodwork specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.
2. Shop drawings shall show all finish hardware, anchors, fastenings and accessories.
3. Shop drawings shall show all jointing, joint treatment and butt jointing in veneers and plastic laminate.
4. Shop drawings for wood paneling must show complete elevations of rooms to receive paneling as well as panel matching required by these specifications.

C. Samples: Submit samples of each of the following items:

1. Plastic laminate, 12" square, including a section of outside corner.
2. Each type and finish of each type of wood trim, molding, etc., 8" long, finish as specified.
3. Cabinet hardware.
4. Countertop.
5. Wood T&G deck with clear finish.

1.6 LEED PERFORMANCE REQUIREMENTS

A. Performance Requirements: The following criteria are required for the products included in this Section:

1. All composite wood, engineered wood, or agrifiber products (e.g. plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to,

phenol formaldehyde and methyl diisocyanate (MDI). Submit certificate substantiating meeting criteria.

2. Field applied adhesives or sealants used for work in this Section shall meet the requirements of Green Building specifications in Division 1, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants and Architectural Coatings," where applicable.
 3. Engineered wood (except certified or salvaged wood) shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
 4. There is no requirement for Certified Wood for this project.
- B. Prohibited Carcinogenic Compounds (Pressure-Treated Wood): Contact International Agency for Research on Cancer (IARC), Lyon, France for list of prohibited compounds.

1.7 QUALIFICATIONS

- A. The work of this Section shall be provided by a firm having a minimum of 3 years' experience on projects of similar size and quality to that specified and shown.

1.8 COORDINATION

- A. Coordinate the work of this Section with other appropriate Sections of the specifications to insure proper scheduling for fabrication and installation of the work specified herein
- B. Coordinate with partition and finish trades to insure that proper provisions are made for the installation of the work specified herein.
- C. Verify all dimensions in the field prior to fabrication of all Architectural Woodwork to assure proper fit.

1.9 PRODUCT HANDLING

- A. All materials and work of this Section shall be protected from damage, from time of shipment from shop to final acceptance of work. Cover, ventilate, and protect work of this Section from damage caused by weather, moisture, heat, staining, dirt, abrasions, any other causes which may adversely affect appearance or use, or which may cause deterioration of finish, warping, distortion, twisting, opening of joints and seams, delamination, loosening, etc., of work of this Section.
- B. Keep all finish carpentry, millwork, and cabinetwork under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork or cabinetwork before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection. Remove such protection when directed by the Commissioner.
- C. Deliver finish carpentry, millwork, and cabinetwork in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plasterwork are thoroughly dry.

- D. Damaged or defective items of work of this Section are subject to rejection and replacement with new by Contractor, at no cost to the City of New York.

1.10 JOB CONDITIONS

- A. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.
- B. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWI, for method of determining equilibrium moisture content values.
- C. Examination of Substrate and Conditions: The Contractor must examine the substrate and the conditions under which the work of this Section is to be performed, and notify the Resident Engineer in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- D. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior door in place, HVAC systems operational and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.
- E. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

PART 2 PRODUCTS

2.1 BASIC REQUIREMENTS

- A. Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of 9 to 12 percent for exterior work and 6 to 11 percent for interior work.
- B. Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain field measurements and verify all dimensions of shop drawing details as required for accurate fit.
- C. Compatibility of Grain and Color: Commissioner reserves the right to select materials for best compatibility between visually related members and veneers.
- D. Machine and sand woodwork to comply with requirements of Standards for specified grade.
- E. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.
- F. Miter joints by joining, splining and gluing to comply with requirements for the specified grade.

- G. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed or otherwise damaged or defective wood.

2.2 GENERAL - MATERIALS

- A. Softwood lumber shall conform to the requirements of the latest edition of American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Association having jurisdiction, and shall bear the official grade and trademark of the Inspection Bureau of the Association and a mark of mill identification.
- B. Framing and Rough Lumber: No. 1 KD grade Southern Pine or Dense Construction grade Douglas Fir, having extreme fiber in bending stress of at least 1700 psi, surfaced four sides (S4S). Provide fire retardant treatment meeting requirements of Section 06200, if any.
- C. Grounds, Blocking, Nailers, Furring: Southern Pine, Douglas Fir or Sitka Spruce, grade to suit particular purpose and to be straight, square edged, straight grained, surfaced four sides (S4S), and which will retain nails and screws without splitting. Provide fire retardant treatment.
- D. Lumber: AWI Section 100 with the following requirements:
 - 1. Hardwood for Transparent Finish: Premium Grade species as shown on drawings, and free from cat's eyes, bird's eyes, burls, curls or cross grains.
 - 2. Hardwood for Opaque Finish: Any hardwood which, when finished, will not show any grain, imperfection or other surface defects when used with the opaque finish specified.
- E. Plywood: AWI Section 200; Veneer core, particle or plywood core unless otherwise specified, and with the following requirements:
 - 1. Hardwood: Premium Grade, Section 200, face veneers as shown or specified.
 - 2. Particleboard: Premium Grade, Section 200, equal to Duraflake.
 - 3. Edges: Banded with hardwood in accordance with Premium Grade Standards.

2.3 WOOD DECKING

- A. Boards for Exterior (Roof) Decking: Provide boards hand selected for freedom from characteristics on exposed surfaces and edges that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane. Wood deck to be sealed with clear finish coat, low sheen, per requirements of Section 09900 Painting and Finishing.
 - 1. Boards: SPF (Spruce-Pine-Fir) Select Structural decking.
 - 2. Size: 2" x 6" nominal size.
 - 3. Maximum Moisture Content: 15 percent.
 - 4. Configuration: Tongue and groove, radius-edged.

5. All decking to be machine graded. See drawing for additional information

2.4 RECYCLED GLASS/CONCRETE COUNTERTOPS

- A. Provide "IceStone" recycled glass/concrete units as manufactured by IceStone LLC, Brooklyn, NY, or approved equal; in sizes and dimensions as shown on drawings.
 - 1. Sizes/Dimensions: As shown on drawings.
 - 2. Color(s): As shown on Drawings.

2.5 PLASTIC LAMINATE

- A. Face Sheets: NEMA Publication LD3, Grade GP50, Type I, 0.05" thick, as manufactured by Formica, Nevamar, Wilson-Art or approved equal. Color, pattern and finish as selected by the Commissioner at time of submittal.
- B. Backing Sheets: Non-decorative, high-pressure plastic laminate, NEMA LD3, Grade BK20, 0.02" thick.
- C. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified.

2.6 METAL

- A. Structural Steel Shapes and Plates: ASTM A 36.
- B. Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only. Galvanize sheets for planters.
- C. Primer for Unexposed Metal: Zinc chromate primer.

2.7 MISCELLANEOUS PRODUCTS

A. Fasteners

- 1. Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
- 2. Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.
- 3. Anchors: Type, size, material and finish as required for the condition of use.
- 4. Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.

B. Adhesives

- 1. For Laminating Plastic Laminate Surfaces: Melamine, phenol-resin, or resorcinol-resin complying with FS MMM-A-181; type, grade and best suited for the purpose.
- 2. For All Other Uses: Moisture resistant complying with FS MMM-A125, Type II, or MMM-A-188, Type I II or III.

2.8 CABINETS WITH PLASTIC LAMINATE FINISH

A. General

1. Fabricate all cabinetry and millwork to the "Premium Grade" standards of the AWI, Section 400.
2. Face construction of cabinets shall be "Flush Overlay."
3. Provide 3/4" thick doors, drawer fronts and fixed panels (including thickness of plastic) except where required to be thicker by Standards; and provide flush units.
4. Provide dust panels of 1/4" thick plywood or tempered hardboard above compartments and drawers, except where located directly below countertops.
5. Exposed Edges: Plastic laminate matching exposed panel surfaces. Ease exposed edge of overlap sheet.

B. Plastic Laminate

1. Plastic Laminate for Horizontal Surfaces: 0.050" thick, general purpose type (high pressure).
2. Plastic Laminate for External Vertical Surfaces: 0.028" thick, general purpose type (high pressure).
3. Plastic Laminate for Post Forming: 0.042" thick, post forming (high pressure).
4. Plastic Laminate for Cabinet Linings: 0.020" thick, cabinet liner (high pressure).
5. Plastic Laminate for Concealed Panel Backing: 0.020" thick, backer type (high pressure).
6. Plastic Laminate Colors and Patterns: As selected by the Commissioner from manufacturer's standard satin finish products. Manufacturers: Wilson-Art, Nevamar, Formica or approved equal.

C. Shop Assembly: All work shall be shop assembled. Work that is too large for entrance into the use area shall be fabricated in attachable sections with provisions for reconnection in the using space.

D. Material Thicknesses: See drawings for general materials thicknesses. Minimum thickness of solid lumber for web frames, trim, bases, etc., shall be 3/4". Minimum thickness of plywood and particleboard shall be 3/4".

E. Sizes: See drawings for woodwork sizes required. The manufacturer shall check field dimensions and verify all openings and actual field conditions prior to fabrication of work.

F. Manufacturer is responsible for rigidity and structural stability.

2.9 CABINET HARDWARE

- A. Architectural Woodwork Hardware: Provide the following items, or their approved equal, as required:

1. Hinges: Hafele concealed hinges, or approved equal.
2. Catches: Magnetic; top and bottom.
3. Pulls: Stainless steel wire pulls by Hafele, or approved equal.
4. Locks: assume all upper cabinets are locked, provided by hafele or approved equal.
5. Drawer Slides: Accuride, Model 7434, full extension, 100 lb. capacity, or approved equal.
6. Shelf Supports: Pin and grommet system equal to No. 282.01.701 pin and 282.50.704 grommet made by Hafele, or approved equal.
7. Finish: Satin Stainless Steel.
8. Closet Hardware: Oval wardrobe rails, chrome plated steel with center bracket and wall support brackets made by Hafele or approved equal.

2.10 WOOD FOR RAILS, CAPS, TRIM, BASES, MOLDINGS AND FRAMES

- A. Quality Standard: For the following types of interior architectural woodwork, comply with indicated standards as applicable.
 1. Standing and Running Trim: AWI Section 300.
 2. Miscellaneous Millwork: AWI Section 700.
 3. Rails: AWI Section 800.
- B. Wood Work for Transparent Finish: Except as otherwise indicated, comply with the following:
 1. Grade: Premium.
 2. Species of Solid Wood: Quarter Sawn Species as noted on drawings.
- C. Woodwork for Paint Finish: Except as otherwise indicated, comply with the following:
 1. Grade: Premium.
 2. Species of Solid Wood: Solid, paint grade, sound clear Poplar or Birch.

2.11 FABRICATION - GENERAL

- A. Provide lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.
- B. Do all fabrication from field measurement with provision for scribing as required to meet built-in conditions.
- C. Coordinate the work of this Section with the work of other trades.

- D. Fabricate units in largest practicable sections. Assemble in the shop for trial fit, disassemble for shipment and reassemble with concealed fasteners.
- E. Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.
- F. Details indicate the required type and quality of construction. Modifications to conform to manufacturer's standards will be considered providing they comply with the Contract Documents, maintain the profiles shown and subject to acceptance by the Architect.
- G. Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.
- H. Factory finish all items where possible. Defer final touch-up, cleaning and polishing until after delivery and installation.
- I. Comply with AWI Section 1500, Premium Grade for sanding, filling countersunk fasteners, back priming and similar preparations for the finishing of architectural woodwork, as applicable to each unit of work.
- J. Prepare all countersunk wood screw attachments for wood plugs. Wood plugs shall match surrounding species and grain direction; putty filling is not acceptable.

2.12 FABRICATION - SPECIFIC ITEMS

A. Casework

- 1. Provide casework in accordance with AWI Section 400, Premium Grade.
- 2. Include all preparations for mechanical, electrical, telephone and plumbing work required.
- 3. Provide cabinet hardware for casework as shown.
- 4. Provide dust panels in body webs and between drawer units.
- 5. Hollow core doors will not be permitted.
- 6. Provide drawers with slides as specified. Drawers shall not rest on web body frames.

B. Closet and Storage Shelving

- 1. Provide closet and storage shelving in accordance with AWI Section 600, Custom Grade, unless otherwise shown or specified.
- 2. Exposed edges shall have hardwood edge bands.

- C. Standing and Running Trim: Provide standing and running trim of the sizes, profiles, species and finish as specified or shown and complying with AWI Section 300, Premium Grade.

PART 3 EXECUTION**3.1 INSPECTION**

- A. Examine the areas and conditions where architectural woodwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 FRAMING

- A. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.
- B. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

3.3 GROUNDS, BLOCKING, NAILERS AND FURRING

- A. Provide all wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit the condition. Install grounds, blocking, nailers, furring, etc., rigidly, in proper alignment, trued with a long straight edge.

3.4 ROUGH HARDWARE

- A. Provide all rough hardware, such as nails, screws, bolts, anchors, hangers, clips and similar items. Hardware shall be of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner. Use galvanized hardware at exterior walls, and at other locations where subject to moisture or where water will be present.
- B. Secure wood to concrete and to solid masonry with countersunk bolts in expansion sleeves or other approved manner, to steel with countersunk bolts, to hollow masonry and to drywall with heavy duty countersunk toggle bolts. Space fastenings not more than 16" apart. Hardened cut nails, power-driven fastenings, or other suitable devices may be used where approved by the Commissioner.
- C. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage and shall permit the work to remain permanently in place without any splitting or opening of joints.

3.5 INSTALLATION OF CABINET FINISH HARDWARE

- A. All items of finish hardware furnished under this Section shall be carefully fitted and secured in place as part of the work of this Section. Locations and positioning of hardware shall be subject to the Commissioner's approval. Care shall be taken not to mar or damage hardware, or other work. Install doors plumb and true. Hardware shall be fitted to assure operation without forcing.
- B. After preliminary fitting of hardware, the Contractor shall remove trim for painting and finishing work; after which he shall reinstall the hardware in a permanent manner.

- C. Upon completion of the work, before final acceptance of the building by the Owner, the Contractor shall, in the presence of the Architect, show that all hardware is in satisfactory working order; fit all keys in their respective locks and, upon acceptance of the work, shall tag and deliver all keys to the City of New York.

3.6 GENERAL INSTALLATION

- A. General: Installation shall conform to the requirements of Section 1700 of AWI "Quality Standards Illustrated," 8th Edition.
- B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.
- C. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

3.7 TRIM, MOLDINGS, ETC.

- A. Install with minimum number of joints possible, using full-length pieces for each run. Stagger joints in adjacent and related members. Cope at returns, miter corner.
- B. Joints of all trim and/or moldings shall be set tight, miter exterior angles and cope interior angles. Joints, except end joints less than 12 feet apart, will not be permitted in straight runs of trim and/or moldings and rails.
- C. Secure all trim and/or moldings with glue and blind nail with finishing nails. Set exposed nail heads in finished work and putty. Sand all work to remove any tool marks and irregularities.
- D. Wood shall receive finish as specified in Section 09900 – Painting and Finishing.

3.8 CLOSET AND STORAGE SHELVING

- A. Provide closet and storage shelving at the locations shown. Provide hang rods where shown. Set adjustable center hangers.

3.9 CABINET WORK AND MILLWORK

- A. General
 - 1. Materials and workmanship shall conform to the Quality Standards of the Architectural Woodwork Institute specified herein and to the drawings.
 - 2. Cabinetwork and millwork shall be performed by experienced cabinet work and millwork company, having craftsmen skilled in their trade.

3. Fabricate all cabinetwork and millwork completely in the shop, in complete and/or as large units as practical, leaving only fitting, assembly, installation and a minimum of fabrication and finishing to be done at the building. Assembled work shall be rigidly secured and permanently fastened together with concealed fasteners.
 4. Afford Commissioner every facility for inspection of work at shop or mill at such times as the Commissioner may select.
 5. As far as practicable, use concealed fastenings for joining and assembling the work. Where this is impossible, the means of securing shall be placed in inconspicuous places and methods of joining and assembling submitted for Commissioner's approval prior to fabrication.
 6. Mill all finish wood accurately to detail, with clean cut moldings, profiles and lines, machined, sanded smooth, housed, jointed, blocked, put together in the best manner, with provision for swelling and shrinkage, and to assure the work remaining in place without warping, splitting or opening of joints.
 7. Cut trim to dimensions and profiles shown, from solid stock.
 8. Make all trim and the like in single lengths wherever possible; joints mitered, glued and splined. Continuous members shall have tight flush joints, doweled or splined and glued.
 9. Make all joints hairline tight, fitted accurately and joined with hardwood splines or dowels, glued together, or by other method approved by Commissioner. Use screws, not nails, for fastenings.
 10. Gluing shall, where practicable, be by the hot plate press method and glued surfaces shall be in close contact throughout. Glue stains on finished work will not be permitted.
 11. Cover surface fastenings, where permitted, with matching wood plugs or wood putty. Finish exposed edges of plywood with matching solid stock. Lock miter external corners; tongue and groove internal corners to allow for contraction and expansion.
 12. Machine sand with grain, finish with hand sanding, leave exposed surfaces free from machine or tool marks that will show through the finish.
 13. Work that adjoins drywall, concrete, or other finish shall be fitted and scribed in a careful manner and ample allowance shall be given for cutting and scribing.
 14. Erect work true to lines, levels and dimensions, square, aligned and plumb, securely and rigidly fastened in place.
- B. Cabinet Work: Provide all items of cabinetwork indicated on drawings and as herein specified.
1. Tops, sides, backs, bottoms, dividers, shelves, fronts, doors and drawer fronts shall be of plywood or flakeboard core, with plastic laminate finish.

2. Drawer sides and backs shall be 1/2" thick solid clear selected white birch, suitable for clear finish. Drawer bottom shall be 3/8" thick plywood with clear selected white birch veneers, suitable for clear finish.
3. Cabinet doors and drawers shall be flush mounted.
4. Adjustable shelves in cabinets shall have grommets spaced 2" o.c.
5. Fixed shelves shall be dadoed into side supports and glued.
6. Shelves shall be 3/4" thick for spans up to 30"; for spans in excess of 30" to 48" shelves shall be 1" thick.
7. All cabinets shall have closed top, sides, bottom, and back with veneers to match face work. Cabinets to fit accurately into indicated locations; scribe moldings permitted only where indicated.
8. Countertops, counters, counter fronts, shelves, etc., shall have plastic laminate shop applied to 3/4" thick core, with plastic laminate backing sheet on underside or back of countertops, counters and shelves. Plastic laminate shall be pressure laminated to core with laminate at external corners. Provide concealed wood framing to support plastic laminate counters, securely fastened to wall and to underside of counters.

3.10 WOOD BASES

- A. Provide plywood backing, toggle bolted to substrate, if substrate not suitable for securing wood base.
- B. Machine wood bases from specified wood, to profiles indicated on drawings.
- C. Set base level and plumb. Where indicated on drawings, face of wood base shall be flush with wall above. Glue wood base to substrate or to plywood backing, and screw or nail wood base to substrate or to plywood backing with countersunk wood screws or with finishing nails, recess wood screw heads, and spackle with wood putty, set and spackle nails with wood putty. Do not nail or fasten wood base to floor. Ends of wood base shall be either splined or ship lapped.
- D. Where no wood backing occurs, screw apply base at each stud with screw countersunk and wood putty applied and sanded smooth and flush with base.

3.11 PAINTING AND FINISHING

- A. General: All woodwork shall be prime coated under this section. Field finish painting shall be by painting Subcontractor, as specified for in Painting and Finishing Section.
- B. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one coat of oil based paint prior to installation, shop applied where practicable.

3.12 CLEAN UP AND PROTECTION

- A. Clean Up: At regular intervals during the course of the work, all debris and excess material shall be cleaned up and removed from the site. Upon completion of installation, clean all spaces of debris caused by woodwork installation.
- B. Protection: Protect all woodwork from marring, defacement or other damage until final completion and acceptance of the project by the Owner. Repair or replace all defective units prior to final inspection as directed by the Architect. Any units that cannot be satisfactorily repaired in the opinion of the Owner shall be replaced with new units of same original design, at no additional cost to the Owner.

END OF SECTION

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SECTION 07130 - SHEET MEMBRANE WATERPROOFING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet membrane waterproofing as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
 - 1. Sheet membrane waterproofing for underslab conditions. See drawings for extent and designation.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast In Place Concrete - Section 03300.
- C. Waterproofing System for Walls- Section 07542.

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).

- 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Shop Drawings: Typical installation details, showing details at flashings, at terminations, at joints, at intersection of horizontal and vertical surfaces, and at penetrations in membrane system.
- C. Samples - Submit
1. Membrane, 6" x 6" samples of each membrane.
 2. 6" x 6" sample of flashing.
 3. 6" x 6" sample of drainage board.
- D. Manufacturer's literature: Submit manufacturer's technical, safety data sheets, and installation literature for all materials of this Section. Submit Independent Test data indicating that membrane meets properties specified herein.
- E. General Contractor's Certification: Submit per Article 1.7.
- 1.5 STORAGE OF MATERIALS
- A. All materials shall be stored in their original tightly sealed containers or unopened packages; shall be clearly labeled with the manufacturer's name, brand name and number, and batch number of the material with expiration date where appropriate.
 - B. Materials shall be stored in a neat and safe manner so as not to exceed the allowable live load of the storage area.
 - C. Material shall be stored out of the weather in a clean, dry area.

- D. Liquid materials, such as adhesives, thinners and primers, shall be stored in areas away from sparks, open flames and excessive heat.

1.6 JOB CONDITIONS

- A. No application of liquid applied urethane flashing shall commence or proceed during inclement weather, or the threat of imminent precipitation.
- B. All surfaces to receive the system shall be thoroughly dry and free of dew or frost.
- C. Application temperatures are not limited except that materials shall be stored until time of mixing at temperatures above 60 deg. F. to maintain a consistency suitable for mixing. Do no work below 40 deg. F.
- D. Prior to and during application, all dirt and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air, or similar methods.
- E. Surfaces not designated to receive the system shall be properly masked or otherwise protected against accidental spillage or application of the material to those areas.

1.7 WARRANTY

- A. The General Contractor shall warranty the waterproofing system executed under this Section to be watertight and free from defects in materials and workmanship for a period of 10 years from date of acceptance of this Contract, and that he, at his own expense, repair and/or replace all other work which may be damaged as a result of such defective work, and which becomes defective during the warranty period.

1.8 QUALITY ASSURANCE

- A. Preinstallation Conference: Approximately 2 weeks prior to scheduled commencement of waterproofing installation, meet at Project site with Waterproofing Installer; preparer of substrate to receive waterproofing; installers of other work in and around waterproofing that must precede, follow, or penetrate waterproofing (including Mechanical and Electrical Installers as applicable); Commissioner; and waterproofing manufacturer's representative to review materials, procedures, schedules, and other requirements and conditions related to installing waterproofing.
- B. Qualifications of Contractors
 - 1. Contractors: All work of this Section shall be performed by a Contractor who is approved by the manufacturer of the waterproofing material.
 - 2. Qualifications of Contractors: Contractors shall submit evidence of being bona fide waterproofing Contractors, for a period of not less than 3 years, and that they are approved by the manufacturer of the waterproofing material for the installation of the manufacturer's material in accordance with the requirements of this Section.
 - a. Contractor shall submit a letter from manufacturer of waterproofing material stating that Contractor is approved by the manufacturer for the application of the waterproofing systems specified and accepted for use on the Project.
 - b. Letter shall certify that the Contractor has previously and satisfactorily applied the waterproofing systems specified herein, under manufacturer's supervision.

- c. Letter shall be on manufacturer's letterhead and shall be signed by an officer of the company, not by a local sales representative.

C. Manufacturer's Representative/Contractor's Certification

1. Representative of the waterproofing material manufacturer shall be required to provide field instructions and supervision for the installation of the waterproofing systems at the start of the work of this Section.
2. The manufacturer's representative shall be required to make sure that the workmen for waterproofing systems on the site of the Project are fully instructed and trained in the handling and application of all the materials, and shall see that all the materials are correctly installed.
3. Upon completion of the Installation, submit to the Commissioner written certification that the representative of the manufacturer of the waterproofing material has supervised the work of this Section and that all materials were correctly installed.

1.9 PROTECTION

- A. Against Loads: Protect work of this Section against concentrated loads and any other loads or equipment that would damage the materials or work.
- B. Against Traffic: Do not permit traffic on horizontally installed work of this Section, except for workmen doing the work, during the installation, and after the installation until membrane systems are covered with protective boards or with the specified finishing materials.
- C. Against Damage: Protect vertically installed work of this section from damage by reinforcing and placement.
 1. Take and maintain necessary preventative measures to protect work of this Section from damage until Project is accepted.
 2. Rejection of Damaged Work
 - a. Damaged materials or work will be rejected.
 - b. Rejected materials or work must be immediately removed and replaced with new materials.

1.10 FIELD QUALITY CONTROL

- A. Construction Traffic:
 1. Limit construction traffic over completed membrane.
 2. General Contractor shall provide 1/2" plywood protection layer, where construction traffic is unavoidable.
- B. Inform Commissioner in writing on a daily basis of any of the following events. State specific location of each occurrence.
 1. Buckling to the waterproofing and other deformations as a result of ground water events.

2. Leakage through the finished waterproofing installation.
 3. Damage by other trades.
- C. Provide Manufacturer's Representative's report (prior to backfill) stating that the waterproofing has been inspected and is acceptable.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Waterproofing Membrane
1. At underslab conditions, provide adhesive coated HDPE Composite Sheet "Bituthene Preprufe 300R" system by W. R. Grace & Co., or approved equal.
 2. For vertical foundation walls, see Section 07542 Waterproofing System for Walls.
- B. Primer Surface Conditioner: Latex/water based primer specifically formulated to provide adhesion of Bituthene Waterproofing Membranes or equal, equivalent to Bituthene Surface Conditioner.
- C. Elastomeric Mastic: Rubberized asphalt base mastic, manufactured by Bithulene or equal.
- D. Tape: Double sided synthetic adhesive tape, Bitostik or equal.
- E. Protection Board: 1/4" thick semi-rigid protection board, Bituthene Asphaltic Hardboard or equal.
- F. Liquid Membrane: Two-component 100% solids trowel grade asphalt modified urethane, Bitholene Liquid Membrane or equal.
- G. Drainage Board/Composite: Prefabricated dimpled polystyrene drainage core with a non-woven filter fabric on one side and a polymer film on the reverse side, Hydroduct 220 or equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where membrane waterproofing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 PREPARATION OF SURFACES TO RECEIVE WATERPROOFING

- A. Conform to the requirements of Bituthene Techletter No. BTL 82-02, published by W. R. Grace, or those of approved equal manufacturer.
- B. Earth or crushed stone substrates shall be compacted to produce an even, sound substrate. Loose aggregate, sharp protrusions and standing water shall be removed.

3.3 INSTALLATION

- A. General: Conform to recommendations and published specifications of the manufacturer' including environmental requirements.

3.4 INSTALLATION OF UNDERSLAB WATERPROOFING

- A. General: Install adhesive coated HDPE composite sheet according to waterproofing manufacturer's written instructions.
- B. Apply the membrane over the mud slab with the HDPE side facing the mud slab and the treated white coating surface facing the concrete to be poured. The membrane may be installed at any convenient length. Apply succeeding sheets by overlapping previous sheets 3" along the self-adhesive edge of the membrane. Remove the silicone coated release liner covering the membrane and roll the side lap to assure a tight seal.

3.5 SEAM REINFORCEMENT FOR HDPE COMPOSITE SHEETS ONLY

- A. Provide a 6" strip of modified bituminous sheet membrane (Bituthene 4000 or approved equal) centered behind all laps.
- B. At locations where a salvage edge is not present and at end laps, lap sheets 6", apply a 1/8" thick by 6" wide application of liquid membrane between sheets, to provide a 6" wide seal.
- C. Integration of old onto new pre-applied sheet membrane.
 - 1. Integration of Sheet Membrane onto Sheet Membrane that has been installed in excess of 30 days prior
 - a. Lap sheets 12", apply a 1/8" thick by 12" wide application of fluid membrane between sheets, to provide a 12" wide seal at this location.
 - b. Install Waterproofing Tape centered at edge of lap and roll firmly into place with an approved roller.
 - c. Install additional Waterproofing Tape to cover white film that has been installed over 30 days prior.
 - 2. Repair of pre-applied sheet membrane
 - a. Scratch on white coating exposing underlying black surfing of Sheet Membrane. Install Waterproofing Tape at areas where the white coating of the membrane is damaged, including boot scuff marks and abrasions by rebar.
 - b. Damage or Puncture of Sheet Membrane: Install Patch of short Membrane set in Liquid Membrane. Patch must extend 3" in every direction around extent of damaged area. Install Waterproofing Tape centered over the edge of the patch. If the damaged area does not have 5" of sound material around it, inject Liquid Membrane into puncture until Liquid Membrane backs out, and proceed with patch as space allows.

3.6 CLEAN-UP

- A. Upon completion of the waterproofing system, remove all equipment, material and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

END OF SECTION

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SECTION 07180 – TRAFFIC COATING SYSTEM

PART 1 GENERAL

1.1 Summary

A. Waterproof surfacing system basis of design:

1. Epoxy Sealer/Primer, fully sanded.
2. Fast curing Polyurethane Wearcoat, fully aggregated.
3. Polyurethane Topcoat, gray with blended aggregates to achieve a speckled color appearance, not a uniform color.
5. Product shall extend up walls 4" to achieve a complete waterproofed base/floor condition.

1.2 Related Sections

- A. Green building requirements – Division 1.
- B. Section 03300 – Cast in Place Concrete.
- C. Section 07900 – Joint Sealers.

1.3 References

1. American Society for Testing and Materials (ASTM).
 1. ASTM D4263-83 (2005) (*Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method*)
 2. ASTM D4258-83 (1999) (*Standard Practice for Surface Cleaning Concrete for Coating*)
 3. ASTM D4259-88 (2006) Sections 6 & 8 (*Standard Practice for Abrading Concrete*)
 4. ASTM D5295-00 (2006) (*Standard Guide for Preparation of Concrete Surfaces for Adhered [Bonded] Membrane Waterproofing Systems*)
 5. ASTM D4261-05 (*Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating*)
 6. ASTM D 4541-02 (*Standard Test Method for Pull-off Strength of Coatings using Portable Adhesion Testers*)
 7. ASTM E2129-05 *Criterion 3.3-3.5 Operational Performance of Installed Product (Standard Practice for Data Collection for Sustainability Assessment of Building Products)*

1.4 System Description

- A. A thick (120 mils), waterproof, protective coating system for interior vehicular and pedestrian areas.
- B. The system has no odor. It combines seamless speed of application and long-term durability.

1.5 Submittals

- A. Submit a representative sample of the system.
- B. Submit copies of manufacturers Shop drawings, Technical Data Sheets and Material.
- C. Safety Data Sheets (MSDS) for all products.
- C. Submit "Approved Installer" confirmation and Sample Warranty from manufacturer.
- D. Submit samples of wear coat Quartz sand for Commissioners selection.
- E. Upon completion of the work, installer shall submit all required warranty documentation, including Pre-installation Project Warranty Request Form, Daily Record Sheets and Certification of Project Completion.
- F. Upon completion of the contract the manufacturer shall submit Maintenance and Repair Recommendations.

1.6 Quality Assurance

- A. The installer must be fully trained by the manufacturer.
- B. Daily Record Sheets as provided by the manufacturer must be recorded and maintained on a daily basis by the installer in accordance with the warranty requirements.
- C. Installer must at all times have available a job specific manual that will include the Specification, Technical Data Sheets and the Material Safety Data Sheet (MSDS) information.
- E. Proposed suppliers of an "approved substitute" system shall be required to meet all the attributes:

These include:

1. Complete system minimum DFT 120 mils.
2. System must have a manufacturer's 10-year ND, labor and materials warranty.
3. System to have no odor and be VOC compliant.
4. Epoxy Sealer/Primer, which can be applied on green concrete.
5. Can be trafficked after 6 hours at 68° F.

1.7 Delivery, Storage, Handling

- A. Materials shall be delivered in original sealed containers, clearly marked with manufacturers name, product name, batch number and date of manufacture.
- B. Materials should be stored upright kept cool, out of direct sunlight, dry and in a safe manner in accordance with the manufacturer's recommendations as indicated on the relevant Technical Data Sheets. Ensure all fillers and aggregates are kept dry and free of contaminants. Do not store exceeding structure design loads.
- C. Operatives should at all times observe the requirements for wearing protective clothing as outlined in the relevant products' MSDS.
- D. The installer should also work in accordance with NIOSH respirator guidelines, indicated in Technical Data Sheets and local health and safety requirements.
- E. Materials and packaging should be disposed of in accordance with applicable rules and regulations of local, state and federal authorities having jurisdiction, as well as requirements of Construction Waste Management, Section 01506.

1.8 Project Conditions

- A. Protection of adjacent areas from overspray or other system-related contamination shall be the responsibility of the installer. Provide windbreaks where necessary.
- B. Install materials in accordance with manufacturers Technical Data Sheets, MSDS or as modified by applicable rules and regulations of NIOSH, and local state and federal authorities having jurisdiction.
- C. Unless otherwise approved by the manufacturer, application can proceed while air and substrate temperatures are between 36°F and 104°F providing the substrate is at least 6°F above the surface dew point and rising.
- D. The General Contractor shall ensure that adequate protection is provided for the duration of the contract to prevent damage to the system by others negligence.

1.9 Warranty

- A. A 10-year NDL labor and materials warranty is required.
- B. A final inspection must be carried out by a material manufacturer representative before covering. Upon completion of the work, it is the responsibility of the applicator to supply the City of New York with the material manufacturer, single source, labor and materials, 10-year NDL manufacturer's warranty.

PART 2 PRODUCTS

2.1 Manufacturer

- A. Dundeq (basis of design), manufactured by material manufacturer TQ3 North America, Morristown, NJ.
- B. Or approved equal.

2.2 Materials

A. Sealer/Primer

- 1. The Primer is a high build, non-solvented, two-component epoxy sealer/primer.
- 2. The Primer is fully broadcast with a dry, contamination free, silica sand (sieve size #20-30 or NJ0), as approved by material manufacturer.
 - a. It can be overcoated and trafficked 4 hours after application.
 - b. The sealer/primer shall have a DFT of 10 mils, including sand.

2. Low Temperature, Fast Cure Sealer/Primer (if required)

- 1. If faster application is required or if temperatures range between 32°F – 45°F, FC a low temperature Primer should be applied.

3. Traffic Coat

- 1. The Wear Coat is a two-component, rapid-curing, hand-applied, coating that can be trafficked or over coated 4 hours after application.
- 2. The Wear Coat is filled with Filler #4 to create a 'slurry', and then fully, broadcast with the chosen dry skid resistant aggregate as approved by material manufacturer.
- 3. The DFT of the GP Wear Coat including aggregate shall be 110 mils.

4. Topcoat – (gray)

- 1. Topcoat is a two component, gray, polyester/polyurethane coating that can be trafficked in 6 hours after completed application at 68°F.
- 2. The DFT of PU Topcoat shall be 5 mils.

2.2 Accessories

- A. Filler – a finely graded blend of fillers to be added to Wearcoat.
- B. Patch Repair Binder – pre-packaged epoxy/cement for small repairs.
- A. Pore Filler – highly thixotropic epoxy paste for vertical hole filling.
- B. Primer – for use on green, highly alkaline concrete.
 - 1. Primer – aluminium, copper, stainless and galvanized steel primer.
 - 2. Aggregates – very hardwearing, black, calcined bauxite aggregate.
- E. Aggregates - as per project requirements and approved by the material manufacturer.

PART 3 EXECUTION

3.1 Inspection

- A. The Commissioner and the Applicator and the material manufacturer representative shall inspect and approve the prepared substrate prior to application of the sealer/primer coat.
- B. Conduct random tests for adequate tensile strength of the substrate (using an Elcometer Adhesion Tester) on the substrate by the installer at a minimum frequency of one per 5000 sf. For smaller areas, a minimum of three tests can be conducted and the results recorded.
- C. The minimum tensile bond strength of the concrete shall be 220 psi.

3.2 Preparation – minimum 2" beyond Traffic Coating System application

- A. The suitability of any surface for application will be the sole responsibility of material manufacturer or its appointed representative (i.e. agent or approved installer). General practice is to have the installer observe the first area prepared (minimum 200 sf) with the Commissioner and the General contractor to agree an acceptable standard. Before the surface preparation contractor leaves the site, the material manufacturer or its appointed representative will inspect the area to approve its suitability for application.
- B. New concrete shall have cured for a minimum of 28 days or be surface dry when tested to ASTM D4263-83 (2005). Place test films in various areas to check for moisture, which can also carry soluble alkali salts. Lightweight structural concrete (C330-05) shall have cured for a recommended 60 days minimum or be moisture free when tested to ASTM D4263-83 (2005).
- C. Substrates to be coated must be firm, dry and load bearing, free of loose and brittle particles, laitance and contaminants that would impair adhesion such as form release agents, admixtures, concrete curing compounds, sealers, dirt, oil, grease, rubber skid

marks and other substances or coatings.

1. Heavy oil or gas contamination may require removal of concrete to a clean surface.
 2. Form release agents must not be oil based.
 3. Concrete curing compounds must be sodium silicate type and not be wax or resin based.
- D. The surface profile is not to exceed $\frac{1}{4}$ " (peak to valley). Minor surface area deterioration of $\frac{1}{4}$ " or greater shall be repaired to minimize excessive material usage. A wood float, wood trowel or broom finish on new concrete is acceptable.
- E. The concrete deck should be abrasively cleaned by shotblasting in accordance with ASTM D4259-88 (2006), section 8. Preparation by mechanically abrading or scarifying in accordance with ASTM 4259-88(2006), section 6 or as outlined in ASTM 4258-83(1999), is acceptable subject to manufacturer's approval. There should be an "open" concrete surface in accordance with ICRI surface profiles CSP 2-6.
- F. Edges and other areas inaccessible to the shotblasting equipment should be prepared using a hand held surface scarifier with vacuum attachment.
- G. The same procedure for surface preparation shall be applied to vertical surfaces. Blow holes and voids exceeding $\frac{1}{4}$ " shall be identified and filled with Pore Filler.
- H. Masonry walls should be tested for loose, soft or failed brick and mortar.
1. They must be removed and replaced. Repair can be made using Patch Repair Binder.
- I. After surface preparation, all cracks, control, cold, and butt joints should be identified and dry; they must be cleaned of sealant, which is not working or poorly bonded.
1. The edges of the cracks and joints must be tested for loose, friable concrete, and removed.
 2. Cracks do not require saw cutting or routing.
 3. After priming, joint voids must be filled with Patch Repair Binder. Where the deck meets an outside wall with no joint between, no cant strip or sealant is required.
- J. After surface preparation all expansion/movement joints should be inspected at the edges and any loose concrete removed and repaired.
- K. Drains, metal upstands, drip edges, gravel stops, flashings, scuppers, anchor hangers, threaded rods and rebar, must be firmly fixed to a solid substrate.

1. Mechanically abrade by power tool (i.e. disc grinder not wire brush) back to clean metal in accordance with SSPC – SP3.
 2. Remove oil and other residue by solvent wipe with a clean cloth.
 3. Any metal edges to be coated, should have a ¼" hemmed edge or have any sharp edges removed.
 4. Cut a ¼" reglet at the outside edge of trench drains.
 5. Loose concrete around drain flanges must be removed and replaced.
 6. Cover drain cap fixing bolts to prevent contamination with resins.
 7. Ensure all drains are blocked during work to prevent clogging with resin or aggregate.
- M. Where the termination point of the system on horizontal surfaces does not meet a wall, curb, or square joint edge, a straight, minimum ¼" square groove saw cut shall be formed.

3.3 Installation

A. Sealer/Primer

1. The Primer shall be applied evenly at a coverage rate of 150sf/gallon (450sf/3 gallon kit), depending on surface porosity.

On concrete that is rougher than specified, or if a resurfacing and pore filling mortar has been used on walls, the consumption rates of sealer/primer will increase.

The consumption of Primer on lightweight structural concrete (ASTM C330-05) will be higher and may vary. It will be applied as usual at a rate of 250-300sf/kit.

2. The sealer/primer should be worked into the surface to seal all pores using a suitable, medium nap (½") roller or double blade foam rubber squeegee and back-rolled. If the concrete is rough, care must be taken to prevent "puddles" of primer by using a long sleeved roller and brush to remove the excess.
3. At elevated temperatures, the priming must be done out of direct sunlight or when temperatures are falling to minimize the risk of blister formation due to moisture vapor drive or expansion of air (the substrate does not have to be wet), in substrate pores.
4. Dry, contamination free, silica sand, as approved by material manufacturer (sieve size #20-30 or NJ0) shall be cast onto the wet primer until it is fully filled. Consumption of the aggregate shall be approximately 0.25 lbs/sf.

Ensure there are no "shiny" areas, indicating the sealer/primer is not fully filled.

5. The excess sand must be completely removed before application of the membrane.
6. If after removal of the aggregate, "shiny" spots do appear, these areas must be re-primed and fully filled with sand.
7. If the concrete is rougher than specified, it can be smoothed by using Patch Repair Binder.
 - a) Any other thin surface repair materials must be compatible with the Traffic Coating System and approved for use by the Commissioner and the material manufacturer.
 - b) Any repair must then be primed as specified.
8. Very porous surfaces, such as Roof Board, Cement board, block work, brick or facades, may require (if the first coat cannot hold sand), two coats of ST Primer. The first coat is applied at a rate of 85sf/gallon (255sf/3 gallon kit). The second coat is applied at a rate of 150sf/gallon (450sf/3 gallon kit) and sanded. Total for 2 coats= 60sf/gallon (180sf/3 gal kit).
 - a) Blow holes and voids in vertical surfaces exceeding 1/4", in width or depth, shall be identified, and filled with Pore Filler. Other pore-filling materials can be used, with approval of the material manufacturer.
9. If the substrate is holding excessive water or if water in the substrate has no other means of escape (i.e. metal decking, flutes or pans with no venting), Traffic Coating System can still be applied. Two coats of Primer should be applied.
 - a) Unless specified, this second coat of ST Primer is normally only required if the concrete is rougher than specified.
 - b) To determine if a second Primer coat is required, a small trial area (on the lowest point on the deck) should be carried out. The first coat is applied at a rate of 125sf/gallon (375sf/3 gallon kit).
 - c) Test the coated area to ASTM 4263-83 (2005). If moisture has passed through the first coat, a second coat of ST Primer will be required.
 - d) The second coat must be applied onto the first coat within 48 hours. If this time is exceeded, solvent wipe the area with a clean cloth.
 - e) It is applied at a rate of 150sf/gallon (450sf/kit), and dry silica sand is added as per specification.
 - f) Cracks must be inspected to ensure that water trapped in the deck is not percolating up through them.
 - g) Remedial action should be taken to allow excess moisture to leave the substrate.
 - h) Metal decks should be vented.

B. Traffic Coat

1. The Wear Coat should be applied to the Primer after 4 hours minimum.

2. The Wear Coat shall be applied evenly using a 1/8" serrated squeegee, medium nap roller (1/2" nap) and brush at a rate of 125sf/mix (3.35 gal resin + 30lbs Filler #4). It must be back-rolled. If the concrete is rougher than specified (Sect. 3.2D), the consumption of Wear Coat may increase.
3. Clean, dry quartz sand (size 16/30), shall be cast onto the wet resin, vertically and fully filled.
4. Consumption rate for the aggregate shall be approximately 1.0 lb/sf.
5. Ensure there are no "shiny" areas, indicating the Wearcoat is not fully filled.
6. The excess aggregate can be removed from the Wearcoat after approximately 4 hours by using heavy-duty brooms, suitable mechanical blowing equipment or an industrial vacuum.

C. Topcoat

1. The Topcoat gray, can be applied to the clean (ensuring all loose aggregate is removed), GP Wearcoat, a minimum 4 hours after application.
2. Topcoat will be applied in one coat using a medium pile roller (3/8" nap) at a rate of approximately 80sf/gallon (120sf/1.5 gallon kit). If a larger aggregate is used on the ramps, the consumption of Topcoat will increase.
3. Topcoat can be walked or driven on in 6 hrs. @68°F. The completed area will not be opened to traffic until the client accepts the Traffic Coating System application.
4. Detailing as follows:
5. Control, Cold or Butt Joints and visible cracks:
 - a. Preparation as per section 3.2J.
 - b. If Traffic Coating System is applied over a caulked control or cold joint, the existing material must be removed and after priming, Patch Repair Binder, must be applied to fill the joint.
 - c. After curing, the mortar must be primed with Primer, as specified.
 - d. After priming, if crack or joint is still visible, apply a "stripe coat" of Wearcoat.
 - e. Apply Wearcoat and Topcoat, as specified, over the complete deck.
6. Expansion/Movement Joints:
 - a. Preparation as per specified above.
 - b. Prime mechanical joint, aluminum side rails with Primer. Primer must completely cure (minimum 1 hour, maximum 24 hours) and then be re-primed with Primer, fully sanded.
 - c. Apply Wearcoat and Topcoat onto mechanical joint, where primed.
 - d. The Traffic Coating System must not be applied directly onto a mechanical joint gland, or sheet expansion joint material where it covers the joint opening.

- e. The detailing of Traffic Coating System onto Mechanical Joints shall be approved by material manufacturer on a case-by-case basis.
7. Metal Upstands, Penetrations and Flashings:
 - a. Apply Traffic Coating System higher than possible water level. If possible, peel back flashings and apply Traffic Coating System onto substrate behind.
 - b. Any gaps between these details and deck must be filled with Patch Repair Binder or a material manufacturer approved, polyurethane sealant.
 - c. Prime with Primer (depending on metal).
After priming to the height specified, apply an 8", "stripe coat" of Wearcoat at deck/upstand interface (4"x 4"), at 40 mils DFT.
 - d. Apply Wearcoat and Topcoat as specified.
 8. Walls, Curbs and Deck Interface:
 - a. Apply Traffic Coating System over curb or wall, higher than possible water level.
 - b. Preparation as per Section 3.2.
 - c. If the Traffic Coating System system will be subject to abuse from vehicle tires, apply only Primer and Topcoat, as specified.
 - d. If there is a non-moving joint between the deck and wall, prepare as per Sect.3.2. After priming, fill the joint with a material manufacturer approved, polyurethane sealant, using a backer rod if required, or Patch Repair Binder.
 - e. After priming to the height specified, apply an 8", "stripe coat" of Wearcoat at deck/wall, curb interface (4"x 4"), at 40 mils DFT.
 - f. If there is a moving joint between the deck and wall, prepare as per Sect.3.2.
 - g. After priming, fill the joint with a Commissioner-specified, proprietary, polyurethane sealant, designed for the joint width and expected movement, using a backer rod if required.
 - h. When applying Wearcoat and Topcoat, do not cover joint opening.
 9. Metal Drains:
 - a. Preparation as per Section 3.2.
 - b. Prime with Primer (steel) or depending on metal.
 - c. After priming, apply a "stripe coat" of Wearcoat to the primed surface at 40 mils DFT, 4" on deck and into drain.
 - d. Apply Wearcoat and Topcoat as specified.
 - e. Drain covers may require grinding to fit into coated drains.
 - f. At trench drains, apply Traffic Coating System into a 1/4"x 1/4" termination groove cut into the concrete at the edge of the drain.
 - g. The detailing of Traffic Coating System to drains that are not metal shall be approved by material manufacturer on a case-by-case basis.
 10. Lining and Directional Marking:

Any type of parking bay and directional lining can be used.

END OF SECTION

SECTION 07210 - BUILDING INSULATION

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the building insulation as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Extruded polystyrene (EPS) board insulation at slab-on-grade construction, below concrete topping slab or below structural slab, in locations shown on the drawings.
 2. Extruded polystyrene (EPS) board insulation on IRMA roof, grooved at bottom with drainage channels.
 3. Composite roof panel comprising of EPS board bonded to CDX exterior grade plywood sheathing for use at sheet metal roofing on skylight monitors.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast In Place Concrete - Section 03300.
- C. Concrete Floor Topping - Section 03320.
- D. Carpentry - Section 06200.
- E. Roof Waterproofing System - Section 07541, for drainage mats and ballast
- F. Sheet Metal Roofing - Section 07610.

1.4 SUBMITTALS

A. Green building submittal requirements

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Submit product data for each type of product indicated.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

1.5 LEED PERFORMANCE REQUIREMENTS

A. The following criteria are required for the products included in this section:

1. Insulation products manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
2. Adhesives or sealants used for work in this section shall meet the requirements of CSI Section 01015, "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants and Architectural Coatings" where applicable. Certification of these products shall be in accordance with the Submittal Requirements herein. This applies to products installed at interior of building only.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type and brand. Delivered materials shall be identical to approved samples.
- B. Store materials under cover in a dry and clean location, off the ground. Remove materials that are damaged or otherwise not suitable for installation and replace with acceptable materials.
- C. Take every precaution to prevent the insulation from becoming wet, cover with tarps or other weather/watertight sheet goods.

1.7 EXTERIOR FIRE SPREAD

- A. Provide testing results confirming compliance with 1968 NYBC subchapter 5, article 4 prevention of exterior fire spread 27-335.1(2) which limits exterior thermal insulation to maximum 25 flame spread and a maximum of 50 smoke developed rating when tested in accordance with the test procedure of reference standard RS 5-5 (ASTM E84-1987- Standard Method for Surface Burning Characteristics of Building Materials).

1.8 WIND UPLIFT AND CALCULATIONS

- B. For roofing products, provide manufacturers calculations or testing results which demonstrate compliance with wind uplift loads per NYC BC, or as shown on Structural Drawings (whichever is higher), with project-specific fasteners, substrate and embedment length. Fastener types and lengths should be selected to avoid penetration of substrate where visible from interior.

PART 2 PRODUCTS

2.1 EXTRUDED POLYSTYRENE BOARD INSULATION

- A. Provide expanded polystyrene board insulation equal to "R-Tech VI", manufactured by Insulfoam, Tacoma Washington, or approved equal, with a compressive strength of 40 psi measured by ASTM D1621. Install in locations shown on drawings.
- B. Provide grooved expanded polystyrene insulation boards equal to "InsulFoam XIV", manufactured by Insulfoam, Tacoma Washington, or approved equal, with a compressive strength of 40 psi measured by ASTM D1621. Install in locations shown on drawings.

- C. Insulation shall have an aged R value of not less than 4.85/inch (at 40 degrees F); and shall be the thickness shown on drawings.

2.2 COMPOSITE ROOF PANEL

- A. Provide composite insulation consisting of a closed-cell, lightweight expanded polystyrene bonded to $\frac{3}{4}$ " exterior grade CDX plywood, equal to "InsulLam", manufactured by Insulfoam, Tacoma Washington, Nailboard by JM, or approved equal.

2.3 ACCESSORIES

- B. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.
 - 1. For bonding rigid polystyrene insulation to concrete, provide adhesive equal to "Foamgrab PS" made by Dacor Products Co., ChemRex Inc., Miracle Adhesives, or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where building insulation is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.
- B. Install insulation in as large components as practical and to cover entire areas indicated on the drawings, closely butted together at sides and ends, and against walls, beams, etc. Neatly fit and cut insulation around all projections such as pipes, conduits, hangers and all other elements encountered in the field, which will result in complete coverage of the scheduled areas.
- C. Discard, off the site insulation that becomes damaged during the course of installation, or is no longer in a physical condition to function for use intended, and replace with new material.
- D. Clean surfaces on which adhesives are used to secure the insulation in place of dirt, grime, grease, oil and other foreign materials, to assure that the surfaces are properly prepared to accept the bond of the approved adhesives.
- E. Exercise extreme care to avoid damage and soiling of faces on insulation units which will be exposed to view. Align joints accurately, with adjoining surfaces set flush.
- F. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.

- G. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement. Cut insulation as required to fit over blocking, etc.
- H. Apply a single layer of insulation to the required thickness, unless a double layer is required, to make up the total thickness shown.
- I. Apply a single or double layer of insulation of the required thickness to make up the total thickness. Stagger joints one direction as recommended by the manufacturer.
- J. Where insulation boards is fixed to deck using mechanical fasteners, apply fasteners at the minimum rate of one fastener per 2 sq. ft. of insulation, or per manufacturers instructions based on wind uplift compliance.
- K. Do not advance the laying of insulation ahead of roofing more than necessary for sequence of operations. Cover insulation exposed at end of each day's work (and when rain threatens) with waterproofing materials. At Composite Panels, do not permit insulation to become wet. Remove and dispose of composite panel insulation which has become wet; replace before proceeding with roofing work.
- L. Lay with edges in moderate contact but do not force into place.
- M. Stagger end joints; or tape joints where recommended by the manufacturer.
- N. Install temporary water cut-offs at completion of each days' work and remove upon resumption of work.

3.3 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION*

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SECTION 07211 -SPRAYED THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED WORKS AND SECTIONS

- A. Division 1- Green Building Requirements
- B. Section 06200 - Carpentry
- B. Section 07210 – Building Insulation

1.2 WORK INCLUDED:

- A. Provide all labor, materials and equipment necessary to provide a complete installed application of sprayed thermal insulation applied to areas indicated on the drawings and described herein. Location of spray thermal is typically at interior furring of exterior walls or demising walls at Boat Storage, or as indicated on drawings.

1.3 QUALIFICATIONS OF APPLICATORS:

- A. All firms of applicators performing the Work of this Section must be approved by the manufacturers of the sprayed thermal material and shall also have been in business for a minimum period of three (3) years.

1.4 SUBMITTALS:

- A. Provide completed EMRF documentation, product information and one sample, minimum 4" x 4" of sprayed insulation bonded to a piece of rigid board.

1.5 MANUFACTURER'S LITERATURE:

- A. Copies of the manufacturer's literature, clearly indicating conditions of acceptance and methods of applications shall be available on site before, and during, period of application of Work of this Section.
- B. Manufacturer shall provide project references for work complete, still performing and in place, for a minimum of 3 years.

1.6 DELIVERY:

- A. Materials to be delivered to the site in original labeled and unopened packages.

1.7 STORAGE:

- A. Materials to be stored on site in a warm, dry place and either on a concrete floor or a wood platform. Bonding adhesives must be kept from freezing at all times.

1.8 ENVIRONMENTAL CONDITIONS

- A. Work on this Section shall only be performed under the conditions stated in the manufacturer's printed application instructions.
- B. Sufficient heat and ventilation must be provided at all times during installation and drying of spray insulation according to manufacturer's printed instructions.

1.9 PATCHING:

- A. All patching and repairing of sprayed thermal insulation due to cutting by other trades shall be performed under this Section and paid for by the trade performing the cutting.

1.10 PROTECTION

- A. Provide adequate protection to adjacent surfaces from being sprayed by means of drop cloths, polyethylene sheets, with necessary taping.
- B. Close off and seal any ductwork in areas where sprayed insulation is being applied.

- 1.11 MANUFACTURER'S REPRESENTATIVE: Allow the manufacturer's representative full access to the site.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Spray-applied materials shall be MONOGLASS Spray-On White Fiber conforming to CAN 4-S114-78 and ASTM E-136 using MONOGLASS Liquid Bonding Adhesive manufactured by Monoglass Incorporated, or approved equal.
- B. Thermal /acoustic insulation shall not contain asbestos, free crystalline silica or combustible fibers, and shall exhibit the following properties:

PROPERTY	TEST METHOD	RESULTS
Fire Hazard Classification	ASTM E84-79:	Flame Spread = 0 Smoke Developed = 0 Fuel Contribution = 0
Non-Combustibility	ASTM E-136, ISO 1182-90 & CAN 4-S114-78	Non-Combustible
Air Erosion	ASTM E859	No Mass Loss
Smolder Resistance	CGSB 51-GP-36P	Passed: 0.4% mean weight loss
Vibration Resistance Type 1	CGSB 51GP-11M	Passed: 0.02% mass loss
Dry Density	ASTM D-1622-83	3.0 pounds/cubic foot
Thermal Conductivity	ASTM C-518	K-Factor .25, R-Value 4.00/inch
Noise Reduction Coefficient	ASTM C-423-77	NRC = .85, 1.4" on solid backing
	ISO 354	NRC = .75 @ 25mm/1" ^{**} NRC = .95 @ 50mm/2" ^{**}
Fire Gas Toxicity	University of Pittsburgh Protocol	Max CO ₂ 3.5%, Max CO 0.3%
Fungus & Bacterial Resistance	ASTM G-21-90	No Growth

- C. All bonding adhesives shall be mixed with fresh, clean water to the exact proportions recommended by the manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine all surfaces and conditions to which the work of this section is to be applied. Ensure they are adequate to provide a satisfactory application of the specified materials. Report any deficiencies to the design authority.

3.2 PREPARATION

- A. Remove any dust, dirt, foreign material, loose paint etc. on surfaces to which the work is to be applied, which could otherwise create a false bond or staining of insulation. Clean and seal as required.
- B. Verify bond requirements and compatibility of all surfaces to receive thermal insulation materials.
- C. Ensure that all ducts, piping, equipment, or other items, which would interfere with application of thermal insulation, are not positioned until thermal insulation work is completed.

3.3 APPLICATION

- A. Mix and apply thermal insulation in strict accordance with manufacturer's recommendations.
- B. Apply insulation to the substrate as specified in the site drawings.
- C. Apply insulation to substrate in sufficient thickness to achieve the required thermal (acoustical) value. Board tamp and over-spray with adhesive if required by design authority.

3.4 CLEAN-UP

- A. Remove sprayed thermal insulation from material and surfaces not specifically required to be insulated.
- B. Broom clean work areas affected by the Work of this Section.

END OF SECTION

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SECTION 07450 - CEMENT BOARD RAINSCREEN SYSTEM

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the cement board rainscreen system as shown on the drawings and specified herein, including, but not necessarily limited to, the following:
 - 1. Prefabricated cement wall panel system.
 - 2. Trim, furring and accessories required for complete installation.
 - 3. Sealant in conjunction with cement wall panel work.

1.3 RELATED SECTIONS

- A. Green building requirements in Division 1.
- B. Vertical Wall Planter Panels – Section 02931.
- C. Autoclaved Aerated Concrete Units – Section 04225.
- D. Miscellaneous Metals – Section 05500, for installation of window surrounds and other metal components at openings.
- E. Carpentry - Section 06200, for installation and for wood furring and blocking.
- F. Waterproofing System For Walls- Section 07542, for waterproofing of wood furring.
- G. Sheet Metal Work– Section 07600, for installation of scuppers and copings and other components.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

1.5 SUBMITTALS

- A. **Manufacturer's Data:** Submit standard detail drawings and installation instructions for cement board rainscreen system. Include manufacturer's certification or other data substantiating that the materials and finishes comply with the requirements. Indicate by copy of transmittal that the Installer has received a copy of the installation instructions.
- B. **Samples:** Submit 12" long by full width samples of wall panel, complete with factory applied finish. Samples will be reviewed by Commissioner for pattern, texture, and color only. Compliance with other requirements is the exclusive responsibility of the Contractor.
- C. **Shop Drawings:** Submit shop drawings showing the profiles of wall panel units, and the details of jointing (gaskets, if any), supports, anchorages, trim, flashing, and accessories. Show details of weatherproofing at edges, terminations, and penetrations of the wall panel work. Show small scale layout and elevations of entire work.
- D. Indicate locations of reinforcement strips, structural support requirements, and other 2pertinent data.
- E. **Structural Performance Criteria:** Design calculations, certified by a registered professional engineer licensed in the State of New York, shall be submitted to verify load-carrying capability of panel system. This includes attachment of wood furring to AAC substrate, cement board to wood furring and/or AAC, and attachment of Vertical Wall Planting Panels (VWPP) through cement board into wood furring. Panel system shall be capable of resisting all applied dead and live loads, including minimum positive and negative wind load per ASCE-7 or loads shown on structural drawings, whichever is greater, with a maximum deflection of $L/360$. Assume VWPP are maximum saturated and fully planted, approximately 5 pounds per square foot dead load.
- F. **GREEN BUILDING SUBMITTAL REQUIREMENTS**
 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.

- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.7 WARRANTY

- A. Wall system shall be warranted for a period of 5 years against failures of any kind, labor and materials.

1.8 COORDINATION

- A. Coordinate wall panel work with work of other trades that penetrate or connect cement wall panels. Openings required in wall panels to accommodate penetrations must be neatly and accurately made.
- B. Provide concealed reinforcing plates, anchors and supports to receive items mounted in wall panels as required to prevent damage or deflection of panels.
- C. Provide all necessary trim, flashing, sealant to ensure watertight integrity of wall panel system where penetrations occur.

1.9 EXTRA STOCK

- A. Provide four (4) cement board panels, 2'-0" x 8'-0". Deliver to City of New Yorks' designated party.
- B. Provide 200 fasteners and one screwdriver.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide non-asbestos through-color cement board wall panel system "Glas Weld" as manufactured Smartboard Building Products, Inc., or approved equal.
 - 1. Use only panels with fiberglass fully embedded in a clean and uniform slurry finish.

2.2 MATERIALS

- A. Cement Board: 1/2" thick minimum by 24" wide by 96" long, factory precut from nominal 4'x8' sheets. Board shall be made of a minimum of 42 per cent lightweight waste by-products and recycled materials, alkali-resistant woven fiberglass mesh and other additives.
- B. Mechanical Fasteners: External tamper proof screws, stainless steel, torx head fasteners.
 - 1. Screws shall be length as required by the panel manufacturer for the furring material used.

2.3 ACCESSORIES

- A. Trim: PVC, composite and stainless steel trim shapes suitable for trim conditions, where shown on drawings.
- B. Sheet Metal Flashing: Minimum 26 gauge hot-dipped galvanized steel sheet, or stainless steel conforming to the requirements specified in Section 07600, where shown on drawings.
- C. Wood furring materials shall conform to the requirements specified in Section 06200.

PART 3 EXECUTION

3.2 INSPECTION

- A. Examine the areas and conditions where preformed cement board rainscreen system is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.3 INSTALLATION

- A. General: Comply with panel manufacturer's instructions for assembly and installation.
- B. Anchor component parts of the preformed cement wall panel system securely in place, providing for necessary thermal and structural movement. Drill holes in wood members as required for anchorage in accordance with approved shop drawings. After installation of vertical wood furring, waterproof entire component with specified exterior waterproofing.
- C. Wood Furring: Install vertical wood furring 16" o.c. minimum. Do not block ventilation cavity with horizontal wood blocking or other materials. Notify Commissioner one week

prior to installation of cement board to schedule an inspection to verify a properly ventilated rainscreen cavity.

- D. Tolerances: Erect the panels plumb, level and true to line with tolerances not exceeding 1/8" in runs of 20'-0", and within 1/16" of adjoining faces and of alignment of matching profiles.
- E. Field Cutting and Trimming:
 - 1. For straight cuts use a circular saw with diamond blade, fine tooth (min.70 teeth)
 - 2. Remove all dust immediately after cutting.
 - 3. Re-Seal all cut edges with factory-supplied sealer and applicator
- F. Drilling:
 - 1. Use high speed carbide-tipped masonry drill bits.
 - 2. Remove dust immediately.
- G. Handling and Erecting: Do not over-torque screws. Do not deform the washers.
- H. Damaged Material: Remove and replace panels and component parts of the work which have been damaged (including finish) beyond successful repair, as directed by the Commissioner. Repair minor damage.

3.4 CLEANING AND PROTECTION

- A. Clean exposed surfaces of cement wall panel work promptly after completion of installation. Comply with recommendations of the panel manufacturer.
- B. Protection: The Installer shall advise the Contractor in writing of protection and surveillance procedures which can be foreseen as needed to ensure that the work will be without damage or deterioration at the time of final acceptance after completion of other construction work.

END OF SECTION*

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SECTION 07541 – ROOF WATERPROOFING SYSTEM

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor materials, equipment and services necessary to complete the roof waterproofing system as shown on the drawings and/or specified herein, including, but not limited to the following:
1. Waterproofing system as an integral component to a ballasted IRMA (inverted roof membrane assembly) type roof, tied into wall waterproofing at parapets and clerestory monitors.

1.3 SYSTEM DESCRIPTION

- A. A cold, fluid applied waterproofing system that cures rapidly, even at low temperatures. PUMA resin combines polyurethane with methacrylate, resulting in a fast-applied membrane that exhibits great elongation and flexibility. The system is fully adhered and contains no solvents or VOCs. The system comprises of:
1. MMA primer, partially sanded.
 2. PUMA membrane embedded in reinforcing fleece.
 3. MMA colored topcoat – for color stability on exposed areas.
 4. Drainage mat and filter fabric.
 5. Roof insulation (specified in Section 07210).
 6. Gravel ballast.

1.4 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Building Insulation- Section 07210.
- C. Waterproofing System for Walls-Section 07542.

- D. Roof Specialties and Accessories-Section 07700
- E. For IRMA-type roof drains, see Plumbing –Division 15.

1.5 REFERENCES

American Society for Testing and Materials (ASTM).

- 1) ASTM D4263-83 (2005) (*Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method*)
- 2) ASTM D4258-05 (*Standard Practice for Surface Cleaning Concrete for Coating*)
- 3) ASTM D4259-88 (2006) Sections 6 & 8 (*Standard Practice for Abrading Concrete*)
- 4) ASTM D5295-00 (2006) (*Standard Guide for Preparation of Concrete Surfaces for Adhered [Bonded] Membrane Waterproofing Systems*)
- 5) ASTM D4261-05 (*Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating*)
- 6) ASTM D4540-02 (*Standard Test Method for Pull-off Strength of Coatings using Portable Adhesion Testers*)
- 7) ASTM E2129-05 *Criterion 3.3-3.5 Operational Performance Of Installed Product (Standard Practice For Data Collection For Sustainability Assessment Of Building Products)*

1.6 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.

- 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. Provide product cut sheets with the Contractor or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
3. Shop Drawings: Submit copies of manufacturers Shop drawings, Technical Data Sheets and Material Safety Data Sheets (MSDS) for all products, including ballast and ballast weight per SF.
4. Samples - Submit a representative sample of the system, including ballast.
6. Upon completion of the work, installer shall submit all required warranty documentation, including Pre-installation Project Warranty Request Form, Daily Record Sheets and Certification of Project Completion.
7. Upon completion of the contract the manufacturer shall submit "Maintenance and Repair Recommendations".

1.7 QUALITY ASSURANCE

- A. The installer must be fully trained by the manufacturer.
- B. Daily Record Sheets as provided by the manufacturer must be recorded and maintained on a daily basis by the installer in accordance with the warranty requirements.
- C. Installer must at all times have available a job specific manual, which will include the Specification, Technical Data Sheets and the Material Safety Data Sheet (MSDS) information.
- D. Proposed suppliers of an "approved substitute" system shall be required to meet all the following attributes:

1. PUMA (polyurethane modified methyl methacrylate) membrane with 230% elongation.
2. System must have a manufacturer's 30-year, NDL, labor and materials, warranty.
3. The warranty includes the cost of overburden removal and replacement over the defective area.
4. The waterproofing system never requires removal or replacement.
5. System can be applied at temperatures as low as 23°F.
6. System can be walked on and overlaid after 1 hour at any temperature.
7. System can be laid to a zero pitch and constantly submerged in water.
8. NO additional surface flashings, clamping rings or termination bars.
9. Any overburden can be used.
10. System has no solvents and is VOC compliant.
11. No boilers or naked flame to be used.

1.8 DELIVERY, STORAGE, HANDLING

- A. Materials shall be delivered in original sealed containers, clearly marked with manufacturers name, product name, batch number and date of manufacture.
- B. Materials should be stored upright, kept cool, out of direct sunlight, dry and in a safe manner in accordance with the manufacturer's recommendations as indicated on the relevant Technical Data Sheets. Ensure all fillers and aggregates are kept dry.
- C. Operatives should at all times observe the requirements for wearing protective clothing as outlined in the relevant products' MSDS. The installer should also work in accordance with NIOSH respirator guidelines indicated in Technical Data Sheets and local health and safety requirements. If there are any questions concerning health and safety issues, contact the manufacturer directly before proceeding.
- D. Materials and packaging should be disposed of in accordance with applicable rules and regulations of local, state and federal authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. Protection of adjacent areas from overspray or other system-related contamination shall be the responsibility of the installer.
- B. Install materials in accordance with manufacturers Technical Data Sheets, MSDS or as modified by applicable rules and regulations of NIOSH, and local state and federal authorities having jurisdiction.
- C. When required, provide odor control. Seal air intakes (with activated carbon filters), nearby windows and doors. Consider erecting a portable and movable enclosure for the mixing station.
- D. Unless otherwise approved by the manufacturer, application can proceed while air and substrate temperatures are between 23°F and 90°F providing the substrate is at least 6°F above the surface dew point and rising. If temperatures are outside this range, use powder accelerators or inhibitors for curing, as specified.
- E. The General Contractor shall ensure that adequate protection is provided for the duration of the contract to prevent damage to the system by others negligence.

1.10 WARRANTY

- A. A 30-year NDL labor and materials warranty is required
- B. A final inspection must be carried out by the manufacturer before covering. Upon completion of the work, it is the responsibility of the installer to supply the City of New York with the, single source, labor and materials, 30-year NDL manufacturer's warranty.

1.11 CODE REQUIREMENTS

- A. Roof coverings must comply with 1968 BC 27-337 Roof Coverings, which require all roofs to be classified as A or B, on the basis of their resistance to exterior fire exposure as listed in BC reference standard RS 5-9, or as determined by tests made in accordance with reference standard RS 5-10 (ANSI/ASTM E108-1987 Standard Method of Fire Tests of Roof Coverings).

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Pumadeq (basis of design), manufactured by TQ3 North America, Morristown, NJ,
- B. Or approved equal.

2.2 MATERIALS

A. PRIMER

- 1. The primer is a low viscosity, two component and rapid curing reactive resin primer, based on methyl methacrylate. It can be overcoated within 1 hour of application.
- 2. The primer is partially filled with a dry, contamination free, silica sand (sieve size #20-30), as approved by material manufacturer.
- 3. The primer DFT shall be 10 mils.

B. WATERPROOF MEMBRANE ON VERTICAL SURFACES AND ALL DETAILING

- 1. The membrane is a high viscosity, thixotropic, elastomeric waterproofing membrane based on polyurethane modified methacrylate (PUMA), embeds a reinforcing fleece.
- 2. It can be overcoated within 1 hour of application.
- 3. The flashing membrane shall have a DFT of 100 mils.

C. WATERPROOF MEMBRANE ON HORIZONTAL SURFACES

- 1. The membrane is a high viscosity, elastomeric waterproofing membrane based on modified methacrylate (PUMA), embeds a reinforcing fleece.
- 2. It can be covered within 1 hour of application.
- 3. The membrane shall have a DFT of 100 mils.

D. WEAR COAT – FOR HEAVY TRAFFIC OR DIRECT BONDED OVERBURDEN

1. The Wear coat, filled with sand, can be used to provide an extra protection layer if the system will be exposed to long term or heavy traffic.
2. The Wear coat is a medium viscosity, elastic, two component, reactive coating based on polyurethane modified methacrylate (PUMA).
3. The Wear coat is broadcast to fully filled with the chosen dry aggregate as approved by material manufacturer.
4. The DFT of the Wear coat, including aggregate shall be 40 mils.

E. TOP COAT (WHITE) – FOR INCREASED COLOR STABILITY

1. The Top coat is an abrasion and UV resistant, medium viscosity, elastic, two component reactive coating based on methyl methacrylate (MMA) with UV stabilizers.
2. The DFT of the Top coat shall be 10 mils.

F. ACCESSORIES

1. Reinforcing Fleece – 165 gram, 50 mils polyester fleece.
Detailing fleece = 6" wide, Reinforcing fleece = 40" wide.
2. Epoxy sealer/primer for damp substrates.
3. Leveling Mortar – MMA mortar for small repairs.
4. Aggregates - as per project requirements and approved by material manufacturer.

2.3 DRAINAGE MAT

- A. TOP MAT (below Ballast): Geocomposite drainage sheet system, comprising of high impact, studded polystyrene core, covered top surface with a non-woven, needle-punched polypropylene filter fabric, Hydroduct 660 or approved equal.
- B. BOTTOM MAT (above waterproof membrane/below insulation): Multidirectional drainage sheet system, Hydroduct 220 or approved equal.

2.4 GRAVEL BALLAST

- A. Provide rounded river-washed gravel in sufficient depth to comply with 10 psf weight.

2.5 RIGID INSULATION

- A. See Section 07210- Building Insulation.

PART 3 EXECUTION

3.1 INSPECTION

- A. The Commissioner, Installer and material manufacturer shall inspect and approve the prepared substrate prior to application of the primer coat.
- B. Random tests for adequate tensile strength of the substrate can be conducted (using an Elcometer Adhesion Tester) on the substrate by the installer at a minimum frequency of one per 1000 sf. For smaller areas, a minimum of three tests can be conducted and the results recorded.

3.2 PREPARATION (MINIMUM 2" BEYOND WATERPROOFING APPLICATION)

- A. The suitability of any surface for the waterproofing application will be the sole responsibility of the manufacturer. General practice is to have the installer observe the first area prepared (minimum 200 sf) with the Commissioner and the General Contractor to agree an acceptable standard.
- B. Before the surface preparation contractor leaves the site, the manufacturer will inspect the area to approve its suitability for the waterproofing application.
- C. Substrates to be coated must be firm, dry and load bearing, free of loose and brittle particles, laitance and contaminants that would impair adhesion such as form release agents, admixtures, concrete curing compounds, sealers, dirt, oil, grease, rubber skid marks and other substances or coatings. Heavy oil or gas contamination may require sanding or grinding to a clean surface.
- D. The surface profile is not to exceed 1/4" (peak to valley). Minor surface area deterioration of 1/4" or greater shall be repaired to minimize excessive material usage.
- E. The same procedure for surface preparation shall be applied to vertical surfaces. Blow holes and voids exceeding 1/4" shall be identified and filled.
- F. After surface preparation, all cracks, control and cold joints should be identified and dry; they must be cleaned of existing sealant and the void filled. The edges of the crack must be tested for loose, friable concrete. Cracks do not require saw cutting or routing.
- G. Drains, metal upstands, drip edges, gravel stops, flashings, scuppers, anchor hangers, threaded rods, rebar and fasteners must be firmly fixed to a solid substrate. Mechanically abrade by power tool (i.e. disc grinder not wire brush) back to clean metal in accordance with SSPC – SP3 and solvent wiped with a clean cloth. Cut a 1/4" reglet at the outside edge of trench drains. Loose concrete around drain flanges must be removed and replaced. Cover drain cap fixing bolts to prevent contamination with resins. Ensure all drains are blocked during work to prevent clogging with resin or aggregate.
- H. Where the termination point of the system on horizontal surfaces does not meet a wall, curb, or square joint edge, a straight, minimum 1/4" square groove saw cut shall be formed.
- I. Substrate of Wood, Roof Board, Cement Board, Oriented Strand Cover board, External Gyproc, Insulation.

1. All must be exterior grade, dry, and clean.
 2. Install only as much as can be primed, sealed and protected before end of workday or onset of inclement weather.
 3. The board edges must be loosely butt joined, supported, resting on joists or metal deck flutes and be fixed with exterior deck screws or corrosion resistant fasteners (as approved by insulation or board manufacturer) at 6" centers minimum.
If multiple layers of these items are used, each layer should be laid at 90°. If laid in the same direction, they must be staggered a minimum 6" in each direction.
 4. Detail these items around penetrations neatly, with no gaps greater than ¼". They should be adjoined with no gaps greater than ¼" between boards or between boards and roof detailing.
 5. Wood must be lightly sanded with special attention at the seams, to remove any splinters that would snag the fleece or penetrate the waterproofing. Fill knotholes or splits with primer and membrane, striking flush with a putty knife, before application of waterproofing, as specified.
- J. Hot pipes or vents (greater than 180°F) can be coated directly with waterproofing.

3.3 INSTALLATION

- A. Apply waterproofing higher than possible water level on roof.

B. PRIMER

1. Wood, Roof Board, Cement Board, Oriented strand Cover board, External Gyproc must receive two coats of Primer.
2. The first coat is applied at a rate of 80sf/gallon (400sf/5 gallon pail). The second coat is applied at a rate of 120sf/gallon (600sf/5 gallon pail). It can be applied within 1-hour minimum and 12hrs. maximum.
3. The primer is applied evenly by medium nap (1/2") roller and brush. Apply slight pressure on the roller to ensure all voids and pores are filled. If the substrate is left rough, care must be taken to prevent "puddles" of primer by using a long sleeved roller and brush to remove the excess.
4. At surface temperatures greater than 80°F, the priming must be done out of direct sunlight or when temperatures are falling.
5. Blow holes and voids in vertical surfaces exceeding ¼", in width or depth, shall be identified and filled.

C. WATERPROOF MEMBRANE ON VERTICAL SURFACES AND ALL DETAILING

1. Normally to be done before horizontal waterproofing.
2. The membrane and fleece flashing shall be applied to the primer after 30 minutes minimum, 48 hours maximum. If these times are exceeded, the primer must be cleaned with solvent and a clean cloth before it is overcoated.

3. The membrane resin shall be applied in two coats by medium nap (1/2") roller and brush at an approximate rate of approx. 20sf/gallon (120sf/6 gallon pail), depending on surface profile.
4. The first coat is applied @ 32sf/gallon (285sf/pail).
5. Apply the primer and resin a minimum 2" past the outside edge of the fleece. Where visible, apply to a neat, straight line.
6. Embed fleece into the wet resin with a brush or roller, ensuring to remove all trapped air and excess resin (no bubbles in the fleece). Avoid wrinkles or folds in the fleece.
7. The second coat of membrane resin is applied @ 48sf/gallon (190sf/pail) onto the fleece until it is completely saturated.
8. The membrane shall be applied evenly in a methodical manner, closely monitoring the volume of material used against the area covered. This information shall be recorded on the Daily Record Sheets.
9. The membrane and fleece flashing must extend a minimum 3" onto the horizontal deck.
10. Whenever the flashing is applied in sections, each vertical application must overlap the previous one by a minimum 3". Ensure there is enough resin between layers of fleece.

D. WATERPROOF MEMBRANE ON HORIZONTAL SURFACES

1. The membrane and fleece shall be applied to the primer after 30 minutes minimum, 48 hours maximum. If these times are exceeded, the primer must be cleaned with solvent and and clean cloth before it is overcoated.
2. The membrane resin shall be applied flat squeegee, medium nap (1/2") roller and brush at a rate of approx. 20sf/gallon (120sf/ 6 gallon pail) @ 80 mils dft, depending on surface profile.
3. The first coat is applied @ 32sf/gallon (285sf/pail).
4. Apply the primer and resin a minimum 2" past the outside edge of the fleece. Where visible, apply to a neat, straight line. Embed the fleece into the wet resin with a brush or roller, ensuring to remove all trapped air and excess resin (no bubbles in the fleece). Avoid wrinkles or folds in the fleece.
5. The second coat of membrane resin is applied @ 48sf/gallon (190sf/pail) onto the fleece until it is completely saturated.
6. The membrane resin shall be applied evenly in a methodical manner, closely monitoring the volume of material used against the area covered. This information shall be recorded on the Daily Record Sheets.
7. Whenever the membrane resin is applied in sections, each application must overlap the previous one by a minimum 3" to a neat straight line.
8. All flashing must be overlapped a minimum 3".
Apply horizontal membrane and fleece up to edge of all detail and walls.

E. TOP COAT – UV RESISTANT, AESTHETIC WHITE FINISH

1. The Topcoat should be applied to the membranes after 1-hour minimum, 48 hours maximum.
2. If these times are exceeded, the membrane must be cleaned with solvent and a clean cloth before Topcoat application.
3. The Topcoat shall be applied evenly in one coat by medium nap (1/2") roller and brush at a rate of approx. 110sf/gallon (660sf/6 gallon kit).
4. If a slip resistant finish or roofing granules are required, a material manufacturer approved, dry silica sand (sieve size # 20-30 or roofing granule) shall be cast onto the wet resin, vertically and to fully filled, and then allowed to cure. Consumption rate for the aggregate shall be approximately 1.0 lb./sf.

F. WEAR COAT ON HORIZONTAL SURFACES (with aggregate)

1. The Wear coat is a high viscosity, hard, coating based on polyurethane modified methacrylate.
2. The Wear coat is fully filled with sand (#20-30, NJ0), as approved by material manufacturer.

G. DETAILING

1. Metal Upstands, Penetrations, Drip Edges, Gravel Stops and Flashings:
 - a. Prime as specified.
 - b. After priming to the height specified, apply a 6", "pre-stripe" of membrane and fleece flashing at deck/upstand, penetration interface. Then apply target patch of resin and fleece.
 - c. The flashing must extend a minimum 3" onto the horizontal deck.
 - d. The complete horizontal deck will then be coated with membrane and fleece, as specified with a minimum 3" overlap onto the flashings.
2. Metal Drains:
 - a. Prime as specified.
 - b. After priming, apply a 6", "pre-stripe" of membrane and fleece flashing to the primed substrate and into drain.
 - c. The complete deck will then be coated with membrane and fleece, as specified with a minimum 3" overlap onto the flashing.
 - d. The detailing of to drains that are not metal shall be approved by material manufacturer on a case-by-case basis
3. Wall Ties, Stone Anchor Hangers, and Fixings:
 - a. Locations should be installed prior to applying waterproofing system.
 - b. Prime as specified.
 - c. After priming, apply a 6", "pre-stripe" of membrane and fleece flashing, to the primed deck and detail.
 - d. The complete deck or wall will then be coated with membrane and fleece, as specified, as high as the overburden or possible water level, with a minimum 3" overlap.
4. Wood, Roof Board, Cement Board, Oriented strand Cover board, External

Gyproc, Insulation:

- a. If there is any dampness or entrapped moisture, epoxy Sealer/Primer (fully sanded) must be used.
- b. All gaps/seams wider than 1/4" shall be "pre-sealed" with membrane (with no fleece).
- c. All gaps/seams must be pre-stripped.
- d. After priming, apply a 6", "pre-stripe" of membrane and fleece flashing.
- e. The complete area will then be coated with membrane and fleece as specified.

H. BOND TEST/EFVM

1. Perform one pull-off test per substrate type.
2. A pull-off bond test according to ASTM D4540-02 can be carried out 24 hours after application. The measured result must be greater than the result carried out on the substrate (Sect. 3.1, Inspection).
3. EFVM testing, on the complete waterproofing system, is also acceptable.

I. WATER TEST

1. Perform water test. Procedures and test to be reviewed by Commissioner. Provide City of New York a minimum of two week notice prior to test.

I. PLACEMENT OF OVERBURDEN

1. Before placement of the overburden, the complete waterproofing system should be inspected and approved by material manufacturer or its' appointed representative (i.e. agent or installer), and by Commissioner.

J. COMPLETION

1. Prior to demobilization from the site, the work shall be reviewed by the Commissioner. All defects noted and non-compliances with the Specifications or the recommendations of the manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Commissioner and the manufacturer prior to demobilization.
2. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract closeout.

END OF SECTION

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SECTION 07542 – WATERPROOFING SYSTEM FOR WALLS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SYSTEM DESCRIPTION

- A. Work of this Section includes all labor materials, equipment and services necessary to complete the exterior waterproofing system as shown on the drawings and/or specified herein, including, but not limited to the following:
1. A waterproofing system incorporating a sealer/primer, instant setting, spray-applied waterproofing membrane and wear coat with aggregate, where exposed. The system is fully adhered and seamless; it has no solvent and no discernable odor.
 2. Waterproofing system on the parapet walls and exterior walls of the project to top of grade beam, including penetrations, green screen clips, and cement board furring.
 3. Miscellaneous waterproofing, such as below-grade steel base plates and portions of vertical posts of the green screen assembly, up to grade.
 4. Miscellaneous waterproofing, such as the steel base plates and portions of the vertical posts of the rooftop chain link mechanical enclosure.
 5. Other locations as shown on drawings.
 6. This system is generically referred to as "waterproofing" throughout this specification.
- B. System includes:
1. Epoxy Sealer/Primer, near fully sanded
 2. Instant Setting, Seamless, Spray Applied, Elastomeric Polyurethane Hybrid Membrane
 3. Fast curing Polyurethane Wear Coat, fully aggregated where exposed, if required

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. AAC Masonry - Section 04225.
- C. Chain Link Mechanical Enclosure – Section 05450.
- D. Miscellaneous Metals – Section 05500
- E. Building Insulation - Section 07210.
- F. Cement Board Rain screen - Section 07450.
- G. Roof Waterproofing System - Section 07541.
- H. Sheet Metal - Section 07600.

3.2 REFERENCES

American Society for Testing and Materials (ASTM).

- 1) ASTM D4263-83 (2005) (*Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method*)
- 2) ASTM D4258-05 (*Standard Practice for Surface Cleaning Concrete for Coating*)
- 3) ASTM D4259-88 (2006) Sections 6 & 8 (*Standard Practice for Abrading Concrete*)
- 4) ASTM D5295-00 (2006) (*Standard Guide for Preparation of Concrete Surfaces for Adhered [Bonded] Membrane Waterproofing Systems*)
- 5) ASTM D4261-05 (*Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating*)
- 6) ASTM D4540-02 (*Standard Test Method for Pull-off Strength of Coatings using Portable Adhesion Testers*)
- 7) ASTM E2129-05 **CRITERION 3.3-3.5 OPERATIONAL PERFORMANCE OF INSTALLED PRODUCT (STANDARD PRACTICE FOR DATA COLLECTION FOR SUSTAINABILITY ASSESSMENT OF BUILDING PRODUCTS)**

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1) Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2) The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3) Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4) Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Shop Drawings: Submit copies of manufacturers Shop drawings, Technical Data Sheets and Material Safety Data Sheets (MSDS) for all products.
- C. Samples - Submit a representative sample of the system.
- D. Upon completion of the work, installer shall submit all required warranty documentation, including Pre-installation Project Warranty Request Form, Daily Record Sheets and Certification of Project Completion.
- E. Upon completion of the contract the manufacturer shall submit "Maintenance and Repair Recommendations".

1.5 QUALITY ASSURANCE

- A. The installer must be fully trained by the manufacturer.
- B. Daily Record Sheets as provided by the manufacturer must be recorded and maintained on a daily basis by the installer in accordance with the warranty requirements.
- C. Applicator must at all times have available a job specific manual that will include the Specification, Technical Data Sheets and the Material Safety Data Sheet (MSDS) information.

- D. Proposed suppliers of an "approved substitute" system shall be required to meet all the attributes:

These include:

1. System must have a manufacturer's 30-year, NDL, labor and materials, warranty.
2. The waterproofing system never requires removal or replacement.
3. System can be constantly submerged in water.
4. Epoxy Sealer/Primer, which can be applied on green concrete, with silica sand.
5. No additional detailing sheets, cant strips, clamping rings or termination bars required.
6. NO protection board required.
7. NO root barrier required.
8. System has no solvents, no odor and is VOC compliant with LEED requirements and standards.
9. No boilers or naked flame to be used.
10. System can be overlaid after 4 hrs. @ 68°F.

1.6 DELIVERY, STORAGE, HANDLING

- A. Materials shall be delivered in original sealed containers, clearly marked with manufacturers name, product name, batch number and date of manufacture.
- B. Materials should be stored upright, kept cool, out of direct sunlight, dry and in a safe manner in accordance with the manufacturer's recommendations as indicated on the relevant Technical Data Sheets.
Ensure all fillers and aggregates are kept dry.
- C. Operatives should at all times observe the requirements for wearing protective clothing as outlined in the relevant products' MSDS. The installer should also work in accordance with NIOSH respirator guidelines indicated in Technical Data Sheets and local health and safety requirements. If there are any questions concerning health and safety issues, contact material manufacturer directly before proceeding.
- D. Materials and packaging should be disposed of in accordance with applicable rules and regulations of local, state and federal authorities having jurisdiction.

1.7 JOB CONDITIONS

- A. Protection of adjacent areas from overspray or other system-related contamination shall be the responsibility of the installer. Provide windbreaks where necessary.

- B. Install materials in accordance with manufacturers Technical Data Sheets, MSDS or as modified by applicable rules and regulations of NIOSH, and local state and federal authorities having jurisdiction.
- C. Unless otherwise approved by the manufacturer, application can proceed while air and substrate temperatures are between 36°F and 104°F providing the substrate is at least 6°F above the surface dew point and rising.
- D. The General Contractor shall ensure that adequate protection is provided for the duration of the contract to prevent damage to the system by others negligence.

1.8 WARRANTY

- A. A 30-year NDL labor and materials warranty is required.
- B. A final inspection must be carried out by a material manufacturer representative before covering. Upon completion of the work, it is the responsibility of the applicator to supply the owner with the material manufacturer, single source, labor and materials, 30-year NDL manufacturer's warranty.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Prodeq (basis of design), manufactured by material manufacturer TQ3 North America, Morristown, NJ,
- B. Or approved equal.

2.2 MATERIALS

A. Sealer/Primer

1. The Primer is a high build, non-solvented and rapid curing two-component epoxy sealer/primer.
2. The Primer is broadcast to near filled with a dry, contamination free, silica sand (sieve size #20-30), as approved by material manufacturer.
3. The primer DFT including sand shall be 10 mils.

B. Low Temperature, Fast Cure Sealer/Primer (if required)

1. If faster application is required, or if temperatures range between 32°F – 45°F, a low temperature Primer should be applied.

C. Waterproof Membrane

1. The membrane is a cold spray applied two-component, rapid curing, polyurethane hybrid membrane that can be overcoated within one hour at temperatures as low as 32°F.
2. The membrane shall have a DFT of 100 mils minimum.

D. Wear Coat – where exposed

1. The Wear Coat is a two-component, rapid-curing, hand applied coating that cures within 4 hours of application at 68°F.
2. The Wear Coat is broadcast to fully filled with the chosen dry aggregate as approved by material manufacturer.

2.3 ACCESSORIES

- A. Primer – for use on green, highly alkaline concrete.
- B. Primer – aluminum, copper, stainless and galvanized steel primer.
- C. Patch Repair Mortar – pre-packaged for filing joints and concrete repairs.
- D. UV Topcoat – colored polyurethane coating for exposed membrane.
- E. Aggregates - as per project requirements and approved by material manufacturer.
- F. Plural component spray machine capable of providing material at 2500 psi and 170° F, as approved by the manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

- A. The Commissioner and Applicator and material manufacturer representative shall inspect and approve the prepared substrate prior to application of the sealer/primer coat.
- B. Random tests for adequate tensile strength of the substrate can be conducted (using an Elcometer Adhesion Tester) on the substrate by the installer (for an agreed fee), at a minimum frequency of one per 5000 sf. For smaller areas, a minimum of three tests can be conducted and the results recorded. The minimum tensile bond strength of the concrete or substrate shall be 150 psi.

3.2 PREPARATION

- A. The suitability of any surface for application will be the sole responsibility of material manufacturer or its appointed representative (i.e. agent or approved installer). General practice is to have the installer observe the first area prepared (minimum 200 sf) with the Commissioner and the General Contractor to agree an acceptable standard. Before the surface preparation contractor leaves the site, the manufacturer or its appointed representative will inspect the area to approve its suitability for application.
- B. New concrete shall have cured for a minimum of 28 days or be surface dry when tested to ASTM D4263-83 (2005). Place test films in various areas to check for moisture, which can also carry soluble alkali salts.

- C. Substrates to be coated must be firm, dry and load bearing, free of loose and brittle particles, laitance and contaminants that would impair adhesion such as form release agents, admixtures, concrete curing compounds, sealers, dirt, oil, grease, rubber skid marks and other substances or coatings. Heavy oil or gas contamination may require removal of concrete to a clean surface. Form release agents must not be oil based. Concrete curing compounds must be sodium silicate type and not be wax or resin based.
- D. The surface profile is not to exceed $\frac{1}{4}$ " (peak to valley). Minor surface area deterioration of $\frac{1}{4}$ " or greater shall be repaired to minimize excessive material usage (Sect.3.3A7). A wood float, wood trowel or broom finish on new concrete is acceptable.
- E. Preparation by mechanically abrading or scarifying in accordance with ASTM 4259-88(2006), section 6 or as outlined in ASTM 4258-83(1999), is acceptable subject to manufacturer's approval. There should be an "open" concrete surface in accordance with ICRI surface profiles CSP 3-6.

Edges and other areas inaccessible to the shotblasting equipment should be prepared using a hand held surface scarifier with vacuum attachment.

- F. The same procedure for surface preparation shall be applied to vertical surfaces. Blow holes and voids exceeding $\frac{1}{4}$ " shall be identified and filled.
- G. Pre-cast concrete panels should not contain oil based release agents. Large voids should be filled in with a material manufacturer approved mortar or non-shrink grout. Pre-cast decks and cast-in-place washes do not have to be shot blasted.
- H. After surface preparation, all cracks, control and cold joints should be identified and dry; they must be cleaned of existing sealant not in good working condition. The edges must be tested for loose, friable concrete or material. Cracks do not require saw cutting or routing.
- I. After surface preparation all expansion/movement joints should be inspected at the edges and any loose concrete removed and repaired.
- J. Drains, metal upstands, flashings, scuppers, anchor hangers, threaded rods and rebar, must be mechanically abraded by power tool (i.e. disc grinder not wire brush) back to clean metal in accordance with SSPC – SP3 and solvent wiped with a clean cloth. Cut a $\frac{1}{4}$ " reglet at the outside edge of trench drains. Loose concrete around drain flanges must be removed and replaced. Cover drain cap fixing bolts to prevent contamination with resins. Ensure all drains are blocked during work to prevent clogging with resin or aggregate.
- K. Where the termination point of the system on horizontal surfaces does not meet a wall, curb, or square joint edge, a straight, minimum $\frac{1}{4}$ " square groove saw cut shall be formed.
- L. Wood, Cement Board, Roof Board, AAC, External Gyproc, must be exterior grade, dry and clean. The board edges must rest on joists or framing, and be fixed with exterior deck screws at 6" center minimum. The complete boards must be lightly sanded with special attention at the seams, to remove splinters that would penetrate the waterproofing.

- M. Exterior Cement Board Vertical Furring: After furring installation, add additional waterproofing over furring.
- N. Masonry Window and Door openings: Extend waterproofing inside masonry openings. After blocking is installed, add additional waterproofing over blocking.
- O. Hot pipes or vents (greater than 180 degrees F) can be coated directly with waterproofing.

3.3 INSTALLATION

A. SEALER/PRIMER

1. The Primer shall be applied evenly at an overall coverage rate of 100sf/gallon (300sf/3 gallon kit), depending on surface porosity of AAC block walls. The Primer shall be applied at a rate of 145sf/gallon (325sf/2.25 gallon kit). On concrete or other substrates that are rougher than specified, or a resurfacing and pore filling mortar has been used on walls, the consumption rates of sealer/primer will increase.
2. The primer should be worked into the surface to seal all pores using a suitable medium pile roller or double blade foam rubber squeegee and back-rolled. If the concrete is rough, care must be taken to prevent "puddles" of primer by using a long sleeved roller and brush to remove the excess.
3. At surface temperatures greater than 90°F, the priming must be done out of direct sunlight or when temperatures are falling.
4. Dry, contamination free, silica sand, as approved by material manufacturer (sieve size #20-30) shall be cast onto the wet primer until it is near filled. Consumption of the aggregate shall be approximately 0.25 lbs/sf.
5. If the concrete is rougher than specified, it can be smoothed by using an approved and compatible patch repair mortar. Any repair must then be primed as specified, to ensure a fully aggregated surface is provided for the membrane.
6. Very porous walls, such as block work, brick or ACC) require two coats of primer.
7. Wood cement or Roof Board, External Gyproc must receive two coats of primer.
 - a. The first coat is applied at a rate of 85sf/gallon (200sf/kit) and no sand is added.
 - b. The second coat is applied at a rate of 150sf/gallon (350sf/kit) and dry silica sand added per manufacturer's recommendations.
 - c. Total 2 coats = 60sf/gallon (140sf/kit)

B. WATERPROOF MEMBRANE – SPRAY APPLIED

1. The membrane shall be spray applied using a suitable plural component spray machine at a rate of 1500sf/kit. If the concrete or substrate is left rougher than specified, the consumption of membrane will increase.

2. The membrane shall be applied evenly in a methodical manner, closely monitoring the volume of material used against the area covered. This information shall be recorded on the Daily Record Sheets.
3. Whenever the membrane is applied in sections, each application must overlap the previous one by a minimum 4" to a neat straight line. The membrane must be applied directly to membrane within 48 hours maximum.
4. If these times are exceeded, the membrane must be wiped with solvent and a clean cloth before it is "stripe coated" with a 4" wide band of primer using a brush or shorthaired roller.

C. WEAR COAT

1. The Wear Coat should be applied to the membrane after 1-hour minimum, 72 hours maximum.
2. If this time is exceeded, the membrane must be wiped with solvent and a clean cloth before Wear Coat application.
3. The Wear Coat shall be applied evenly using a 1/8" serrated squeegee, medium pile roller (1/2" nap) and brush at a rate of (180 sf/3.35 gal kit). It must be back-rolled with and allowed to level.
4. The material manufacturer approved, dry silica sand (sieve size # 20-30), shall be cast onto the wet resin, vertically and to fully filled. Consumption rate for the aggregate shall be approximately 1.0 lb/sf.

D. DETAILING

1. There may be many "runs" in the cured membrane due to its application thickness. This is technically acceptable.
2. Where the membrane is exposed, the green color may be visible, even where overcoated with Wear Coat. Apply a colored UV Topcoat onto the membrane by roller or brush in two coats at a rate of 100sf/gallon (300sf/3 gallon kit).
3. Cracks over 1/16", Control or Cold Joints:
 - a. Preparation as per specification. No saw cut or routing is required.
 - b. After priming, apply a "stripe coat" of membrane at 80 mils DFT into and 4" either side of the crack/joint.
 - c. When the wall is sprayed, these areas will receive another 100 mils DFT (total 180 mils DFT) of membrane.
4. Wall Ties, Stone Anchor Hangers, Furrings, and fixings: Should be installed prior to applying membrane. Preparation as per specification.
 - a. Prime with appropriate primer, depending on metal.

- b. After priming, apply a "stripe coat" of membrane to the primed surface at 80 mils dft.
- c. When the wall is sprayed, these details will receive another 100 mils dft (total 180 mils dft).
- d. If they cannot be installed prior to membrane application, resin anchor bolts or a proprietary sealant must be used to waterproof these details when they are installed through the waterproofing. The membrane and Wear Coat must then be applied to these details as specified.

3.4 BOND TEST/EFVM

- A. Provide one pull-off test per substrate type.
- B. A pull-off bond test according to ASTM D4541-02 can be carried out 24 hours after application. The measured result must be greater than the result carried out on the substrate (Sect. 3.1, Inspection).
- C. EFVM testing, on the complete system, is also acceptable.

END OF SECTION

SECTION 07600 - SHEET METAL WORK

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the sheet metal work, as indicated on the drawings and/or specified herein, including but not limited to, the following:
 - 1. Stainless steel edge flashing and coping.
 - 2. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.
 - 3. Stainless steel scuppers.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Stainless steel window and door surrounds see Miscellaneous Metals – Section 05500.
- C. Cement Board Rainscreen System – Section 07450.
- D. Roof Waterproofing System - Section 07541.
- E. Waterproofing System for Walls –Section 07542.
- F. Sheet Metal Roofing – Section 07610.

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1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction and relation to adjoining construction.

C. Samples: Submit 12" x 12" samples of flashing materials and finishes.

1.5 LEED BUILDING PERFORMANCE CRITERIA

A. The following criteria are REQUIRED for the products included in this section:

1. Every effort shall be made to maximize post industrial/post consumer waste but sheet metal flashing shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of Item 1.5 below.
2. Sheet metal flashing manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of Item below.

1.6 WARRANTY

- A. The Contractor shall warrant that all metal flashing work executed under this Section will be free from defects in materials and workmanship for a period of 10 years from date of acceptance of the Project, and he shall remedy any defects in the metal flashing work.

1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the City of New York.

PART 2 PRODUCTS

2.1 MATERIALS

A. Flashing Materials

1. Stainless Steel Flashing: ASTM A167, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, Washington Steel Corp., or approved equal. Thickness of stainless steel shall be as listed below.
 - a. Concealed Flashings: 0.012" thick, 30 gauge.
 - b. Exposed Flashings: 0.015" thick, 28 gauge.
 - c. Edge Strips: 0.025" thick, 24 gauge.
 - d. Or as shown on Drawings.
 2. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.
 3. Solder: Composed of 60 percent block tin and 40 percent pig lead, except that solder at seams exposed to public view shall be 80 percent tin and 20 percent lead.
 4. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where sheet metal work is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 METAL FLASHING INSTALLATION

- A. Reference Standard: Conform to the requirements of 5th Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.
- B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.
- C. Nailing: Confine to sheets 12" or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use 1" long masonry nails for nailing to concrete. Space nails 4" o.c. maximum.
- D. Cleating: Use cleats where sheets are more than 12" in width. Space cleats approximately 12" o.c. Cleats 2" wide by 3" long, of the same material and weight as the metal flashing being installed. Secure one end of the cleat with 2 nails and fold edge back over the nail heads. Lock other end into seam or into folded edge of metal flashing sheets. Pre-tin cleats for soldered seams.
- E. Joining: Join metal flashings with 1" locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.
- F. Soldering: Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well-heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.
- G. Slip Joints: Locate slip joints not more than 24 feet apart and not more than 8 feet from corners. Form slip joints as 3" wide joints with cover piece behind flashing, and fill locked ends neatly with sealant.
- H. Cap Flashing: Install over base flashings, in 8 to 10 foot lengths, lapped 6" at ends. Cap flashing shall be increased longitudinally to produce spring action to hold bottom edge of cap flashing firmly against base flashing. Cap flashing shall lap base flashing

at least 4", with exposed bottom edge at a 45 degree angle downward and folded back on underside at least 1/2" to form drip. Make cap flashing continuous at corners and angles. Provide preformed and welded corner cap flashings.

- I. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein, but indicated on drawings and/or required to provide a watertight installation.
- J. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.
- K. Reglets
 - 1. Provide watertight reglets in masonry and concrete work to receive cap flashing. Form reglets of stainless steel using same thickness as stainless steel sheet metal specified.
 - 2. In masonry work use open or closed slot reglets with slot at least 1" deep and 3/16" wide. Provide hook dams or turn-ups for anchoring securely into mortar joints. Insert cap flashing into slot full depth using button punch or lead wedges to lock in place.
 - 3. In concrete work, use open or closed slot reglets with slot sloped upward at 45 degrees, at least 1" deep and 3/16" wide. For fastening reglets to concrete forms use double-head stainless steel nails spaced 12" apart maximum.
 - 4. Insert cap flashing full depth into reglet slot, and wedge in place using lead strips spaced on 12" centers maximum or lead caulking rope. When lead strips are used for continuous caulked reglets, use approved weather-resistant fibrous compounds.
- L. Scuppers:
 - 1. Scuppers shall be manufactured from stainless steel, in a rectangular shape a minimum of 8" wide by 4" high, with flanges flush on both sides of wall, suitable for receiving wall waterproofing and achieving a watertight connection.
 - 2. Coordinate location with adjacent masonry, roof assembly and miscellaneous steel of green screen perimeter fence.
 - 3. Provide wire debris basket at each scupper, interior high point.
 - 4. Caulk all joints between scupper and adjacent surface, such as interior face of masonry parapet wall, and penetration through cement board.

END OF SECTION*

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SECTION 07610 - SHEET METAL ROOFING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet metal roofing, flashing and roof insulation as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Stainless steel roofing, sheet metal work and related flashing and accessories.
 - 2. Self-adhering waterproof membranes.

1.3 RELATED SECTIONS

- A. Green building requirements in Division 1.
- B. Carpentry - Section 06200.
- C. Building Insulation - Section 07210.
- D. Roof Waterproofing System - Section 07541.
- E. Photovoltaic System - Section 13650.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers
 - 1. For actual installation of roofing, use only competent and skilled roofers completely familiar with the products and the manufacturer's currently recommended methods of installation.
 - 2. Installer: A firm which can show proof of prior successful experience with the installation of metal roofing of similar type and equivalent scope.

- B. **Manufacturer's Certifications:** Secure a visit to the job site by a representative of the manufacturer of the roofing used, who shall inspect and shall certify that:
 - 1. The surfaces to which the roofing was applied were in a condition suitable for this application.
 - 2. The materials installed complied in all respects with the requirements of this Section of these specifications.
 - 3. The materials were installed in complete accordance with the manufacturer's current recommendations.
- C. **Manuals: SMACNA Details:** Except as otherwise shown or specified, comply with the applicable recommendations and details of the "Architectural Sheet Metal Manual" by SMACNA. Conform to the dimensions and profiles shown.
- D. **Coordination:** Coordinate metal roofing with rain drainage work, flashing, trim and the construction of decks, parapets, walls and other adjoining work, to provide a permanently leakproof, secure and non-corrosive installation.

1.5 MOCK-UP

- A. Before proceeding with fabrication of metal roofing components, prepare a mock-up of each metal roof system. Correct mock-up as directed by the Commissioner until it meets with approval. Retain accepted mock-up as standard for acceptance of all metal roofing and flashing.
- B. Provide mock-up of at least 100 sq. ft. in location as directed by Commissioner, to show typical pattern of seams, edge construction and finish texture and color.

1.6 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also

- in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 - e. Recycled content information shall be for aluminum extrusions only.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. **Manufacturer's Data:** Submit for information only, metal manufacturer's specifications, installation instruction and general recommendations for roofing applications. Include manufacturer's certification or other data substantiating that the materials comply with the requirements. Indicate by copy of transmittal that the Fabricator/Installer has received copy of manufacturer's instructions and recommendations.
 - C. **Samples:** Submit 12" square samples of each specified metal and gauge to be used on roofing. Samples will be reviewed by Commissioner for thickness and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
 - D. **Shop Drawings:** Submit shop drawings showing the manner of forming, jointing and securing the metal roofing, and the pattern of seams. Show expansion joint details and waterproof connections to adjoining work and at obstructions and penetrations. Show all roof penetrations required by work of all trades.
- 1.7 PERFORMANCE AND TESTING
- A. **Provisions For Thermal Movement:** Metal roofing systems shall be fabricated and installed so that they provide for expansion and contraction of the component materials without buckling, hole elongation, fastener failure or excess stress loading situations developing at any time during the temperature cycle. Cleats shall be installed to resist rotation (2 fasteners per cleat minimum) and to avoid stress when roofing expands and contracts. Any continuous panel run exceeding 30 feet must involve expansion cleats. Follow manufacturer's specifications and SMACNA for all recommendations to design details.
 - B. **Uplift Resistance:** Metal roofing systems shall be fabricated to resist the negative pressure and uplift loads as shown in the SMACNA Manual – 5th edition, appendix A-4. If necessary a separate independent test can be performed to determine the actual pullout of the particular fastener in the particular substrate. Most fastener manufacturers have tested their parts in different substrates. It is recommended that a safety factor be used with all fastener applications.

1.8 PHOTOVOLTAIC (PV) PANEL CLIPS

- A. Provide Letter of Approval from Sheet Metal manufacturer that use of standing seam PV panel clamps (such as S-5 or approved equal) are acceptable, and do not affect Sheet Metal warranty as long as clamps are properly installed per manufacturers' instructions.

1.8 GUARANTEE

- A. Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Commissioner a written guarantee signed by the Roofing Contractor, and endorsed by the roofing materials manufacturer guaranteeing that the installed roofing will remain intact and free from leaks for a period of at least ten (10) years.

1.9 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.10 CODE REQUIREMENTS

- A. Roof coverings must comply with 1968 BC 27-337 Roof Coverings, which require all roofs to be classified as A or B, on the basis of their resistance to exterior fire exposure as listed in BC reference standard RS 5-9, or as determined by tests made in accordance with reference standard RS 5-10 (ANSI/ASTM E108-1987 Standard Method of Fire Tests of Roof Coverings).

PART 2 PRODUCTS

2.1 STAINLESS STEEL ROOFING

- A. Provide standing seam zinc-tin alloy turne coated stainless steel (TCS II) made by Revere Copper, consisting of 304 nickel-chrome stainless steel coated on both sides with zinc/tin alloy (50% zinc, 50% tin).
- B. Nails and fasteners, including rivets, screws and bolts, shall be of stainless steel or per manufacturers standard installation recommendations.
 - 1. Nails for nailing to wood and concrete shall be flathead, barbed, wire slating nails, not less than No. 12 ga., 1" long.
 - 2. Screws and bolts shall have round heads.
 - 3. Expansion shields shall be lead sleeves.
- C. Solder: Pure tin.
- D. Flux: Rosin, muriatic acid neutralized with zinc or an approved brand of soldering paste.

- E. Roofing Felt: Asphalt or coal tar saturated felt weighing 15 lbs. per 100 sq. ft.
- F. Building Paper: Rosin sized, unsaturated paper weighing approx. 6 lbs. per 100 sq. ft.
- G. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. Provide Ultra as manufactured by Grace Construction Products, a unit of W. R. Grace & Co., Ice and Water Shield by W.R. Grace, or approved equal.

2.2 MISCELLANEOUS MATERIALS

- A. Flashing sheet of minimum 0.015 gauge, exposed and concealed.
- B. Primers as recommended by roof system manufacturer.
- C. All other materials not specifically described but required for a complete and proper installation of roofing.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2" wide and 1/8" thick.

2.3 DISSIMILAR METALS PROTECTION

- A. Where possible, contact between dissimilar metal surfaces shall be avoided. Where contact occurs, notify the Commissioner who shall advise the Contractor how best to isolate the surfaces, as follows:
 - 1. Painting with
 - a. Bituminous paint complying with FS-TT-C-494, Type II, 12 mils dry film thickness.
 - b. Zinc chromate primer, alkyd, complying with FS-TT-P-645.
 - 2. Taping or gasketing with a non-absorptive material.
 - 3. Caulking the joint between the 2 metals using sealant specified herein.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where the metal roof, flashing and roof insulation are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 SHEET METAL WORK - GENERAL

- A. Surfaces that are to receive sheet metal and underlayments shall be even, smooth, sound, clean, and dry, and free from all defects. Cutting, fitting, drilling and similar operations required to accommodate the work of other trades shall be performed.

Where sheet metal abuts or merges into adjacent materials, the juncture shall be executed in a manner to assure waterproof construction.

- B. Accessories and other items essential to complete the sheet metal installation, though not specifically indicated on the drawings or specified herein, shall be provided.
- C. Felt shall be provided as an underlayment for sheet metal linings and coverings. Each ply shall lap 2" with the slope and shall be fastened with flathead, annular thread, wire slating nails, not less than No. 12 ga. and not less than 1" long. Nails shall be driven through sheet metal washers spaced not more than 6" o.c. along all lapped seams. Laps shall be sealed with adhesives.
- D. A cushioning layer of rosin sized or unsaturated building paper weighing not less than 6 lbs. per 100 sq. ft. shall be laid over the asphalt saturated felt as the metal work is installed. Each ply shall lap 2" and nails shall be spaced not more than 18" o.c. along all lapped seams.
- E. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under sheet metal roofing or in locations shown on drawings. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply at locations indicated on drawings, in shingle fashion to shed water, with end laps of not less than 6" staggered 24" between courses. Overlap side edges not less than 3-1/2". Roll laps with roller. Cover underlayment within 14 days.
- F. Sheet metal items shall be fabricated and installed in accordance with the details indicated and as specified. Sheet metal shall be formed on a bending brake. Shaping, trimming and seaming shall be done on the bench, where practicable. Bends, folds, and seams shall be made in such a manner as to avoid buckling or fullness in the metal after installation.
- G. Fastening
 - 1. Nailing: Direct nailing of sheet metal shall be confined to strips less than 12" wide. Flashings less than 12" wide shall be nailed along only one edge. Nails shall be spaced not over 3" o.c. unless otherwise specified or indicated. Where sheet metal is applied to other than wood surfaces, detailed drawings shall be provided to establish locations for sleepers and/or nailing strips required to properly secure the work.
 - 2. Cleats: Shall be provided to secure all flashings and sheet metal work over 12" in width. Cleats shall be evenly spaced not over 12" o.c. unless otherwise specified or indicated. Cleats shall be not less than 1-1/2" wide and long enough to permit a min. 1/2" interlock with the metal work and to allow sufficient metal to fold over the nail heads. Cleats shall be of the same weight as the metal being installed. Cleats shall be secured with 2 flat head, annular thread, slating nails of No. 12 ga. at least 1" long. Cleats for soldered seams shall be pre-tinned.
 - 3. Bolts, Rivets and Screws: Bolts and machine screws shall be a min. of 1/4" dia.; wood screws a min. of No. 12 ga.; and rivets a min. of 1/8" dia.
- H. Soldering and Seaming

1. Soldering: TCS shall not be tinned, but the edges in contact with the solder shall be wire brushed to produce a bright surface. Seams shall be well fluxed with rosin, or cut muriatic acid prior to soldering. Soldering irons only shall be used; no torching or welding.
2. Seams: Seams shall conform to the following requirements:
 - a. Standing seams shall finish not less than 1" high unless specified otherwise.
 - b. Lap seams subject to stress shall finish not less than 1" wide and shall be soldered and riveted.
 - c. Unsoldered lap seams shall finish not less than 4" wide.
 - d. All flat and lap seams shall be made in the direction of flow.
- I. Coverings on Minor Flat, Pitched or Curved Surfaces: Unless otherwise specified or indicated, all minor flat, pitched or curved surfaces, such as crickets, dormers and small decks, shall be covered and flashed with sheets not larger than 18" x 24". Sheets shall be secured with cleats using not less than 3 cleats on the long side and 2 cleats on the short side. All seams shall be pre-tinned, clinch locked and soldered.

3.3 STANDING SEAM ROOFING

- A. Standing seam roofing shall consist of 20" wide by 120" long metal sheets with standing seams 16-3/4" o.c. No straight run of standing seam shall exceed 30'-0".
- B. Place roofing felt and building paper over roof surfaces as specified herein.
- C. Pan Method: Fold lower end of each pan under 3/4". Slit fold 1" away from corner to form a tab where pan turns up to make a standing seam. Fold upper end of each pan over 2". Hook 3/4" fold on lower end of upper pan into the 2" fold on upper end of underlying pan.
- D. Apply sheet metal roofing beginning at eaves with half-length sheets, staggering transverse seams. Space cleats 12" o.c. in each standing seam. Loose lock roofing pans to valley flashing and edge strips at eaves and gable rakes.
- E. Standing seams shall finish 1" except on curved surfaces where they shall finish 1/2" high. Bend up one side edge 1-1/2" and the other 1-3/4". The first fold shall be a single fold 1/4" wide and the second fold shall be 1/2" wide. The locked portion of the standing seam shall be 5 plies in thickness. Fold lower ends of standing seams at eaves over at an angle of about 45 degrees. Terminate standing seams at ridge and hips by turning down in a tapered fold.

3.4 FLASHING

- A. General: Flashings shall be installed at intersections of roofs with vertical surfaces, at projections through roofs, and elsewhere as specified, indicated or required to provide watertight construction. Edges of flashings concealed in masonry joints opposite the drain side shall be turned up 1/4" to form an integral dam. In the drain side of the edge of the flashing shall be kept back 1/4" from the face of the masonry. All exposed edges of flashings shall be finished with a 1/2" hem formed by folding the flashing edge back on itself. Cap flashings shall be installed in conjunction with all base flashings except as otherwise specified or indicated.

- B. Base Flashing: Base flashings shall extend up vertical surfaces not less than 6" nor more than 12". The roof flange or horizontal extension shall not be less than 4" nor more than 6". Base flashings shall be formed in lengths of not less than 8 ft. End joints shall be clinch locked and soldered.
- C. Cap Flashing: Cap flashings shall extend up the vertical surface not less than 2" above the top of the base flashing and shall lap the base flashing not less than 4". The lower edge of the cap flashing shall be stiffened by a 1/2" hem. Cap flashings shall be formed in 8 ft. lengths with end joints lapped a min. of 4". The cap flashing shall extend into the masonry not less than 3".
- D. Hip and Ridge Flashing: Hip and ridge flashings shall be secured along both edges with screws spaced not over 12" o.c., set through washers. Screw heads and washers shall be covered with stainless steel caps. End laps shall be not less than 4". Joints shall not be soldered.
- E. Valley Flashings: Valley flashings shall be of the open type of sufficient width to extend not less than 6" under the finished roofing on each side. Sheets shall be lapped at least 6" on steep slopes. Where the slope is less than 6", sheets shall be clinch locked and filled with caulking or white lead paste. Edges of the flashing shall be not less than 6" wide at the top and shall increase 1" in width for each 9 ft. of length. Where 2 valleys of unequal size intersect or where a valley drains unequal roof areas, a 1" high inverted V joint is formed in the flashing sheet, the end lap shall be increased to 12".
- F. Stepped Flashing: Where sloping roofs abut vertical masonry surfaces, separate flashing squares 8" x 7" shall be woven in with each roofing course. The flashing shall extend out on the roof 4" and shall be turned up under the counter flashing at least 3". Head lap between flashing squares shall be not less than 3".

3.5 MISCELLANEOUS ITEMS

- A. Expansion and Contraction Joints: Expansion and contractions joints shall be provided at intervals not exceeding 24 ft. Expansion and contraction joints shall be slip-type or loose locked. Joint covers shall be of the same gauge material as the flashing served.
- B. Reglets: Reglets shall have edges bent to an angle of at least 45 degrees and shall be of sufficient width to provide firm anchorage in the wall construction. Open type reglets shall be fitted with suitable separators to prevent crushing or filling of the slot during the masonry work. Metal flashing shall be secured in open type reglets by means of lead plugs spaced not over 12" o.c. Grooves shall be filled with caulking compound, finished smooth and wrinkle free.

3.6 CLEANING

- A. All metal work when finished shall be thoroughly cleaned of all flux, scraps and dirt. On large areas this shall be done as each section of the work is finished. Excess flux shall be neutralized by washing with a 5% to 10% solution of washing soda. After cleaning, the metal shall be washed off with clear water.

END OF SECTION

SECTION 07700 - ROOF SPECIALTIES AND ACCESSORIES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the roof specialties and accessories as shown on the drawings and/or specified herein, including but not necessarily limited to the following:

1. Roof hatch.

1.3 RELATED SECTIONS

- A. Green building requirements in Division 1.
- B. Miscellaneous Metals – Section 05500.
- C. Roof Waterproofing System - Section 07541.
- D. Sheet Metal Flashing - Section 07600.

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.

- 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 - e. Recycled content information shall be for aluminum extrusions only.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Before any roof specialties and accessories are delivered to the job site, submit shop drawings showing profiles and anchoring devices.

1.5 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 ROOF HATCH

- A. Provide shop-primed, galvanized steel roof hatch units, 36" x 30", Bilco Type S or approved equal, with 1" rigid insulation at curbs and door and standard self-lifting mechanism. Provide manufacturer's standard hardware, including hold-open device, hinges, latch and operating handles for inside operation. Provide internal locking device. Construct units for 40 lbs. per sq. ft. live load.
- B. Provide units manufactured by Bilco, Babcock-Davis, Milcor or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where roof specialties and accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- D. Operational Units: Test operational units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

END OF SECTION

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SECTION 07840 - FIRESTOPS AND SMOKESEALS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the firestops and smoke seals as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 4. Sealant joints in fire-resistance-rated construction.
 5. Construction joints, including those between top of fire rated walls and underside of structure above.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast in Place concrete - Section 03300.
- C. Joint Sealers - Section 07900.

- D. Gypsum Drywall - Section 09250.
- E. Ducts and piping penetrations - Division 15.
- F. Cable and conduit penetrations - Division 16.

1.4 REFERENCES

- A. ASTM E 814 "Standard Method of Fire Tests of Through-Penetration Firestops."
- B. UL 1479, UBC 7-5 (Both are same as A. above).
- C. ASTM E 119 "Standard Method of Fire Tests of Building Construction and Materials."
- D. UL 263, UBC 7-1 (Both are same as C. above).
- E. UL 2079 "Tests For Fire Resistance of Building Joint Systems."
- F. ASTM E 1399 "Test For Dynamic Movement Conditions."
- G. ASTM E 1966 (Same as E. above).
- H. Published Through-Penetration Systems by recognized independent testing agencies.
 - 1. UL Fire Resistance Directory, Volume II of current year.
 - 2. Warnock Hersey Certification Listings, current year.
 - 3. Omega Point Laboratories, current year.
- I. Material must have BSA and/or MEA approval for use in New York City.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.

- 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
 - B. Submit manufacturer's product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance, limitation criteria, test data and indication that products comply with specified requirements.
 - C. Submit shop drawings detailing materials, installation methods, and relationships to adjoining construction for each firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspection agency evidencing compliance with requirements for each condition indicated.
 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
 - D. Material Safety Data Sheets: Submit MSDS for each firestop product.
 - E. Manufacturer's Letters: For installations or configurations not covered by a UL or Warnock Hersey design number, a recommendation shall be obtained from the manufacturer, in writing, for the specific application.
- 1.6 QUALITY ASSURANCE
- A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, and the passage of smoke and other gases.

- B. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E 814 or UL 1479. The F rating must be a minimum of one hour but not less than the fire resistance rating of the assembly being penetrated. T rating, when required by code authority, shall be based on measurement of the temperature rise on the penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
- C. Firestopping products shall be asbestos free and free of any PCBs.
- D. Do not use any product containing solvents or that requires hazardous waste disposal.
- E. Do not use firestop products which after curing, dissolve in water.
- F. Do not use firestop products that contain ceramic fibers.
- G. Firestopping Installer Qualifications: Firestop application shall be performed by a single firestopping contractor who specializes in the installation of firestop systems, whose personnel to be utilized have received specific training, and firestop installer shall have a minimum of three years experience (under present company name) installing firestop systems of the type herein specified.
- H. Mock-Up: Prepare job site mock-ups of each typical Firestop System proposed for use in the project. Approved mock-ups will be left in place as part of the finished project and will constitute the quality standard for the remaining work.
- I. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened containers with manufacturer's name, product identification, lot numbers, UL or Warnock Hersey labels, and mixing and installation instructions, as applicable.
- B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.
- C. All firestop materials shall be installed prior to expiration of shelf life.

1.8 PROJECT CONDITIONS

- A. Verify existing conditions and substrates before starting work
- B. Do not use materials that contain solvents, show sign of damage or are beyond their shelf life.

- C. During installation, provide masking and drop cloths as needed to prevent firestopping products from contaminating any adjacent surfaces.
- D. Conform to ventilation requirements if required by manufacturer's installation instructions or Material Safety Data Sheet.
- E. Weather Conditions: Do not proceed with installation of firestop products when temperatures are in excess or below the manufacturer's recommendations.
- F. Schedule installation of firestop products after completion of penetrating item installation but prior to covering or concealing of openings.
- G. Coordinate this work as required with work of other trades.

1.9 SEQUENCING AND SCHEDULING

- A. Pre-Installation Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
- B. Sequence: Perform work of this and other sections in proper sequence to prevent damage to the firestop systems and to ensure that their installation will occur prior to enclosing or concealing work.
- C. Install all firestop systems after voids and joints are prepared sufficiently to accept the applicable firestop system.
- D. Do not cover firestop systems until they have been properly inspected and accepted by the authority having jurisdiction.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following manufacturers:
 - 1. Tremco
 - 2. Bio-Fireshield
 - 3. 3M
 - 4. Specified Technologies Inc.
 - 5. U.S. Gypsum Co.
 - 6. Nelson
 - 7. Hilti, Inc.
 - 8. Grace Flame Safe

9. Or approved equal.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
 1. Permanent forming/damming/backing materials including the following:
 - a. Semirefractory fiber (mineral wool) insulation.
 - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Joint fillers for joint sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.
- D. Smoke seals at top of partitions shall be flexible to allow for partition deflection.

2.3 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.
- B. Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation.
- C. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or polyethylene foil on one side.
- E. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing

ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.

- F. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- G. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- H. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam.
- I. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless firestop system limits use to non-sag grade for both opening conditions.

2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.
 - 1. Sealant Colors: Color of exposed joint sealants as selected by the Commissioner. Generally, sealant colors shall match substrate color as much as feasible.
- B. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.
 - 1. Additional Movement Capability: Provide sealant with the capability to withstand 33 percent movement in both extension and compression for a total of 66 percent movement.
- C. Multi-Component, Non-Sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.
 - 1. Additional Movement Capability: Provide sealant with the capability to withstand 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated.

- D. Single-Component, Non-Sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.

2.5 MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE SAFING)

- A. Provide min. 4 pcf Thermafiber as manufactured by Thermafiber Co., min. 4 pcf FBX Safing Insulation as manufactured by Fibrex, or approved equal to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.

- B. Material shall be classified non-combustible per ASTM E 119.

2.6 MIXING

- A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with Installer present, for compliance with requirements for opening configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
 1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form release agents from concrete.
- B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that

would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

3.3 CONDITIONS REQUIRING FIRESTOPPING

A. Building Exterior Perimeters

1. Where exterior facing construction is continuous past a structural slab, and a space (i.e. construction joint) would otherwise remain open between the inner face of the wall construction and the outer perimeter edge of the structural floor, provide firestopping to equal the fire resistance of the floor assembly.
 - a. If mineral wool is part of firestop system, the mineral wool must be completely covered by appropriate thickness of UL or Warnock Hersey listed firestop sealant or spray.
 - b. Refer to Article 3.6 herein for description of fire safing insulation.
2. Firestopping shall be provided whether or not there are any clips, angles, plates, or other members bridging or interconnecting the facing and floor systems, and whether or not such items are continuous.
3. Where an exterior wall passes a perimeter structural member, such as a girder, beam, or spandrel, and the finish on the interior wall face does not continue up to close with the underside of the structural floor above, thus interrupting the fire-resistive integrity of the wall system, and a space would otherwise remain open between the interior face of the wall and the structural member, provide firestopping to continuously fill such open space.

B. Interior Walls and Partitions

1. Construction joints between top of fire rated walls and underside of floors above, shall be firestopped.
2. Firestop system installed shall have been tested by either UL or Omega Point, including exposure to hose stream test and including for use with steel fluted deck floor assemblies.
3. Firestop system used shall allow for deflection of floor above.

C. Penetrations

1. Penetrations include conduit, cable, wire, pipe, duct, or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.
2. Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E 814.

3. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall of opening.
- D. Provide firestopping to fill miscellaneous voids and openings in fire rated construction in a manner essentially the same as specified herein before.

3.4 INSTALLING THROUGH PENETRATION FIRESTOPS

- A. General: Comply with the through penetrations firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through penetration firestop systems by proven techniques to produce the following results:
 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration

indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.6 INSTALLING FIRESAFING INSULATION

- A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.
- B. Completely fill voids in areas where safing insulation is required.
- C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

- A. Inspecting agency employed and paid by the Owner will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor and Owner.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.
- D. Where deficiencies are found, Contractor must repair or replace firestopping so that it complies with requirements.

3.8 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they 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 firestopping immediately and install new materials to product firestopping complying with specified requirements.

END OF SECTION

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SECTION 07900 - JOINT SEALERS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the joint sealers work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
1. Flashing reglets and retainers.
 2. Exterior wall joints not specified to be sealed in other Sections of work.
 3. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.
 4. Control and expansion joints in walls.
 5. Joints at wall penetrations.
 6. Joints between items of equipment and other construction.
 7. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Roof Waterproofing System - Section 07541.
- C. Sealant within drywall construction - Section 09250.
- D. Sealant at tile work - Section 09310.

1.4 QUALITY ASSURANCE

- A. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.
- B. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.
- C. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work shall start until results of these tests have been submitted to the Commissioner and has given his written approval to proceed with the work.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.
1. Submit joint sizing calculations certifying that movement capability of sealant is not being exceeded.
- C. Samples: Submit the following:
1. Color samples of sealants.
 2. Sealant bond breaker and joint backing.
- D. Product Data: Submit manufacturer's technical information and installation instructions for:
1. Sealant materials, indicating that material meets standards specified herein.
 2. Backing rods.
- E. Submit manufacturer's certification as required by Article 1.6 herein.
- F. Submit results of testing required in Article 1.4 herein.

1.6 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

- A. Contractor shall require sealant manufacturer to review the Project joint conditions and details for this Section of the work. Contractor shall submit to the Commissioner written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vaportight seals (as applicable), and that materials supplied meet specified performance requirements.

1.7 ENVIRONMENTAL CONDITIONS

- A. Temperature: Install all work of this Section when air temperature is above 40 degrees F. and below 80 degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.8 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section, before, during and after installation and to protect the installed work and materials of all other trades.

- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.
- C. Storage
 - 1. Store sealant materials and equipment under conditions recommended by their manufacturer.
 - 2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.

1.9 WARRANTY

- A. Provide a written, notarized warranty from the manufacturer and the applicator stating that the applied sealants shall remain watertight for a period of 10 years.
- B. Warranty shall be in a form acceptable to the Owner and executed by an authorized individual.
- C. Warranty shall further state that installed sealant is guaranteed against:
 - 1. Adhesive or cohesive failure of sealant joints.
 - 2. Cracking greater than 3 mils in depth developing on surface of material.
 - 3. Staining of surfaces adjacent to joints by sealants or primer by migration through building materials in contact with them.
 - 4. Chalking, or visible color change on surface of cured sealant.
 - 5. Increase or decrease of "Shore A" durometer hardness (5 second reading) of sealant of more than 30 percent of 7 day value of "Shore A" durometer hardness of sealant.
- D. Include in warranty provision, agreement to repair and/or replace, sealant defects that develop during guarantee period, because of faulty labor and/or materials.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

- A. Exterior Wall Sealant: Provide one part non-sag sealant equal to No. 790 or 795 made by Dow Corning, "Silpruf SCS 2000" or "LM SCS 2700" made by G.E., "Spectrem 1" or "Spectrem 3" made by Tremco, "Sonolastic 150" by Sonneborn, or approved equal, conforming to the minimum standards of ASTM C 920, Type S, Grade NS, Class 50.
- B. Interior Sealant: Provide a one part acrylic based sealant conforming to ASTM C 834, equal to "AC-20+ Silicone" made by Pecora, or approved equal.
- C. Colors: Custom colors of sealants as selected by the Commissioner.

2.2 MISCELLANEOUS MATERIALS

- A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non-staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "Sof-Rod" made by Nomaco Inc., or approved equal, 25 percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing.
- B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.
- C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.
- D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.
- E. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instructions.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where joint sealers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.
- B. Sample Section of Sealant
 1. During sealant installation work in exterior wall, the manufacturer of sealant shall send his representative to the site, under whose supervision a section of the wall (used as "control section") shall be completed for purposes of determining performance characteristics of sealant in joints. Commissioner shall be informed of time and place of such installation of control section.
 2. Control section shall be installed according to specification given herein and shall not be considered as acceptable until written acceptance is provided by the Commissioner.
 3. Accepted control section shall be standard to which all other sealant work must conform.

- C. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.
- D. Preparation and Application
1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
 2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
 - a. Do not use any acid or other material that might stain surfaces.
 - b. Remove laitance by grinding or mechanical abrading.
 - c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
 3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent with clean, lint free paper towels, and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
 4. Do not seal joints until they are in compliance with drawings, or meet with the control section standard.
 5. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joint 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than 1", sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
 6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming.
 7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately 25 percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.

8. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
9. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
10. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 5A in ASTM C 1193. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.
11. Replace sealant that is damaged during construction process.

END OF SECTION

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SECTION 08100 - STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the steel doors and frames work as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Hollow metal doors and frames.
 2. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.
 3. Preparation of hollow metal doors to receive glazing where required.
 4. Furnishing anchors for building into masonry and drywall.
 5. Factory prime painting of work of this Section.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Carpentry - Section 06200, for Installation of doors and frames.
- C. Finish Hardware - Section 08700.
- D. Glass and Glazing - Section 08800.
- E. Gypsum Drywall - Section 09250.
- F. Painting and Finishing - Section 09900.

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- C. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, reinforcement for surface applied hardware, dimensions of profiles and hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.

- D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.

1. Coordinate glazing frames and stops with glass and glazing requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing steel doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.
- D. Work of this Section must meet the minimum standards of ANSI 250.4 and SDI-100; where more stringent requirements are specified herein, such requirements shall apply.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
1. Every effort shall be made to maximize post industrial/post consumer waste but steel doors and frames shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
 2. Steel doors and frames manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.
- B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Commissioner; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames under cover at building site. Conform to the requirements of ANSI A250-11-2001 for site storage unless more stringent requirements are noted herein. Place units on minimum 4" high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4" spaces between stacked doors to permit air circulation.

PART 2 PRODUCTS

2.1 FABRICATION - GENERAL

- A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."
- D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

2.2 MANUFACTURERS

- A. Provide products manufactured by Steelcraft, Curries, Stiles, Ceco Door Products, or approved equal meeting these specifications.
 - 1. Manufacturer must be a member of the Steel Door Institute, or approved equal.

2.3 FRAMES

A. Materials

- 1. Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A 1008, Type B not less than 14 gauge, and shall have a hot dipped galvanized coating conforming to ASTM A 924 and A 653 with A-60 coating. The zinc-alloy coating shall be a dull matte surface treated for paint adhesion.
- 2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM A 1008, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011, Commercial Steel, Type B. Metal thickness shall be not less than 16 gauge for frames in openings 4'-0" or less in width; not less than 14 gauge for frames in openings over 4'-0" in width.

B. Design and Construction

- 1. All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings.
- 2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
- 3. Jamb depths, trim, profile and backbends shall be as shown on drawings.

4. Welded frames shall have corners mitered and reinforced and faces of welded frames shall be continuously back welded.
5. Minimum depth of stops shall be 5/8". Cut-off (sanitary type) stops, where scheduled, shall be capped at 45 degrees at heights shown on drawings, and all jamb joints below cut-off stops shall be ground and filed smooth, making them imperceptible. Do not cut off stops on frames for soundproof, light proof or lead-lined doors.
6. Frames for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth.
 - a. Mullions shall have 16 gauge internal steel stiffeners welded not less than 4" o.c.
7. Hardware Reinforcements
 - a. Frames shall be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.
 - b. Minimum thickness of hardware reinforcing plates shall be as follows:
 - 1). Hinge and pivot reinforcements - 7 gauge, 1-1/4" x 10" minimum size.
 - 2). Strike reinforcements - 12 gauge
 - 3). Flush bolt reinforcements - 12 gauge
 - 4). Closer reinforcements - 12 gauge
 - 5). Reinforcements for surface mounted hardware - 12 gauge.
8. Floor Anchors
 - a. Provide adjustable floor anchors, providing not less than 2" height adjustment.
 - b. Minimum thickness of floor anchors shall be 14 gauge.
9. Jamb Anchors
 - a. Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the wire type. Anchors shall be not less than 0.156" diameter steel wire. The number of anchors provided on each jamb shall be as follows:
 - 1). Frames up to 7'-6" height - 3 anchors.
 - 2). Frames 7'-6" to 8'-0" height - 4 anchors.
 - 3). Frames over 8'-0" height - one anchor for each 2'-0" or fraction thereof in height.
 - b. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, not less than 18 gauge thickness, securely welded inside each jamb as follows:
 - 1). Frames up to 7'-6" height - 4 anchors.
 - 2). Frames 7'-6" to 8'-0" height - 5 anchors.

- 3). Frames over 8'-0" height - 5 anchors plus one additional for each 2'-0" or fraction thereof over 8'-0".
 - c. Frames to be anchored to previously placed concrete or masonry shall be provided with minimum 3/8" concealed bolts set into expansion shields or inserts at 6" from top and bottom and 24" o.c. Reinforce frames at anchor locations with 16 gauge sheet steel stiffeners welded to frame at each anchor.
10. Anchors in exterior frames and in masonry walls shall be hot dip galvanized per ASTM A 153.
 11. Frames for installation in masonry wall openings more than 4'-0" in width shall have an angle or channel stiffener factory welded into the head. Such stiffeners shall be not less than 12 gauge steel and not longer than the opening width, and shall not be used as lintels or load bearing members.
 12. Dust cover boxes (or mortar guards) of not thinner than 26 gauge steel shall be provided at all hardware mortises on frames to be set in masonry partitions.
 13. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
 14. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
 15. Loose glazing stops shall be of cold rolled steel, not less than 20 gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium-or zinc-plated screws. Interior frames may be provided with snap-on glazing stops.
 16. Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single doorframes and 2 silencers on heads of double-door frames.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Frames shall then be chemically treated to insure maximum paint adhesion and shall be coated on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.
1. Frames set in masonry or ACC walls shall be grouted in as described in Section 04225. These frames shall have surfaces in contact with grout shop coated with epoxy coating equal to Series 27 FC Typoxy made by Tnemec or approved equal spray applied at 4 to 6 mils, passing NFPA 101, Class A for smoke and flame spread, tested per ASTM E 84.

2.4 HOLLOW METAL DOORS

- A. Materials: Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM A 1008, Commercial Steel, Type B and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than 18 gauge. Face sheets for exterior doors shall be not less than 16 gauge and shall have a hot dipped galvanized coating conforming to ASTM A 924 and A 653, A-60 coating. The zinc alloy coating shall be a dull matte surface treated for paint adhesion.
- B. Design and Construction

1. All doors shall be custom made, of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".
2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
3. Core Construction: Resin impregnated Kraft paper with maximum 1" cells; fastened to face sheets with waterproof adhesive.
 - a. Fire Rated Door Core: As required to provide fire-protection and temperature rise ratings indicated.
4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than 14 gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
6. Edge profiles shall be provided on both vertical edges of doors as follows:
 - a. Single-acting swing doors - beveled 1/8" in 2".
 - b. Double acting swing doors - rounded on 2-1/8" radius.
 - c. No square edge doors permitted.
7. Hardware Reinforcements
 - a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates.
 - b. Minimum gauges for hardware reinforcing plates shall be as follows:
 - 1). Hinge and pivot reinforcement - 7 gauge.
 - 2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - 12 gauge.
 - 3). Reinforcements for all other surface mounted hardware - 16 gauge.
8. Glass Moldings and Stops
 - a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
 - b. Fixed moldings shall be securely welded to the door on the security side.

- c. Loose stops shall be not less than 20 gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced 8" o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.
- 9. Louvers shall be 16 gauge sheet steel, stationary type, closely spaced inverted "V" blade design, flush with face sheets of door, integral with and welded to door. 50 percent free area, unless indicated otherwise on drawings.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive alkyd primer as specified for frames that shall be fully cured before shipment.
- D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, including in a diagonal direction.

2.5 LABELED DOORS AND FRAMES

- A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames shall be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service.
- B. If any door or frame specified by the Commissioner to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Commissioner shall be so advised before fabricating work on that item is started.

2.6 HARDWARE LOCATIONS

- A. The location of hardware on doors and frames shall be as follows unless otherwise required by prevailing Handicapped Codes:
 - 1. Hinges: Top 5" from head of frame to top of hinge; bottom 10" \pm 1" from finish floor to bottom of hinge; intermediate centered between top and bottom hinges.
 - 2. Unit and Integral Type Locks and Latches: 38" to centerline of knob.
 - 3. Deadlocks: 48" to centerline of cylinder.
 - 4. Panic Hardware: 40-5/16" to centerline of cross bar.
 - 5. Door Pulls: 42" to center of grip.
 - 6. Push-Pull Bars: 42" to centerline of bar.
 - 7. Push Plates: 48" to centerline of plate.
 - 8. Roller Latches: 45" to centerline.

*All of the above dimensions are from finished floor.

2.7 CLEARANCES

A. Fabricate doors and frames to meet edge clearances as follows:

1. Jamb and Head: 1/8" plus or minus 1/16".
2. Meeting Edges, Pairs of Doors: 1/8" Plus or minus 1/16".
3. Bottom: 3/4", if no threshold.
4. Bottom: 3/8", at threshold.

B. Fire rated doors shall have clearances as required by NFPA 80.

2.8 MANUFACTURING TOLERANCES

A. Manufacturing tolerance shall be maintained within the following limits:

1. Frames for Single Door or Pair of Doors

- a. Width, Measured Between Rabbets at the Head: Nominal opening width +1/16", -1/32".
- b. Height (total length of jamb rabbet): Nominal opening height + 3/64"
- c. Cross Sectional Profile Dimensions
 - 1). Face: + 1/32"
 - 2). Stop: + 1/32"
 - 3). Rabbet: + 1/64"
 - 4). Depth: + 1/32"
 - 5). Throat: + 1/16". Frames overlapping walls to have throat dimension 1/8" greater than dimensioned wall thickness to accommodate irregularities in wall construction.

2. Doors

- a. Width: + 3/64"
- b. Height: + 3/64"
- c. Thickness: + 1/16"
- d. Hardware Cutout Dimensions: Template dimensions +0.015", -0"
- e. Hardware Location: + 1/32"

2.9 PREPARATION FOR FINISH HARDWARE

A. Prepare door and frames to receive hardware:

1. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
2. Preparation includes sinkages and cutouts for mortise and concealed hardware.

B. Provide reinforcements for both concealed and surface applied hardware:

1. Drill and tap mortise reinforcements at factory, using templates.

2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.10 REJECTION

- A. Hollow metal frames or doors that are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed and replaced with new at no cost.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where steel doors and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Refer to CSI Section 06200 for installation procedures for all work of this Section.

END OF SECTION

SECTION 08300 - ACCESS DOORS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the access doors as indicated on the drawings and/or specified herein, including but not limited to, the following:
1. Frameless recessed panel access doors at drywall ceilings and walls.
 2. Framed flush panel access doors at walls.
 3. Provide access doors and frames for access from occupied spaces to the following, where indicated or required, and as directed by the trades of Divisions 15 and 16.
 - a. All shutoff or balancing valves.
 - b. Fire dampers, as required.
 - c. Points of duct access.
 - d. Pull boxes.
 - e. Controls of mechanical and electrical items.
 - f. Masonry shafts for pipes and conduits, as required.
 - g. Pipe spaces, if required.
 - h. Inlets of fans.
 - i. Fusible link and splitter damper at filter bank.
 - j. Automatic damper and motor.
 - k. Equipment not otherwise accessible.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Autoclaved Aerated Concrete Units – Section 04225.
- C. Gypsum Drywall - Section 09250.

- D. Ceramic Tile - Section 09310.
- E. Plumbing and Mechanical – Division 15, for valves and connections.
- F. Electrical – Division 16.

1.4 QUALITY ASSURANCE

- A. For actual installation of the work of this Section, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the skills required.
- B. Fire-Resistance Ratings: Wherever a fire-resistance classification is shown, or for construction where access doors are installed, provide required access door assembly with panel door, frame, hinge and latch from manufacturers listed in Underwriters' Laboratories, Inc. "Classified Building Materials Index" for the rating shown.
 - 1. Provide UL label on each access panel.
 - 2. Provide flush, key operated cylinder lock.
- C. Size Variations: Obtain Commissioners's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.

- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Before any materials of this Section are delivered to the job site, submit complete manufacturer's literature to the Commissioner. Submit plans and schedules showing size and location of each and every access door for Commissioner's acceptance prior to installation, per requirements of Addenda to General Conditions.

1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. Provide access door assembly manufactured by Milcor Inc, or equal made by Nystrom Inc., Karp Associates, Inc. or approved equal. Assembly shall be an integral unit complete with all parts and ready for installation.
- B. Fabricate units of continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces. Provide attachment devices and fasteners of the type required to secure access panels to the types of supports shown.
- C. Frames for Masonry and Tile Wall Only (Flush Panel Units)
 - 1. Fabricate frame from 16 gauge steel. Provide frame with exposed flange not less than 1" wide around perimeter of frame.
 - 2. For installation in masonry construction, provide frames with adjustable metal masonry anchors.
- D. Frameless Units for Drywall Surfaces (Recessed Panel Units): Provide access doors without exposed frames for drywall adhered to recessed panel.
- E. Panels: Fabricate from 14 gauge steel, with concealed spring hinges set to open to 175 degrees. Provide removable pin type hinges of the quantity required to support

the access panel sizes used in the work. Finish with manufacturer's factory applied baked enamel prime coat applied over phosphate protective coating on steel.

F. Locking Devices

1. For non-rated access doors, provide flush, screwdriver operated cam locks of number required to hold door in flush, smooth plane when closed.
2. For fire rated doors, provide fire rated locks as described in paragraph 1.4, B. herein.

- G. Inserts and Anchorage: Furnish inserts and anchoring devices which must be built into masonry for the installation of access panels. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where access doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 COORDINATION

- A. Coordinate all work with the mechanical trades to insure proper locations and in a timely manner to permit orderly progress of the total work.
- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Adjust hardware and panels after installation for proper operation.
- D. Remove and replace panels or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08330 - ROLL UP DOORS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the motorized overhead insulated roll up doors as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Insulated stainless steel roll-up doors.
 2. Hardware and accessories.
 3. Motor operation.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Miscellaneous Metals – Section 05500.
- C. Roll Up Grilles - Section 08340.
- D. Finish hardware - Section 08700.
- E. Painting and Finishing - Section 09900.
- F. Electrical service – Division 16.

1.4 QUALITY ASSURANCE

- A. Furnish each roll up door as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.
- B. Provide each type of roll up door by one manufacturer for entire project.

- C. Wind Loading: Design and reinforce exterior roll up doors to withstand a 30 lbs per square foot wind loading pressure, unless otherwise indicated on drawings.
- D. Cycle: Provide doors for normal use of up to 20 (twenty) cycles per day, maximum.
- E. Insulated Door Slat Material Requirements:
 - a. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84.
 - b. Minimum Sound Transmission Class (STC) rating of 26 as tested per ASTM E90.
 - c. Minimum R-value of 8.0 (U-factor of 0.125) as calculated using the ASHRAE Handbook of Fundamentals.
 - d. Insulation to be CFC Free with an Ozone Depletion Potential (ODP) rating of zero.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
 - B. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of coiling door. Include operating instructions and maintenance information.
 - C. Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed on manufacturer's data sheets. Show interface with adjacent work.
 - D. Closeout Submittals: Provide Operations and Maintenance Manual.
 - E. Warranty: Provide two-year warranty from against defects in material and workmanship.
 - F. Label Certification: Submit UL certification for fire-rated doors and frames.
- 1.6 LEED BUILDING PERFORMANCE CRITERIA
- A. The following criteria are REQUIRED for the products included in this section:
 1. Every effort shall be made to maximize post industrial/post consumer waste but roll up doors shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
 2. Roll up doors manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
- 1.7 PRODUCT HANDLING
- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
 - B. Replacements: In the event of damage, immediately make all repairs and replacements.
- 1.8 STRUCTURAL CALCULATIONS
- A. Submit stamped and signed engineering calculations for all anchoring, based on through-bolting through AAC substrate. Calculations to address substrate material characteristics such as pull-out strength, crushing, edge distance, etc. Note that the compressive strength of ACC block is approximately 580 psi compared to 1900 for CMU.

PART 2 PRODUCTS**2.1 MANUFACTURER**

- A. Provide Thermiser Insulated Doors, Model ESD20, as manufactured by Cornell Iron Works Inc., Mountaintop, PA, or approved equal meeting these specifications.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Shutter Curtain: Fabricate roll up door curtains of interlocking flat slats designed to withstand required wind loading, of continuous length for width of doors, without splices. Provide slats of structural quality, minimum twenty (22) gauge stainless steel sheets complying with AISI type 304 series stainless steel.
 - 1. Curtain shall be insulated with 7/8" foamed-in-place urethane and 22 ga. back-up sheet. Total slat thickness 15/16" with an R-value of 8.0.
- B. Endlocks: Malleable iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets. Provide locks on alternate curtain slats for curtain alignment and resistance against lateral movement.
- C. Windlocks: Malleable iron castings secured to curtain slats with galvanized rivets. Provide windlocks on roll-up doors approximately twenty-four (24) inches o.c. on both edges of curtain.
- D. Bottom Bar: Consisting of two (2) angles, each not less than 1-1/2" x 1-1/2" x 1/8" thick, stainless steel to suit type of curtain slats.
- E. Curtain Jamb Guides: Fabricate curtain jamb guides of stainless steel angles, or channels and angles with sufficient depth and strength to retain curtain loading. Build up units with minimum 3/16" thick steel sections. Slot bolt holes for track adjustment.
 - 1. Secure continuous wall angle to wall framing by 3/8" minimum through-bolts at not more than twenty-four (24) inches o.c. Extend wall angles above roll up door opening head to support coil brackets, unless otherwise shown. Place anchor bolts on exterior wall guides so they are concealed when roll up door is in closed position. Provide removable stops on guides to prevent over-travel of curtain, and continuous bar for holding windlocks.
- F. Weather Seals: Provide vinyl, neoprene or EPDM weatherstripping with weather/sensing edge for exterior doors. At door heads, use 1/8" thick continuous sheet secured to inside of curtain coil hood. At doorjamb, use 1/8" thick continuous strip secured to exterior side of jamb guide.

2.3 COUNTERBALANCING MECHANISM

- A. Counterbalance doors by means of adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to door curtain with required barrel rings. Use grease sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed structural quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support

curtain without distortion of slats and limit barrel deflection to not more than 0.03" per foot of span under full load.

- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cast-hardened steel, of required size to hold fixed springs ends and carry torsion load.
- E. Brackets: Provide mounting brackets of manufacturer's standards design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.
- F. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head, and act as weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods, and any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
 - 1. Fabricate steel hoods for doors of not less than twenty-four (24) gauge stainless steel with No. 4 finish.

2.4 INSERTS AND ANCHORAGES

- A. Furnish inserts and anchoring devices which must be set in concrete or built into masonry or other substrates for installation of units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- B. Refer to concrete and masonry sections of these specifications for installation of inserts and anchorage devices.

2.5 PAINTING

- A. Shop clean and prime ferrous metal and galvanized surfaces, exposed and unexposed, except faying and lubricated surfaces, with door manufacturer's standard rust inhibitive primer.

2.6 ELECTRIC DOOR OPERATORS

- A. Furnish electric door operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory pre-wired motor controls, gear reduction unit, solenoid operated brake, remote control stations, control devices, conduit and wiring from controls to motor and control stations, and accessories required for proper operation.
- B. Provide hand-operated disconnect or a mechanism for automatically engaging a sprocket and chain operator and releasing brake for emergency manual operation. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

- C. Design operator so that motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.
- D. Door Operator Type: Provide wall or bracket mounted door operator units consisting of electric motor, worm gear drive from motor to reduction gear box, chain or worm gear drive from reduction box to gear wheel mounted on counterbalance shaft, and a disconnect-release for manual operation. Provide motor and drive assembly of horsepower and design as determined by door manufacturer for size of door required.
- E. Electric Motors: Provide high starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move roll up door in either direction, from any position, at not less than 2/3 foot nor more than one foot per second.
 - 1. Coordinate wiring requirements and current characteristics of motors with building electrical system.
 - 2. Furnish totally enclosed, non-ventilated type motors, fitted with plugged drain, and controller with NEMA Type 4 enclosure.
- F. Remote Control Station: Provide momentary contact, 3-button control station with push button controls labeled "open," "close," and "stop."
 - 1. Provide interior units, full-guarded, surface mounted, heavy duty, with NEMA Type 4 enclosure.
- G. Automatic Reversing Control: Furnish each door with automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch before fully closing will immediately stop downward travel and reverse direction to fully opened position. Connect to control circuit through retracting safety cord and reel, or self-coiling cable.
 - 1. Provide electrically actuated automatic bottom bar.
- H. Locking Device: Curtain shall have cylinder locking device, including cylinder and 2 deadbolts, one at each end. Provide electric interlocks that prevent motor from operating when lock is engaged.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where roll up doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install roll up door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.

- B. Coordinate installation with custom 'green screen' specified in Section 05500 and as indicated on drawings.
- C. Upon completion of installation, including work by other trades, lubricate, test and adjust roll up doors to operate easily, free from warp, twist or distortion and fitting weather-tight for entire perimeter.

END OF SECTION

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SECTION 08340 - ROLL UP GRILLES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the motorized stainless steel roll up security grilles as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Miscellaneous Metals – Section 05500.
- C. Roll Up doors - Section 08330.
- D. Electric - Division 16.

1.4 QUALITY ASSURANCE

- A. Provide each roll up grille as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.
- B. For actual installation of the roll up grilles, use only personnel who are thoroughly trained and experienced in installation of the selected products and who are completely familiar with the requirements of this work.

1.5 SUBMITTALS**A. GREEN BUILDING SUBMITTAL REQUIREMENTS**

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data:** Submit manufacturer's product data, rough-in diagrams, and installation instructions for each type and size of roll up grille. Include operating instructions and maintenance data.
- C. Shop Drawings:** Submit shop drawings indicating location and size of unit, details for special components, surrounding conditions and installations which are not fully dimensioned or detailed in manufacturer's product data.
- D. Warranty:** Provide two year standard warranty against defects in material and workmanship.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
1. Every effort shall be made to maximize post industrial/post consumer waste but roll up grilles shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of Item 1.5 above.
 2. Roll up grilles manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of Item 1.5 above.

1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide roll up grilles manufactured by Cornell Iron Works Inc., Kinnear Corp., Atlas, or approved equal.

2.2 MATERIAL DESCRIPTION

- A. Fabricate grille curtain consisting of a network of 5/16" min. diameter horizontal rods spaced approx. 2" o.c. Interconnect rods by vertical links approx. 5/8" wide, spaced approx. 9" apart and rotating on the rods. Grilles shall be aluminum conforming to ASTM B221, with clear, satin anodized finish.
- B. Furnish inserts and anchoring devices, which must be secured to concrete or built into masonry or drywall assemblies for the installation of the units. Provide setting drawings, templates, instructions and directions or installation of anchorage devices. Coordinate delivery with other work to avoid delay.

2.3 ACCESSORIES

- A. End Locks: Continuous end locks or other devices at ends of rods, locking and retaining grille curtain in guides against excessive pressures, maintaining curtain alignment and preventing lateral movement.
- B. Guides: Manufacturer's standard extruded aluminum shape having curtain groove with return lips or bars to retain curtain. Furnish pile strips, rigid vinyl liner, or other non-metallic inserts to prevent metal-to-metal contact and minimize noise of travel. Furnish removable stops on guides to prevent overtravel of curtain.

- C. Bottom Bar: Manufacturer's standard extruded shape, finished to match grille. Provide sloped closure pieces to fit any sloped grades.

2.4 COUNTERBALANCING MECHANISM

- A. Counterbalance grilles by means of an adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to the curtain. Use grease-sealed ball bearings or self-lubricating graphite bearings for all rotating members.
- B. Barrel deflection shall not exceed 0.03" per ft. of span under full load.
- C. Form hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to suit end of brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface mounted hoods, and any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag. Fabricate hoods of alloy 3003 aluminum sheet not less than 0.032" thick, finished to match curtain. Furnish removable aluminum soffit when hood is mounted above ceiling of same material and finish as hood.

2.5 SHOP PAINTING

- A. Shop clean and prime all ferrous metal and galvanized surfaces exposed and unexposed, except faying and lubricated surfaces, with grille manufacturer's standard rust inhibitive primer.

2.6 ELECTRIC OPERATORS

- A. Provide electric operator assembly of the size and capacity recommended and provided by the door manufacturer; complete with electric motor and factory pre-wired motor controls, gear reduction unit, solenoid operated brake, clutch, remote control stations, and control devices.
- B. Provide a hand-operated disconnect or a mechanism for automatically engaging a sprocket and chain operator and releasing brake for emergency manual operation. Mount disconnect and operator so that they are accessible from floor level. Include an interlock device to automatically prevent the motor from operating when emergency operator is engaged.
- C. Design operator so that motor may be removed without disturbing the limit switch adjustment and without affecting the emergency auxiliary operator.
- D. Operator Type: Provide wall or bracket-mounted operator units consisting of an electric motor, a worm gear drive from motor to reduction gear box, a chain or worm gear drive from reduction box to a gear wheel mounted on the counterbalance shaft, and a quick-clutch disconnect-release for manual operation. Provide motor, clutch, and drive assembly of horse-power and design as determined by the manufacturer for the size of grille required and as herein specified.
- E. Electric Motors

1. Provide high-starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move door in either directions, from any position, at not less than 2/3 ft. nor more than 1 ft. per second.
 2. Coordinate wiring requirements and current characteristics of motors with the building electrical system.
- F. Remote Control Station: Provide momentary-contact control station with key operated controls labeled "open", "close" and "stop".
- G. Safety Edge Device: Provide each grille with an electric safety switch, extending full width of grille bottom, and located within a neoprene or rubber astragal mounted to the bottom rail. Contact with switch before fully closing will immediately stop the downward travel and reverse direction to the fully opened position. Connect to the control circuit through a retracting safety cord.
- H. Locking Device: Curtain shall have cylinder locking device, including cylinder and 2 deadbolts, one at each end. Provide electric interlocks that prevent motor from operating when lock is engaged.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where roll up grilles is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install grilles and operating equipment complete with necessary hardware, in accordance with final shop drawings, manufacturer's instructions, and as specified herein.
- B. Coordinate installation with custom 'green screen' specified in Section 05500 and as indicated on drawings.
- C. Upon completion of installation including work by other trades, test and adjust grilles to operate easily, free from warp, twist, or distortion.

END OF SECTION

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SECTION 08410 - ALUMINUM SWINGING ENTRANCE DOORS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the aluminum swinging entrance doors as indicated on the drawings and/or specified herein including the following:

1. Aluminum swinging entrance doors and sidelight framing.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. For SS door surrounds, Miscellaneous Metals- Section 05500.
- C. Sheet Metal Work - Section 07600.
- D. Joint Sealers - Section 07900.
- E. Finish Hardware -Section 08700.
- F. Glass and Glazing - Section 08800.

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.
- C. Shop Drawings: Provide large-scale shop drawings for fabrication, installation and erection of all parts of work. Provide plans, elevations, and details of anchorages, connections and accessory items. Provide installation templates for work installed by others. Show interfaces and relationships to work of other trades.
- D. Field Measurements: Take necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.
- E. Initial Selection Samples: Submit samples showing complete range of colors, textures, and finishes available for each material used.
- F. Verification Samples: Submit representative samples of each material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.

- G. Calculations: Provide professionally prepared calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied; refer to Article 1.5, para. D for further description.
- H. Test Reports: Provide certified test reports for specified tests.

1.5 QUALITY ASSURANCE

- A. Source: For each material type required for work of this Section, provide primary materials that are products of one manufacturer. Provide secondary or accessory materials that are acceptable to manufacturers of primary materials.
- B. Installer: A firm with a minimum of three years experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.
- C. Design Criteria: Drawings indicate sizes, member spacing, profiles, and dimensional requirements of work of this Section. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in the Architect's sole judgment, such deviations do not materially detract from the design concept or intended performances.
- D. Engineering: Provide services of a Professional Engineer, registered in the jurisdiction in which the Project will be built, to design and certify that work of this Section meets or exceeds performance requirements specified.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
 - 1. Every effort shall be made to maximize post industrial/post consumer waste but automatic swinging entrance doors shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
 - 2. Automatic swinging entrance doors manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

1.7 TESTS AND PERFORMANCE REQUIREMENTS

- A. Manufacturer's Standard Tests: Provide manufacturer's standard test data showing compliance with specified requirements.
- B. Testing and performance data applies to exterior assemblies.
- C. Test Sequence: Test sequence is optional, except that air infiltration tests shall precede water resistance tests.
- D. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:
 - 1. Static Air Pressure Difference: 6.24 psf for fixed framing units, and 1.567 psf for doors.
 - 2. Performance: Maximum air leakage shall not exceed the following:

- a. Fixed Framing Units: 0.06 cfm per sq. ft. of window area.
 - b. Door Units: 0.50 cfm per sq. ft. of single doors, 1.00 cfm per sq. ft. for doors hinged in pairs.
- E. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.
1. Test Pressure: 6.24 psf.
 2. Performance: No leakage as defined in test method at specified test pressure.
- F. Uniform Load Deflection Test: Test units in accordance with ASTM E 330, at following static air pressure difference (Design Wind Pressure), or loads prescribed by code for this project site, whichever is greater. Apply pressure first to exterior side (positive) and then interior side (negative).
1. Design Wind Pressure: 30 pounds per square foot minimum.
 2. Test Procedure: Procedure A as specified in ASTM E 330.
 3. Performance: Deflection in each member measured at locations of greatest deflection shall not exceed $L/175$ at specified Design Wind Pressure.
- G. Uniform Load Structural Test: Test units in accordance with ASTM E 330 at following static air pressure difference. Apply high pressure load first on one side and then on other side. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms.
1. Static Air Pressure: Minimum 1.5 times the Design Wind Pressure.
 2. Permanent Deformation in Any Member: Not to exceed 0.2% of member span.
- H. Condensation Resistant Factor: Not less than 45 for fixed framing, and not less than 48 for doors; per AAMA 1502.7.
- I. Thermal Movement: Provide framing systems that allow for expansion and contraction of members throughout an ambient temperature range of 120°F.
- J. Seismic Loads: Provide entrance systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures", Section 9, "Earthquake Loads", whichever are more stringent.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.
 - B. Sequence deliveries to avoid delays, but minimize on-site storage.
- 1.9 WARRANTIES
- A. Provide written warranty, signed by manufacturer, agreeing to repair or replace work that exhibits defects in materials or workmanship. "Defects" is defined to include, but

not limited to, leakage of water, abnormal aging or deterioration, abnormal deterioration or fading of finishes, and failure to perform as required. Include requirement for removal and replacement of covering and connected adjacent work.

1. Warranty Period: 3 years from date of Substantial Completion; except finish shall be warranted for a period of 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS/PRODUCTS

- A. Provide aluminum entrance systems of one of the following manufacturers that meet or exceed requirements of these specifications:
 1. EFCO Series D302 Medium Stile ThermaStile entrance door. (Basis of design)
 2. Wausau Metals Corporation.
 3. Kawneer Company, Inc.
 4. Vistawall.
 5. Or Architect approved equal.
- B. Products: See drawings for additional information.

2.2 MATERIALS AND ACCESSORIES

- A. Aluminum Members: Provide 6063-T5 alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish. Comply with ASTM B 221 for extrusions, and ASTM B 209 for sheet/plate. Provide 0.125" thick extrusions for door stiles and fixed framing. Provide 0.050" thick aluminum for glazing moldings.
 1. Structural aluminum shapes shall conform to ASTM B 308.
- B. Fasteners: Provide non-magnetic stainless steel fasteners, warranted by manufacturer to be non-corrosive and compatible with aluminum components.
- C. Concealed Flashing: Dead-soft stainless steel, 26 gage minimum, or extruded aluminum 0.062 in. minimum, of an alloy and type selected by manufacturer for compatibility with other components.
- D. Brackets and Reinforcements: Non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.
- E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 386.
- F. Bituminous Coatings: Cold-applied asphalt mastic compounded for 30-mil thickness per coat.
- G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of molded neoprene or PVC gaskets complying with ASTM D 2287.

- H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing.

2.3 HARDWARE

- A. Provide hardware units as indicated, scheduled, or required for operation of each door. Refer to CSI Section 08700, Finish Hardware for hardware description.

2.4 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are indicated on Drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
- B. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.
 - 1. Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.
 - 2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
 - 3. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.
- C. Welding: Comply with recommendations of American Welding Society to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- D. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator to prevent corrosion.
- E. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
- F. Fasteners: Conceal fasteners.
- G. Provide EPDM/vinyl blade gasket weatherstripping in bottom exterior door rail, adjustable for contact with threshold.
- H. At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.
- I. Provisions shall be made in the framing for minimum edge clearance, nominal edge cover, and nominal pocket width for the thickness and type of glazing installed, and shall be in accordance with the GANA Glazing Manual.
- J. Pocket glazed framing shall provide:

	<u>Single Glass</u>	<u>Ins. Glass</u>
1. Nominal edge cover (or bite) framing only	5/16"	1/2"

- | | | |
|--------------------------------|------|-------|
| 2. Min. nominal edge clearance | 1/8" | 1/4" |
| 3. Min. face clearance | 1/8" | 5/32" |

2.5 FIXED FRAMING

- A. General: Provide inside-outside matched resilient flush glazed system with provisions for glass replacement. Shop-fabricate and preassemble frame components where possible.
- B. Thermal-Break Construction: Fabricate exterior aluminum fixed framing system with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members, in manner which eliminates direct metal-to-metal contact. Provide manufacturer's standard construction that has been in use for similar projects for at least three years.
- C. For glass and glazing, refer to CSI Section 08800.

2.6 ALUMINUM DOORS

- A. Aluminum entrance doors shall be thermally-broken medium stile factory-glazed aluminum doors, manufactured by same manufacturer as fixed framing.
- B. Aluminum entrance doors shall be stile and rail type swing doors. Aluminum shall be extruded aluminum conforming to ASTM B 221, 0.125" thick for door stiles and 0.050 in. thick for glazing molding.
 - 1. Sections shall be of sizes and profiles indicated; shall present straight, sharply defined lines and arrises; and shall be free from defects impairing strength, durability, and appearance.
 - 2. Fasteners where exposed shall be aluminum stainless steel or plated steel conforming to ASTM A 164.
- C. Each door shall be factory glazed set in neoprene glazing gasket, refer to CSI Section 08800 for glass.
- D. Doors shall meet the following resistance to corner racking when tested by the Dual Moment Load Test.
 - 1. Test section shall consist of a standard top door corner assembly. Side rail section shall be 24" long and top rail section shall be 12" long.
 - 2. Anchor "top rail" positively to test bench so that corner protrudes 3" beyond bench edge.
 - 3. Anchor a lever arm positively to "side rail" at a point 19" from inside edge of "top rail". Attach weight support pad at a point 19" from inner edge of "side rail".
 - 4. Test section shall withstand a load of 235 lbs. on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 deg.
- E. Air Infiltration: (Applies only to single acting offset pivot or butt hung entrances).

1. Air infiltration shall be tested in accordance with ASTM E 283, at a pressure differential of 1.567 psf. A single 3'-0" x 7'-0" entrance door and frame shall not exceed .50 cfm per linear foot of perimeter crack. A pair of 6'-0" x 7'-0" entrance doors and frame shall not exceed 1.0 cfm per linear foot of perimeter crack.
- F. Thermal Performance: maximum allowable U-value for doors =NFRC 0.40.
- G. For door hardware, refer to CSI Section 08700.
- H. Door bottom rail of exterior doors shall have an EPDM blade gasket sweep strip applied with concealed fasteners.
- I. Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds. Glazing stops shall be hook-in type with EPDM glazing gaskets.
- J. The door weatherstripping on a single acting offset pivot or butt hung exterior door and frame (single or pairs) shall be thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
- K. The door weatherstripping on a double acting, center pivoted door and frame (single or pairs) shall be pile cloth. The door bottom rail shall be weathered with an EPDM blade gasket sweep strip applied with concealed fasteners.
- L. The meeting stiles on pairs of doors shall be equipped with an adjustable astragal.

2.7 FINISH

- A. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.
 2. See drawings for color selection.
 3. IG glass as selected by the Architect. See Section 08800 Glass & Glazing.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where aluminum entrances are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install aluminum entrance doors and framing in openings prepared under other Sections plumb, square, level, in exact alignment with surrounding work, with proper clearances, and securely and positively anchored to building structure, to meet performance requirements specified herein, in accordance with manufacturer's published instructions and approved submittals.
- B. Use only skilled mechanics for erection, under supervision of manufacturer's representative.
- C. Provide protection against galvanic action. Isolate dissimilar materials with bituminous coating or non-absorptive dielectric tape.
- D. Coordinate all work with installation of exterior waterproofing, flashing, window surrounds and other building components.
- E. Install aluminum entrance doors, framing, and finish hardware. Carefully fit and adjust doors and hardware to frames and weatherstripping. After erection check and adjust operating hardware for smooth and proper operation.
- F. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Section 07900 – Joint Sealers.
- G. Coordinate sill and swinging doors and adjacent finished flooring products to provide under-door clearance.
- H. Erection Tolerances: Install entrance systems to comply with the following maximum tolerances.
 - 1. Variation from Plane: Limit variation from plane or location shown to 1/8" in 12'; 1/4" over total length.
 - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16". Where surfaces meet at corners, limit offset from true alignment to 1/32".
 - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8".

3.3 PROTECTION AND CLEANING OF ALUMINUM

- A. Protect finished metal surfaces from damage during fabrication, shipping, storage, and erection, and from then until acceptance by Owner.
- B. Clean metal surfaces promptly after installation, exercising care to avoid damage. Remove excess sealant, dirt, and other substances. Lubricate hardware and other moving parts.

3.4 PROTECTION AND CLEANING OF GLASS

- A. Replace glass that is broken, cracked or chipped prior to time of final acceptance of Project by Owner.

- B. Clean glass surfaces promptly after installation, exercising care to avoid damage to same.

END OF SECTION

SECTION 08480 - ALUMINUM FRAMED FOLDING DOORS

PART 1 - GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the aluminum framed folding doors as shown on the drawings and/or specified herein, including but is not necessarily limited to the following:
1. Sliding/bi-folding aluminum and glass door system, including aluminum frame, threshold, panels, sliding/bi-folding and locking hardware, weather stripping, glass and glazing.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Autoclaved Aerated Concrete Units - Section 04225.
- C. For SS door surrounds, Miscellaneous Metals- Section 05500.
- D. Sheet Metal Work - Section 07600.
- E. Joint Sealers - Section 07900.
- F. Glass and Glazing - Section 08800.

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Shop Drawings: Submit detailed drawings; indicate dimensioning, general construction, component joining, connections and locations, and hardware locations.
- C. Product Data: Submit manufacturer's literature including Owner's Manual and test data listing performance criteria.

1.5 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
1. Every effort shall be made to maximize post industrial/post consumer waste but aluminum framed folding door components shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
 2. Aluminum framed folding doors manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Provide complete, precision built, engineered, pre-fitted unit by a single manufacturer.
- B. Performance Criteria: Inward opening unit with raised sill and with steel locking rods shall meet all the performance criteria for CAWM 300-96 and a HGD-C55 rating in accordance with AAMA/NWWDA 101/I.S. 2.

PART 2 - PRODUCTS

2.1 SUPPLIER

- A. NANA Wall Systems, Inc., Mill Valley, CA, or approved equal.
 - 1. Basis for Project Design: NANA SL 70 Monumental Folding, Thermally Broken Aluminum Framed Opening Glass Wall System.

2.2 MATERIALS

- A. Frame and Panels: From manufacturer's standard profiles, provide head jamb, side jambs, and panels with dimensions shown on drawings. Provide standard bottom rail width. Provide matching, thermally broken raised sill.
 - 1. Aluminum: Extrusions with nominal thickness of 0.098". Alloy specified as AlMgSi 0.5 with strength rated as 6063-T5.
 - 2. Thermal-break construction: Fabricate with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members, in a manner that minimalizes or eliminates direct metal-to-metal contact. Acceptable thermal break materials include 9/16" insulbar, a polyimide plastic reinforced with glass fibers, or approved equal.
 - 3. Finish: High-performance organic finish, AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 - a. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermo-cured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.
 - b. Custom color and gloss as selected by the Commissioner. See drawings for additional information.
- B. Glass: Provide 1" thick insulating Low-E tempered glass, or manufacturers' standard. Exact glass dimensions to be provided by manufacturer. ASTM C 1048 Kind FT, select glazing quality float glass; fully tempered safety glass complying with applicable codes. Provide EPDM gaskets and extruded aluminum snap-in glazing bead for dry glazing per manufacturer's instructions. Stops to provide for total glass thickness of 15/16".

- C. Locking Hardware and Handles: Provide manufacturer's standard flat handle and concealed two point locking hardware operated by 180 degree turn of handle between each pair of folding panels and on swing panels of configurations with a swing panel.
 - 1. Flat Handle Finish: Match framing.
 - 2. Aluminum locking rods capped by polyamide at top and bottom tracks.
 - 3. Provide handle height centered at 41-3/8" from bottom of panel.
- D. Sliding/Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top and bottom tracks.
 - 1. For each pair of folding panels, provide four wheeled coated with toughened polyamide upper running carriage and lower guide carriage.
 - 2. Provide on all corners of panels, thermally broken, die cast zinc multi-functional corner fittings with carriage connectors, hinge and hinge pins as required. Finish: Powder coated, closest match to finish of frame and panels.
 - 3. Adjustment: Provide system capable of specified amount of adjustments without removing panels from tracks.
- E. Other Components:
 - 1. Weatherstripping: Provide manufacturer's standard double layer APTK, EPDM, or brush seals at both the inner and outer edge of door panels or on frame for sealing between panels and between panel and frame.
 - 2. Provide tapered pins or machine screws for connecting frame components.

2.3 FABRICATION

- A. Use extruded aluminum frame and panel profiles, corner connectors and hinges, sliding and folding hardware, locking hardware and handles, glass and glazing and weatherstripping as specified herein to make a folding glass wall. Factory pre-assemble as is standard for manufacturer and ship with all components and installation instructions.
- B. Sizes and Configurations: See drawings for selected custom dimensions within maximum frame sizes possible as indicated in manufacturer's literature. See drawings for selected number of panels and configuration. Inward opening unit.

2.4 ACCESSORIES

- A. Provide matching side lites, transoms, corner posts, or single or double doors as per drawings.

PART 3 - EXECUTION

3.1 ERECTION

- A. Because of the large dimensions involved and the weight and movement of the panels, verify the structural integrity of the header with the maximum deflection limited to be the lesser of $L/720$ of the span with a maximum deflection of $3/8"$.
- B. Examine surfaces of openings and verify dimensions; verify rough openings are level, plumb, and square, with no unevenness, bowing, or bumps on floor.
- C. Installation of units constitutes acceptance of existing conditions.

3.2 INSTALLATION

- A. Install frame in accordance with manufacturer's recommendations and installation instructions.
- B. Coordinate all work with installation of exterior waterproofing, flashing, window surrounds and other building components.
- C. Provide anchorage devices and securely and rigidly fit frame in place, absolutely level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work.
- D. If necessary, provide drain connections from lower track.
- E. Coordinate sill and operable doors and adjacent finished flooring products to provide proper under-door clearance.
- F. Install panels, handles and lock set in accordance with manufacturer's recommendations and installation instructions.
- G. Adjust hardware for proper operation.

END OF SECTION*

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SECTION 08520 - ALUMINUM WINDOWS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum windows as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Aluminum windows.
 2. Miscellaneous insulation at window frames.
 3. Anchors, hardware and accessories including trim pieces and panning.
 4. Screens on all operable units.
 5. Motorized control systems for high clerestory windows.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Autoclaved Aerated Concrete Units - Section 04225.
- C. For SS window surrounds, Miscellaneous Metals- Section 05500.
- D. Sheet Metal Work - Section 07600.
- E. Joint Sealers - Section 07900.
- F. Glass and Glazing - Section 08800.
- G. Electrical - Division 16.

1.4 PERFORMANCE REQUIREMENTS

- A. Windows shall conform to the "Voluntary Specification for Aluminum Prime Windows & Sliding Glass Doors" as published by ANSI/AAMA 101/I.S.2-97 unless more stringent requirements are specified. Windows shall conform to minimum standards of AW75 for double hung windows and AW60 for projected, casement and fixed windows.
- B. Performance and Testing: Except as otherwise indicated, comply with air infiltration tests, water resistance tests and applicable load tests specified in ANSI/AAMA 101/I.S.2-97 for type and classification of window units required in each case.
1. Testing: Where manufacturer's standard window units comply with requirements and have been tested in accordance with specified tests, provide certification by manufacturer to the Commissioner showing compliance with such tests; otherwise, perform required tests through an AAMA-accredited testing laboratory or agency, and provide certified test results to the Commissioner.
 2. Test reports shall be not more than four years old.
 3. Sample submitted for tests shall be manufacturer's standard construction and whose overall dimensions shall be at least the lay-out size window and window/door unit required for this Project. Sequence of test shall be optional between manufacturer and the testing laboratory except that in all cases, air infiltration test shall be performed before water resistance test. Sash in sample shall contain the approximate configuration as that of windows to be tested.
 4. To evaluate testing and measure product performance, testing shall be conducted on manufacturer's standard product glazed with type of glazing material specified herein.
- C. A thermal transmittance test and a condensation resistance test shall be conducted according to AAMA 1503-04, "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections." Standard test conditions as specified in Section 9.1 of the 1503.1-04 shall be used. Windows shall meet the following minimum criteria:
1. Condensation Resistance Test (CRF)
 - a. With window sash and ventilators closed and locked, test unit in accordance with AAMA 1502.7.
 - b. Condensation Resistance Factor (CRF) shall be not less than 50.0 for glass and 55.0 for frame.
 2. Thermal Transmittance Test (Conductive U-Value)
 - a. With window sash and ventilators closed and locked, test unit in accordance with AAMA 1503.0.
 - b. Conductive thermal transmittance (U-value) shall be not more than NFRC 0.45 BTU/hr/sf/deg. F.
- D. Manufacturers shall have been engaged in the manufacture of aluminum windows of grades specified for not less than 3 years.

- E. Provide anchorage of window to building substrate to withstand pressure or suction winds loads per requirements of the Building Code but not less than 30psf.
- F. Life Cycle Testing: When tested in accordance with AAMA 910-93, there is to be no damage to fasteners, hardware parts, support arms, activating mechanisms or any other damage which would cause the window to be inoperable at the conclusion of testing. Air infiltration and water resistance tests shall not exceed the primary performance requirements specified.
- G. Fabricate and install window to allow for thermal movement of materials when subject to a temperature differential from -30 deg. F. to +180 deg. F. without damage of any finish.
- H. Take field measurements of existing openings prior to submitting shop drawings and show same on shop drawings for each opening. Note that the Contract Drawings show general locations and sizes of windows, but the Contractor shall remain responsible for all field measurements, quantities, etc.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
- d. 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.
- e. Recycled content information shall be for aluminum extrusions only.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Shop Drawings

1. Shop drawings shall show in detail and fully indicate the location and the quantities of all the work, the kind, finish, size, section of each unit, overall and detail dimensions, factory and field joint locations, arrangements and details, location and detail of each piece of anchorage, flashings, supporting construction provisions for the work of others.
2. Shop drawings shall show all surrounding conditions on elevations and details, including steel, concrete, masonry, lintels, block, and anchorage; all correctly dimensioned.
3. Shop drawings of building elevations shall be at scale of $1/8" = 1'-0"$, or larger. Other shop drawings shall be at a scale that is normal to trade, or larger if required by Commissioner.
4. Contract drawings may not be used (reproduced, enlarged, reduced, etc.) by Subcontractor for shop drawings.
5. Shop drawings also shall fully demonstrate all requirements respecting the manufacture, finishing, handling, storage, carting sequence and erection of all materials specified herein.
6. Show joinery techniques, provision for horizontal and vertical expansion, drainage and weep systems, glass and metal thicknesses and framing member profiles.
7. Identify all materials, including metal alloys, glass types, fasteners, and glazing materials. Identify all shop and field sealants by product name and locate on drawings. Glazing details shall be at full size scale.
8. Show dimensioned position of glass edge relative to metal rabbet.
9. Shop drawings shall show attachments of window assemblies to adjoining construction and location of all work; kind, finish and size of frames, overall and detail dimensions, location and detail of each anchorage; supporting and adjoining construction; provision for the work of other trades; and all other required information.
10. Contractor shall verify all measurements of window openings in the field before commencing fabrication.
11. Shop drawings of motorized window control system for clerestory hopper windows, with details, installation instructions, wiring diagrams, standard color finish palette.
12. Any proposed deviations from work shown on the Contract drawings shall be indicated and so identified on shop drawings for Commissioner's review.

C. Samples

1. Submit 12" long sample of extrusion with specified finish.

2. Full size corner section of all types of aluminum frame, showing construction, glass and finishing - 12" x 12".
 3. All fasteners, straps, hardware, locks and keys, sealant, window insect screen, etc.
- D. Submit certified test results as required herein.
- E. Guarantees as noted in 1.9.
- F. Window manufacturer and Contractor for work of this section must each submit references of prior projects similar in size, scope and window type.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
1. Every effort shall be made to maximize post industrial/post consumer waste but aluminum windows shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements.
 2. Aluminum windows manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Protection
1. Materials shall be packed, loaded, shipped, unloaded, stored and protected in a manner which will avoid abuse, damage and defacement in accordance with the recommendations contained in the AAMA Aluminum Curtain Wall Manual #10 entitled "Care and Handling of Architectural Aluminum From Shop to Site."
 2. Remove all paper type wrappings and interleavings that are wet or which could become wet when unloading materials.
 3. Store inside structure in space designated by Commissioner.
 4. Stack vertically or on edge so that water cannot accumulate on or within materials using wood or plastic shims between components to provide water drainage and air circulation.
 5. Cover materials with tarpaulins or plastic hung on frames to provide air circulation and prevent contaminants from contacting aluminum.
 6. Keep water away from stored assemblies.
 7. Protect materials from careless handling of tools, weld splatter, acids, roofing compounds, solvents, abrasive cleaners, and other items that could damage window components and finish.

1.8 MANUFACTURER'S REPRESENTATIVE

- A. Contractor shall require representative of manufacturer of the windows to provide field instructions and supervision of the installation of the windows.

- B. Contractor shall require the manufacturer's representative to make sure that the subcontractor's workmen are fully instructed and trained in the handling and application of all the materials, and shall see that all the materials are correctly installed.
- C. Upon completion of the installation, the Contractor shall submit to the Commissioner in written form certification that the representative of the manufacturer of the windows has supervised the work of this Section and that all windows are correctly installed.

1.9 GUARANTEE

- A. Furnish manufacturer's warranty, co-signed by the Contractor, guaranteeing materials and workmanship, including glass and glazing and aluminum finish, for a period of 10 years from date of substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide aluminum windows (fixed, casement and project-in (hopper) manufactured by EFCO type 325X 3-1/4" Heavy Commercial, or equivalent by Wasco, Kawneer, or approved equal.

2.2 FIXED AND CASEMENT AND HOPPER WINDOWS

A. Aluminum Windows and Components

1. Extruded aluminum prime billet 6063TS, aluminum sheet 5005 H32 (anodic) or 3003 H14
2. Minimum principal window member wall thickness 1/8".
3. Minimum frame and vent depth front to back 2-1/2". Vent to be flush with frame.
4. Maximum exposed metal sightlines of main frame members shall be 2" at all members except 3" at horizontal intermediate between fixed and operable areas.
5. There shall be no change in exterior sightlines between fixed and operable units.
6. Vent sections must be tubes.

B. Hardware - General

1. All steel components 300 Series stainless steel (SS) (except roto-operator arms) i.e. - keepers, fasteners, hold open arms, tracks, etc.
2. All aluminum components 6063-T5 (T6) or 6105-T6.
3. Locking handles and cases, white bronze.
4. Hardware members bridging frame or vent thermal barrier to be nylon or suitable low conductivity, non-metallic material.

- C. Thermal-Break, Frame and Vent: Factory poured in place polyurethane into prefinished cavity in manufacturer's plant providing minimum 3/8" separation.

- D. Weatherstrip: Extruded sponge neoprene meeting ASTM C 509.
- E. Glass and Glazing: Shop glaze; see section 08800 for material description.
- F. Motorized Control Systems: Where indicated for high windows, provide motorized control system as supplied by Clearline Inc., North Wales, PA, or approved equal; all wiring and conduits to be concealed within the wall. Utilize standard rocker switches.
- G. Insect Screens: All operable units to have insect screens. Screens to be extruded 6063-T6 aluminum alloy frames. Mesh to be 18x18 stainless steel in .009" diameter wire.
- H. Fabrication
 - 1. General
 - a. Finish, fabricate and shop assemble frame and sash members into complete windows under responsibility of one manufacturer.
 - b. No bolts, screws or fastenings to bridge thermal barriers or impair independent frame movement.
 - 2. Casement Ventilator: Miter all corners and mechanically stake over solid aluminum, corner block minimum 1/4" thick, set and sealed in epoxy leaving hairline joinery, then seal weathertight. Joinery methods must not discolor finish or be unsightly.
 - 3. Main Frame Members: Miter all corners and continuously weld along unexposed surfaces so as not to affect the structural or thermal integrity of the thermal barrier, then seal weathertight.
 - 4. Weatherstripping
 - a. Two rows (both inner and outer overlap contacts) of extruded neoprene meeting ASTM C509 in extruded races about perimeter of operating sash.
 - b. Securely stake and join at corners.
 - 5. Glass Drainage: Provision shall be made to insure that water will not accumulate and remain in contact with the perimeter areas of sealed insulating glass.
 - 6. Hardware
 - a. Hinges
 - 1). Each operating sash shall be provided with a minimum of two extruded aluminum, 3-knuckle hinges with stainless steel pins. Windows over 4'-4" in height shall be provided with an intermediate hinge.
 - 2). The hinge shall be attached to both the frame and sash with concealed fasteners. The hinge shall be furnished to match the window.
 - b. Locks
 - 1). Each operating sash shall be provided with a minimum of one die cast locking handle up to a ventilator height of 4'-0" and two locking handles on vents over 4'-0" high.

- 2). All locking hardware shall be provided with a stainless steel strike backed up with an extruded aluminum leg a minimum of 0.125" in thickness. Locking directly against aluminum, will not be accepted.
- c. Riser Blocks: Each operating vent shall be equipped with a nylon riser block at the sill.

2.3 FINISH OF ALUMINUM

- A. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.
 2. Color and gloss as selected by Commissioner. See drawings for additional information.

PART 3 EXECUTION

3.1 INSPECTION AND REMOVALS

- A. Examine surfaces and conditions where aluminum windows are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.
- B. Verify dimensions taken at the job site affecting the work. Bring field dimensions that are at variance to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of installation.

3.2 INSTALLATION

- A. Use only skilled tradesman with work done in accordance with approved Shop Drawings and specifications.
- B. Plumb and align window faces in a single plane for each wall plane and erect windows and materials square and true adequately anchored to maintain positions permanently when subjected to normal thermal and building movement and specified wind loads.
- C. Adjust windows for proper operation after installation.
- D. Coordinate all work with installation of exterior waterproofing, flashing, window surrounds and other building components.
- E. Furnish and apply sealants to provide a weathertight installation at all metal-to-metal joints and intersections of frames and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

- F. Aluminum shall be insulated from direct contact with steel, masonry, concrete, or non-compatible materials by bituminous paint, zinc chromate primer, or other suitable insulation material.
- G. Blanket insulation shall be installed behind aluminum covers, panning and trim to insure thermally insulated seal.

3.3 ADJUSTING AND CLEANING

- A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, etc.
- B. Glass that is broken, damaged, cracked, or permanently stained shall be replaced.
- C. Final cleaning of finish shall be in accordance with AAMA 610.1.

END OF SECTION

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SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.
- B. The required hardware items for doors are indicated in hardware sets shown herein. Should any opening be omitted, the contractor shall contact the Commissioner for the correct hardware.

1.2 RELATED WORK

- A. Green Building Requirements – Division 1.
- B. For exterior gates, Miscellaneous Metals – Section 05500.
- C. Steel Doors and Frames – Section 08100
- D. Aluminum Swinging Entrance Doors- Section 08410
- E. Aluminum Framed Folding Doors- Section 08480
- F. Painting and Finishing – Section 09900

1.3 SUBMITTALS

- A. General: Submit the following in accordance with the provisions of the general contract documents.
 - 1. Hardware Schedule: Submit three (3) copies of the hardware schedule. Follow Door and Hardware Institute (DHI) guide lines for scheduling. At the beginning of the schedule furnish an index, which list each door number with appropriate heading number and hardware set number. Furnish initial draft of schedule at the earliest possible date, in order to facilitate the fabrication of other work. Furnish final schedule after samples, manufacturer's data sheets have been approved. HORIZONTAL SCHEDULES WILL NOT BE ACCEPTED.
 - 2. Product Data: Submit three (3) copies of the manufacturer's data for each item of hardware. Include whatever information may be necessary to show compliance with requirements. Submission shall clearly identify item submitted. Facsimile documents or copies of facsimile documents will not be accepted.
 - 3. Keying Schedule: A key schedule showing all key numbers and spaces to which each permits entry, shall be provided. Consult with Commissioner and provide necessary assistance required for development of the schedule before submitting final key schedule. After final approval has been received, the schedule along

with the key gathering envelopes containing keys for each lock endorsed with lock number and space designation shall be turned over to the City of New York.

4. **Samples:** Prior to submittal of the final hardware schedule and prior to delivery of hardware, submit one (1) sample of each exposed hardware unit. Sample will be reviewed by the Commissioner for design, color and texture only. Compliance with other requirements is the exclusive responsibility of the CONTRACTOR. Samples approved by the Commissioner shall be turned over to the City of New York for attic stock.
5. **Wiring Diagrams:** Supplier shall furnish riser diagrams, wiring diagrams and point to point diagrams for all electrical hardware specified herein. These diagrams shall be included with the initial draft of the hardware schedule.

1.4 QUALITY ASSURANCE

- A. **Standards:** All finish hardware shall conform to all of the following standards:
 1. **Testing Laboratories:** Underwriters Laboratory (UL) and or Warnock Hersey Fire Laboratories Division: All fire rated doors shall have hardware assemblies approved by one of the listed laboratories. Panic hardware UL Listed only.
 2. **National Fire Protection Association:** NFPA 80 and NFPA 101.
 3. **Builders Hardware Manufacturers Association (BHMA).**
 4. **American National Standards Institute (ANSI).**
 5. **American Disabilities Act (ADA).**
 6. **Where required, products shall have MEA approval.**
- B. **Supplier:** Finish hardware shall be furnished by those having a minimum of 3 years of builders hardware experience and shall have in their employ at least one AHC to interpret plans, detailed drawings and specifications.

1.5 PRODUCT HANDLING

- A. **Handle, store, distribute, protect and install** in accordance with the manufacturers instructions. Deliver packaged material in original containers with seals unbroken and labels intact. Deliver assemblies completely identified and with adequate protection for storage, handling and installation.
- B. **Provide secure lock-up for hardware delivered to the project, but not yet installed.** Control the handling and installation of hardware which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses; both before and after installation.

1.6 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 function. 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.

1.7 WARRANTIES

- A. The hardware manufacturers shall provide full replacement warranty as listed below. Replacement warranty shall not include any labor cost.
 - 1. Surface Closers 25 years.
 - 2. Locksets etc. 1 year
 - 3. Exit Devices 3 years
 - 4. Balance of hardware 1 year

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION

- A. Hand of Door: The drawings show the swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door swing shown.
- B. Base Metals: Produce hardware units of the basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness but in no case of lesser quality material.
- C. Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws.
- D. Screws: Furnish screws for installation, with each hardware item. Finish exposed screws to match the hardware finish.
- E. Tools for Maintenance: Furnish a complete set of specialized tools as needed, for the OWNERS continued maintenance, removal and replacement of hardware.
- F. Concealed Fasteners: Provide concealed fasteners for hardware units which are exposed when the door is closed except to the extent no standard manufacturer's units are available with concealed fasteners. Use thru bolts only where necessary to adequately fasten hardware to the door.

2.2 HINGES

- A. All hinges shall be full mortise five knuckle ball bearing type, template, with non-rising loose pins. All outswing doors shall have non-removable pins (NRP).
- B. All hinges for 1-3/4" thick doors shall be 4-1/2" wide in the open position. For other thickness doors, and trim projections, hinges shall be of a width to permit unobstructed swing of the doors.
- C. Size and weight of hinges shall conform to the following:
 - Up to 36" -----4-1/2" Standard Weight
 - Over 36" to 44" -----5" Heavy Weight
 - Over 44" -----Continuous Hinge 910DBAA
- D. Quantity of hinges shall be provided to conform to the following:
 - Doors up to 60" in height -----2 hinges
 - Doors 60" to 90" in height -----3 hinges
 - Doors 90" and over -----1 hinge every 30" in height
- E. All hinges shall be the products of one manufacturer.

2.3 LOCKSETS, LATCHSETS ETC.

- A. Unless otherwise noted, all locksets and latchsets shall be heavy duty mortise type, and shall have the following features:
 1. Curved lip strikes with proper lip lengths as required.
 2. Wrought steel box strike.
 3. Auxiliary deadlatching.

2.4 KEYS, KEYING, CYLINDERS AND KEY CABINET

- A. Keys: All keys shall be nickel silver. Furnish a quantity of keys as follows.

1. Great Grand Master	2 total
2. Grandmaster Keys	2 each per group
3. Master Keys	6 each per group
4. Change Keys	3 each per cylinder
5. Control Keys	3 total
- B. Keying: All locks shall be construction keyed and great grand master keyed to a new Dorma SKC great grand master key system. The hardware supplier shall meet with the Owner to establish the keying requirements. All master keys shall be hand delivered to the Owner by the manufacturer or his representative.
- C. Cylinders: All cylinders shall be six pin interchangeable core furnished with visual key control.

- D. Key Cabinet: Provide a key control system set-up (by hardware supplier) to include envelopes, labels, tags with self-locking key clips, receipt forms, 3 way visible card index, temporary markers, permanent markers and standard metal cabinet with locked access. Capacity for 150% of the number of locks required for this project. Instruct City of New Yorks representative on the operation of the key control system.

2.5 DOOR CLOSING DEVICES

- A. All door closers shall meet ANSI A156.4 Grade 1 requirements. All closers shall be barrier free. Furnish all required brackets, filler plates and any others items required to insure proper installation and operation.
- B. All closers shall be installed so that closer bodies are positioned on room side of doors to and from corridors, i.e., in-swing doors shall be regular arm. Out-swing doors shall have a parallel arm. Regular arm shall be used in connecting doors between rooms.

2.6 FLUSH BOLTS AND COORDINATORS

- A. Manual Flush Bolts: Shall be Trimco W3917 series, furnish 3910 dustproof strikes for all bottom bolts, or equal. Top bolts shall be furnished with proper extensions to allow for easy operation.
- B. Self Latching Flush Bolts: Shall be Trimco 3810/3815 series, furnish 3910 dustproof strikes for all bottom bolts, or equal. Furnish wear plates as required.
- C. Automatic Flush Bolts: Shall be Trimco 3820/3825 series, furnish 3910 dustproof strikes for all bottom bolts, or equal. Furnish wear plates as required.
- D. Coordinators: Shall be Trimco 3094 series, or equal. Furnish all fillers, mounting brackets, carry bars and special cutouts for use with exit devices, as required.
- E. All flush bolts and coordinators shall be the products of one manufacturer.

2.7 APPROVED MANUFACTURERS:

- A. Hinges: PBB, Stanley, and Bommer, or approved equal.
- B. Locksets, Deadlocks and Cylinders: Dorma, Schlage and Best, or approved equal.
- C. Door Closers: Dorma, LCN and Sargent, or approved equal.
- D. Door Stops: Rockwood, Trimco and Ives, or approved equal.
- E. Overhead Stops: Rixson, Dorma and Glynn Johnson, or approved equal.
- F. Flush Bolts: Rockwood, Trimco and Ives, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. **Approval:** As soon as practical after award of Contract and before a hardware schedule is prepared, and before any hardware is ordered or delivered to the project, the CONTRACTOR shall submit to the Commissioner for written approval, copies of sample list, listing each of the different items of builders hardware and catalog cuts of each item.
- B. **Templates:** As soon as the hardware schedule is approved the hardware supplier shall furnish to the various fabricators, required templates for fabrication purposes. Templates shall be made available not more than (10) days after receipt of the approved hardware schedule.
- C. **Packaging and Marking:** All hardware shall be shipped with proper fastenings for secure application. Each package of hardware shall be legibly marked indicating the part of the work for which it is intended. Markings shall correspond with the item numbers shown on the approved hardware schedule. Keys shall be tagged within each package set and plainly marked on the face of the envelope with the key control number, door designation and all identification as necessary.
- D. **Delivery:** Delivery shall be made to the project site to the attention of the GENERAL CONTRACTOR. Where delivery of special hardware is required at any fabricator's plant, the hardware supplier shall make such delivery.

3.2 INSTALLATION

- A. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by BHMA, unless otherwise noted or directed by the Commissioner.
- B. Install each hardware unit in compliance with the manufacturer's recommendations.

3.3 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer. Replace units that cannot be adjusted.
- B. Wherever hardware installation is made more than one (1) month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance make a final check, and adjust all hardware items in such space or area. Adjust door control devices and compensate for final operation of heating and ventilating equipment.
- C. Instruct OWNERS personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.4 HARDWARE SETS

- A. The following is a general listing of hardware requirements and is not intended for use as a final hardware schedule. Any items of hardware required by established standards or

practices, or to meet state and local codes or proper door operation shall be furnished whether or not specifically called out in the following listed groups.

HARDWARE SET # 1

Each to have:

	Hinges	PBB (see description) x US26D
1	Office Lock	Dorma CL853CLRC x US26D
1	Door Closer	Dorma 8616AF-FC x Alum
1	Door Stop	Trimco 1270WV x US26D
1	set Smoke Seals	Zero 188S-BK jambs/head or approved equal

HARDWARE SET # 1A

Each to have:

	Hinges	PBB (see description) x US26D
1	Office Lock	Dorma CL853CLRC x US26D
1	Door Stop	Trimco 1270WV x US26D
3	Silencers	Trimco 1229A or approved equal

HARDWARE SET # 1B

Each to have:

	Hinges	PBB (see description) x US26D
1	Office Lock	Dorma CL853CLRC x US26D
1	Door Closer/Stop	Dorma 8616DS-FC x Alum
3	Silencers	Trimco 1229A or approved equal

HARDWARE SET # 2

Each to have:

	Hinges	PBB (see description) x US26D
1	Classroom Lock	Dorma CL870CLRC x US26D
1	Door Closer/Stop	Dorma 8616IS-FC x Alum
1	set Smoke Seals	Zero 188S-BK jambs/head or approved equal

HARDWARE SET # 3

Each to have:

	Hinges	PBB (see description) x US26D
1	Storeroom Lock	Dorma CL880CLRC x US26D
1	Door Closer/Stop	Dorma 8616DS-FC x Alum
1	set Smoke Seals	Zero 188S-BK jambs/head or approved equal

HARDWARE SET # 3A

Each to have:

- | | |
|------------------|-------------------------------|
| Hinges | PBB (see description) x US26D |
| 1 Storeroom Lock | Dorma CL880CLRC x US26D |
| 1 Door Stop | Trimco 1270WV x US26D |
| 3 Silencers | Trimco 1229A |
| | or approved equal |

HARDWARE SET # 3C

Each to have:

- | | |
|------------------------|-------------------------------|
| Hinges | PBB (see description) x US26D |
| 1 Storeroom Lock | Dorma CL880CLRC x US26D |
| 1 Door Closer/Stop | Dorma 8616DS-FC x Alum |
| 1 set Weatherstripping | Zero 429A jambs/head |
| 1 Door Bottom | Zero 8193A |
| | or approved equal |

HARDWARE SET # 3D

Each to have:

- | | |
|-------------------|-------------------------------|
| Hinges | PBB (see description) x US26D |
| 1 Storeroom Lock | Dorma CL880CLRC x US26D |
| 1 Door Closer | Dorma 8616AF-FC x Alum |
| 1 Door Stop | Trimco 1270WV x US26D |
| 1 set Smoke Seals | Zero 188S-BK jambs/head |
| | or approved equal |

HARDWARE SET # 4

Each to have:

- | | |
|--------------------|----------------------------------|
| Hinges | PBB (see description) x US26D |
| 2 Flush Bolts | Trimco (see description) x US26D |
| 1 Storeroom Lock | Dorma CL880CLRC x US26D |
| 1 Door Closer/Stop | Dorma 8616DS-FC x Alum |
| 1 set Smoke Seals | Zero 188S-BK jambs/head |
| | or approved equal |

HARDWARE SET # 5

Each to have:

- | | |
|-------------------------|----------------------------------|
| Hinges | PBB (see description) x US26D |
| 2 Automatic Flush Bolts | Trimco (see description) x US26D |
| 1 Coordinator | Trimco (see description) x BPC |
| 1 Classroom Lock | Dorma CL870CLRC x US26D |
| 2 Door Closers/Stops | Dorma 8616DS-FC x Alum |
| 1 set Smoke Seals | Zero 188S-BK jambs/head |

- | | | |
|---|---------------|---------------------------------------|
| 1 | Astragal Seal | Zero 328A x 328A
or approved equal |
|---|---------------|---------------------------------------|

HARDWARE SET # 5A
Each to have:

- | | | |
|---|-----------------------|---------------------------------------|
| | Hinges | PBB (see description) x US26D |
| 2 | Automatic Flush Bolts | Trimco (see description) x US26D |
| 1 | Coordinator | Trimco (see description) x BPC |
| 1 | Passage Lock | Dorma x US26D |
| 2 | Door Closers/Stops | Dorma 8616IS-FC x Alum |
| 1 | set Smoke Seals | Zero 188S-BK jambs/head |
| 1 | Astragal Seal | Zero 328A x 328A
or approved equal |

HARDWARE SET # 6
Each to have:

- | | | |
|---|----------------------|---------------------------------------------------------------------------|
| 1 | Masterkeyed Cylinder | Schlage (to suit) x US26D,
or approved equal, with concealed lock box. |
|---|----------------------|---------------------------------------------------------------------------|

The gate manufacturer will furnish the balance of hardware.

HARDWARE SET # 6A
Each to have:

- | | | |
|---|----------------------|------------------------------------------------|
| 1 | Masterkeyed Cylinder | Schlage (to suit) x US26D
or approved equal |
|---|----------------------|------------------------------------------------|

The door manufacturer will furnish the balance of hardware.

HARDWARE SET # 7
Each to have:

- | | | |
|---|-------------|--------------------------------------------|
| | Hinges | (by door manufacturer) |
| 1 | Passage Set | (by door manufacturer) |
| 1 | Door Closer | (by door manufacturer) |
| 1 | Door Stop | Trimco 1270WV x US26D
or approved equal |

HARDWARE SET # 8
Each to have:

- | | | |
|---|----------------|----------------------------------|
| | Hinges | PBB (see description) x US26D |
| 2 | Flush Bolts | Trimco (see description) x US26D |
| 1 | Deadlock | Dorma MB9963 x US26D |
| 2 | Recessed Pulls | Trimco 1060 x US26D |

- 2 Overhead Stops Dorma 700S series x US26D
- 2 Silencers Trimco 1229A
or approved equal

HARDWARE SET # 9

Each to have:

- Hinges PBB (see description) x US26D
- 1 Utility Lock Dorma CL882CLRC x US26D
- 1 Door Closer Dorma 8616AF-FC x Alum
- 1 Door Stop Trimco 1270WV x US26D
- 1 set Weatherstripping Zero 429A jambs/head
- 1 Door Bottom Zero 8193A
or approved equal

HARDWARE SET # 10

Each to have:

- Hinges PBB (see description) x US26D
- 1 Privacy Set Dorma ML9956CLRA x US26D
- 1 Occupancy Indicator Dorma x US26D
- 1 Door Closer Dorma 8616AF-FC x Alum
- 1 Door Stop Trimco 1270WV x US26D
- 1 set Smoke Seals Zero 188S-BK jambs/head
or approved equal

HARDWARE SET # 10B

Each to have:

- Hinges PBB (see description) x US26D
- 1 Privacy Set Dorma CL840LLRC x US26D
- 1 Overhead Stop Dorma 700S series x US26D
- 3 Silencers Trimco 1229A
or approved equal

HARDWARE SET # 11

Each to have:

- Hinges (by door manufacturer)
- 1 Entry Lock (by door manufacturer)
- 1 Masterkeyed Cylinder Dorma (to suit) x US26D
- 1 Door Closer (by door manufacturer)
or approved equal

HARDWARE SET # 12 (Exit Gate G7)

Each to have:

- Description: Exit function only. No knob on exterior.
- | | | |
|---|----------------|------------------------|
| 1 | Exit Device | 98-L-996L-R/V-US32D |
| | Hinges | (by gate manufacturer) |
| | Drop cane bolt | (by gate manufacturer) |

HARDWARE SET # 13 (Main Gate G1)

Each to have:

- Description: Storeroom / entrance function. Key cylinder on exterior. Exit function from interior.
- | | | |
|---|-----------------|--------------------------------------------|
| 1 | Entry Lock | Storeroom function with concealed lock box |
| 1 | Exit Device | 98-L-996L-R/V-12 lever-US32D |
| | Pull (exterior) | (by gate manufacturer) |
| | Hinges | (by gate manufacturer) |
| | Drop cane bolt | (by gate manufacturer) |

END OF SECTION

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SECTION 08800 - GLASS AND GLAZING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the glass and glazing as shown on the drawings and/or specified herein, including but not limited to glazing of the following:
1. Windows.
 2. Doors.
 3. Entrances.
 4. Interior borrowed lites.
 5. Interior mirrors, frameless.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Steel Doors and Frames - Section 08100.
- C. Aluminum Swinging Entrance Doors – Section 08410.
- D. Aluminum Framed Folding Doors – Section 08480
- E. Framed mirrors in Toilet Accessories - Section 10800.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and

installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

- B. Glass Design: Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: 50 psf (30 lbs for pressure and 20lbs. for suction) or greater if required by Code.
2. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - a. Load Duration: 60 seconds or less.
3. Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 3/4", whichever is less.
4. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - a. Temperature Change (Range): 120 deg. F ambient; 180 deg F, material surfaces.
5. Recycled Content: all glazing shall contain 20% recycled glass cullet, minimum.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).

- 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.
 - C. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.
 - D. Test Reports: Provide certified reports for specified tests.
 - E. Warranties: Provide written warranties as specified herein.
- 1.6 QUALITY ASSURANCE
- A. Source: For each glass and glazing type required for work of this Section, provide primary materials that are products of one manufacturer. Provide secondary or accessory materials that are acceptable to manufacturers of primary materials.
 - B. Installer: A firm with a minimum of three (3) years experience in type of work required by this Section and which is acceptable to manufacturers of primary materials; and with a successful record of in-service installations similar in size and scope to this Project.

- C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section. Provide units with proper thickness, edge clearance and tolerance to comply with recommendations of glass manufacturer.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
 - 1. GANA Publications: GANA's "Glazing Manual" and "Laminated Glass Design Guide."

1.7 TESTS

- A. Preconstruction Sealant Test: Submit samples of materials to be used to glazing sealant manufacturer to determine sealant compatibility. Include samples of glass, gaskets, glazing materials, framing members, and other components and accessories of glazing work. Test in accordance with ASTM C 794 to verify what type of primers (if any) are required to ensure sealant adhesion to substrates.
 - 1. Submit minimum of nine pieces of each type and finish of framing member, and nine pieces of specified glazing panels for adhesion tests.
 - 2. Provide manufacturer's written report and recommendations regarding proper installation.

1.8 PROJECT CONDITIONS

- A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.
- B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.
 - 1. Protect materials from moisture, sunlight, excess heat, sparks and flame.
 - 2. Sequence deliveries to avoid delays, but minimize on-site storage.

PART 2 PRODUCTS

2.1 MANUFACTURERS/FABRICATORS

- A. All glass and glazing used at the exterior of the Project shall be manufactured by the same manufacturer. The same manufacturer and the same furnace shall be used for all tempered and heat strengthened glass used throughout the project.

2.2 GLASS MATERIALS AND PRODUCTS

- A. Clear Float Glass: ASTM C 1036, Type I-Transparent, Flat, Class 1-Clear, Quality q3, minimum 1/4" thick.
- B. Clear Tempered Glass: ASTM C1048, Condition A-Uncoated, Type I-Transparent, Flat, Class 1-Clear, Quality q3, Kind FT, minimum 1/4" thick.
- C. Low 'E' Coated Glass: Provide high-performance, clear, metallic coating, Solarscreen 2000, as manufactured by Viracon. Provide Low 'E' coating which has the following performance characteristics when applied to the No. 2 surface of 1" insulating units, both lites 1/4" clear:
1. Visible Light Transmittance: 70%.
 2. Shading Coefficient: 0.43.
 3. SHGC: 32%.
- D. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conform to ASTM C1172, and as follows:
1. Interlayer Color: Clear.
 2. Interlayer Material: Provide Monsanto "Saflex" or DuPont "Butacite", 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.
 3. Minimum thickness of 1/4".
- E. Insulating Glass: Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 774, and as follows:
1. Sealing System: Dual Seal.
 2. Primary Sealant: Polyisobutylene.
 3. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, Rhodorsil Rhodortherm 542 or 543, or Dow Corning 982 or approved equal.
 4. Spacer: Clear finish aluminum with welded, soldered, or bent corners.
 5. Desiccant: Molecular sieve, silica gel, or blend of both.
 6. Air Space Thickness: 1/2".
 7. Glass Thickness: 1/4" minimum.

- F. Wire Glass: ASTM C 1036, UL Listed, Fire Rated polished transparent wire glass complying with ANSI Z97.1. Provide Type II - Patterned and Wired Glass, Class 1 - Clear, Quality q8 - Glazing, Form 1 - Polished Both Sides, and as follows:
 - 1. Thickness: 1/4" unless otherwise indicated or required.
 - 2. Square Pattern: Mesh M2.
- G. Obscure Glass (for bathrooms): Frosted.
- H. Frameless Mirrors: 1/4", Quality q2, clear float glass with silver, copper, and organic coating, and as follows:
 - 1. Edges: Uniformly ground and polished.

2.3 GLAZING MATERIALS AND PRODUCTS

- A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulated glass sealants, with laminated glass interlayers, and with any other surfaces in contact.
- B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following, or approved equal:
 - 1. Dow Corning 795.
 - 2. General Electric Silglaze N 2500 or Contractors SCS-1000.
 - 3. Rhodorsil 3B, 5C, or 6B.
 - 4. Tremco Spectrem 2.
 - 5. Approved equal.
- C. Weather Seal Sealant: Provide non-acid curing sealant with movement range $\pm 50\%$, ASTM C 719. Provide one of the following, or approved equal:
 - 1. Dow Corning 795.
 - 2. General Electric Silpruf.
 - 3. Rhodorsil 3B, 5C, or 6B.
 - 4. Tremco Spectrem 2.
 - 5. Approved equal.
- D. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75 ± 5 for hollow profile, and 60 ± 5 for solid profiles, ASTM C 864.
- E. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40 ± 5 , and 20% to 35% compression, ASTM C-509; Type II.

- F. **Preformed Glazing Tape:** Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form. Provide Tremco "Polyshim II", or approved equal.
- G. **Setting Blocks:** Provide neoprene or silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be 1/16" more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds 3/4" the glass manufacturer must be consulted for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.
1. **Shims:** For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.
 2. **Structural Silicone Glazing:** Provide silicone setting blocks where structural silicone occurs at sills and at insulated units with silicone edge seals.
- H. **Edge Blocks:** Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of 55+5.
- I. **Spacers:** Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.
- J. **Miscellaneous Glazing Materials:** Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.
- K. **Mirror Adhesive:** Palmer's Super Set Mirro-Mastic, or approved equal.

1. **Clips:** No. 4 finish Type 304 stainless steel.

2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.
- C. Grind smooth and polish exposed glass edges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- L. Flush Glazing
 - 1. If the butt joint in the metal framing is in the vertical direction, the glazier shall run the tape initially on the head and sill members going directly over this joint. Should the butt joint in the metal framing run horizontally, tapes must first be applied to the jambs so that it crosses over the joint.
 - 2. Each tape section shall butt the adjoining tape and be united with a tool to eliminate any opening.
 - 3. Do not overlap the adjoining length of tape or rubber shim as this will prevent full contact around the perimeter of glass.
- M. Off-Set Glazing
 - 1. Where the glazing legs are off-set, the difference in the rabbet width shall be compensated by employing different glazing tapes with different diameter shims. The difference in shim shall be equal to the size of the off-set. The thinner tape shall be positioned first on the glazing leg closest to the interior. The thicker tape shall be cut to the exact length of the dimension between the applied tapes, and installed on the outermost glazing leg.
 - 2. Immediately prior to setting glass, paper backing shall be removed. Apply a toe bead of sealant 6" in each direction, from each corner.
 - 3. Locate setting blocks in the sill member at quarter points, or if necessary to within 6" of each corner. Setting blocks must be set equal distance from center line of the glass and high enough to provide the recommended bite and edge clearances.
 - 4. Set edge block according to glass manufacturer's recommendations.
 - 5. Set Glass: The glass shall be pressed firmly against the tape to achieve full contact.
 - 6. Interior stops shall be set, and glazing tape spline for the appropriate face clearance shall be rolled into place, compressing the glass to the shim within the glazing tape.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant as recommended by glass manufacturer or glass frame manufacturer.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape where noted on approved shop drawings.

3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 FRAMELESS MIRRORS

- A. Apply mastic to back of mirror "pats" spaced 4 pats/sq. ft.; adjust mirror so that it is plumb and in place to avoid distortion of reflecting images. Allow 1/8" space between back of mirror and wall surface.
 - 1. Apply "pats" using Palmer Electric Applicator, or equal.
- B. Apply stainless steel clips at mirror top and bottom; securely clip to substrate using non-corrosive anchors. At drywall back-up anchors must be secured to studs or steel wallplate spanning from stud to stud.

3.8 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

END OF SECTION

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SECTION 09250 - GYPSUM DRYWALL

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the gypsum drywall as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.
 2. Metal supports for gypsum drywall construction.
 3. Acoustical insulation for gypsum drywall work.
 4. Sealant for gypsum drywall work.
 5. Concealed metal reinforcing for attachment of items supported on drywall partitions and walls.
 6. Installing rings and frames in drywall surfaces for grilles, registers and lighting fixtures.
 7. Bracing and connections.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Hollow metal door frames - CSI Section 08100.
- C. Painting - CSI Section 09900.
- D. Rings for grilles, registers and light fixtures - CSI Division 15 and 16.

1.4 QUALITY ASSURANCE

- A. The following standards as well as other standards which may be referred to in this Section, shall apply as applicable to the work of this Section:
1. Gypsum Drywall Construction Handbook, latest edition, U.S. Gypsum Co.
 2. ASTM C 645 "Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board."
 3. ASTM A 568 "Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For."
 4. ASTM C 1396 "Standard Specification for Gypsum Board."
 5. ASTM C 475 "Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction."
 6. ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board."
 7. ASTM C 919 "Standard Specification for Use of Sealants in Acoustical Applications."
 8. ASTM C 954 "Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs From 0.033 in. to 0.112 in. in Thickness."
 9. ASTM C 1002 "Standard Specification for Steel Drill Screws for the Application of Gypsum Board."
 10. ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Board."
 11. ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber."
 12. ASTM C 1177 "Specification for Glass Mat Gypsum Substrate for Use at Sheathing."
 13. ASTM C 1178 "Specification for Glass Mat Water Resistant Gypsum Backing Board."
 14. ASTM C 1278 "Specification for Fiber Reinforced Gypsum Panels."
- B. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.
- C. System Design Load: Provide drywall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to 1/240 of partition height.
1. Drywall assemblies with tile finish shall have a deflection limit of 1/360.

- D. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.
- E. Installer: Firm with not less than 3 years of successful experience in the installation of specified materials.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. Submit shop drawing for each drywall partition, furring and ceiling system showing size and gauges of framing members, hanger and anchorage devices, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.
- C. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.
- D. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications.
- E. Test Reports: Submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

1.6 INDOOR AIR QUALITY MANAGEMENT PLAN

- A. The following practices shall be implemented in accordance with the Construction Indoor Air Quality Management Plan.
 - 1. Gypsum wallboard is to be stored per manufacturer's recommendations for allowable temperature and humidity range. Products shall not be allowed to become damp.
 - 2. Where feasible, gypsum wallboard shall be stored separately from materials which have high short-term emissions. Materials with high short-term emissions include, but are not limited to, adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paint, 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.
 - 3. Where feasible, exposed fiberglass or mineral wool insulations shall not be stored in occupied spaces, near HVAC diffusers (supply or return), or near fresh air intakes.

1.7 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are required for the products included in this section:
 - 1. Steel studs, track, and miscellaneous framing shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Gypsum wallboard shall contain "synthetic" gypsum produced with a minimum of 95% post-industrial recycled content. Certification of recycled content shall be in accordance with the Submittal Requirements.
 - 2. Adhesives or sealants used for work in this section shall meet the requirements of Green Building Articles, where applicable. Certification of these products shall be in accordance with the Submittal Requirements.

1.8 PRODUCT HANDLING AND PROTECTION

- A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.
- B. Protect wallboard from becoming wet.

1.9 ENVIRONMENTAL CONDITIONS

- A. Provide and maintain minimum temperature of 55 degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the drywall work for at least 24 hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Materials specified below, unless noted otherwise or specified herein, are those of U.S. Gypsum Co. Equivalent materials of National Gypsum Co., Georgia Pacific, Lafarge, or approved equal, meeting specification requirements are acceptable.

2.2 METAL SUPPORTS

A. Metal Floor and Ceiling Runners

1. Channel Type: Formed from 20 gauge (unless otherwise noted) galvanized steel, width to suit channel type metal studs. Use 20 gauge top runners with 1-1/4" minimum flanges.
2. Ceiling runners and head of wall connections at rated partitions shall conform to UL #2079 for cycle movement. Provide positive mechanical connection of framing to structure, allowing for vertical movement within connections. Minimum of 20 gauge galvanized steel for clips, 25 gauge galvanized steel for ceiling runners. Providing a friction free – anti-seizure movement capacity.
 - a. As manufactured by the Steel Network, VertiClip or VertiTrack, or approved equal.
 - b. FireTrak (including stud clips) by FireTrak Corp, or approved equal.
3. "J" Type: Formed from 20 gauge galvanized steel, 1" x 2-1/2" or 4" wide (to suit detail) x 2-1/4" (for shaft wall).

B. Metal Studs, Framing and Furring

1. Channel Type Studs: Channel type with holes for passage of conduit formed from minimum 20 gauge (unless heavier gauge is required to meet deflection limits) galvanized steel, width as shown on drawings.

2. Furring Channels: Hat shaped, formed from galvanized steel, 25 gauge.
3. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of railings, toilet partitions and other items supported on drywall partitions and walls.

C. Suspended Ceiling and Fascia Supports

1. Main Runners: 1-1/2" steel channels, cold rolled at 0.475 lbs. per ft., rust-inhibitive paint finish.
2. Furring Members: Screw-type hat-shaped furring channels of 25 gauge, zinc-coated steel; comply with ASTM C 645.
3. Hangers: Galvanized, 1" x 3/16" flat steel slats capable of supporting 5x calculated load supported.
4. Hanger Anchorages: Provide inserts, clips, bolts, screws and other devices applicable to the required method of structural anchorage for ceiling hangers. Size devices for 5x calculated load supported.
5. Furring Anchorages: 16 gauge galvanized wire ties, manufacturer's standard clips, bolts or screws as recommended by furring manufacturer.

2.3 GYPSUM WALLBOARDS

- A. General: Provide boards in manufacturer's standard widths and in maximum lengths available to minimize end-to-end butt joints. Provide thicknesses as indicated on drawings; where not indicated provide 5/8" thickness.
- B. Gypsum Wall Board: "Sheetrock", or approved equal.
- C. Fire Rated Gypsum Wall Board: "Sheetrock Firecode C", or approved equal.
- D. Water Resistant Backing Board for Tile Finish: "Durock Tile Backer Board", "Dens-Shield Tile Backer Board" by Georgia Pacific, or approved equal. Cover joints with a pressure sensitive woven glass fiber tape equal to Imperial Type P Tape.
- E. Mold Resistant Paperless Wall Board (at all perimeter walls and wet shafts): "DensArmour Plus" by Georgia Pacific or USG "Mold Tough" or approved equal that has a rating of 10 per ASTM D 3273 with core that meets ASTM C 630.

2.4 ACCESSORIES

- A. Acoustic Insulation: Paper-less, non-combustible, semi-rigid mineral fiber mat, 2" thick, in walls (unless otherwise indicated), 3 lb./cu. ft. maximum density; Thermafiber LLC "Thermafiber," or approved equal.
- B. Fasteners for Wall Board: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 gauge). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 gauge to 12 gauge); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wall board. Lengths

specified below under "Part 3 - Execution" Articles and as recommended by drywall manufacturer.

- C. Laminating Adhesive: "Sheetrock Brand Joint Compound" or approved equal.
- D. Metal Corner Beads: For 90 degree External Corners - "Dur-A-Bead" No. 103, 27 gauge galvanized steel, 1-1/4" x 1-1/4", for 90 degree external corners, or approved equal.
- E. Metal Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim" Or approved equal.
- F. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; Setting Type (Durabond 90) or Lightweight Setting Type Joint Compound for taping and topping; and Ready Mix Compound for finishing.
 - 1. For areas to receive mold-resistant drywall, use tape with compounds as recommended by manufacturer.
- G. Control Joints: No. 0.093, USG.
- H. Acoustical Sealant: USG "Acoustical Sealant" or "Tremco Acoustical Caulking" of Tremco Mfg. Co., or approved equal.
- I. Neoprene Gaskets: Conform to ASTM D 1056.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where gypsum drywall is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. General

- 1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.
- 2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.
- 3. Provide concealed reinforcement, 16 gauge thick by 8" wide or as detailed or as recommended by manufacturer, for attachment of railings, toilet partitions, and other items to be supported on the partitions which cannot be attached to the metal framing members. Concealed reinforcement shall span between metal studs and be attached thereto using 2 self-tapping pan head screws at each stud.

- a. Back of drywall shall be scored or notched to prevent bulging out where reinforcement plate occurs.
- B. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of authorities having jurisdiction, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.
- C. Acoustic Assemblies: Install acoustic rated assemblies to achieve a minimum STC as noted on drawings, in accordance with test results obtained and published by the drywall manufacturer, for the drywall assembly type indicated on the drawings.
- D. Sealant
1. Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.
 2. Install acoustical sealant in 1/8" wide vertical control joints within the length of the wall or partitions, and in all other joints, specified below under "Control Joints." Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetration in the wallboard; place sealant bead between penetrations and edge of wallboard.
 3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.
- E. Wall Board Application
1. Do not install wallboard panels until steel door frames are in place; coordinate work with CSI Section 08100 - Steel Doors and Frames.
 2. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
 3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
 4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
 5. Provide safing insulation meeting standards of CSI Section 07840 at firestops, smoke seals, and flutes of metal deck where partitions carry up to bottom of metal deck.
 6. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items that penetrate wallboard; fill gaps with acoustic sealant.

7. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
 8. Screw fasten wallboard with power-driven electric screw driver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
 9. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.
- F. Cement Backer Board
1. General: Furnish concrete backer board in maximum available lengths. Install horizontally, with end joints over framing members.
 2. Fastening: Secure concrete backer board to each framing member with screws spaced not more than 12" on center and not closer than 1/2" from the edge. Install screws with a conventional screw gun so that the screw heads are flush with the surface of the board.
 3. Joint Treatment: Fill space between edge of backer and receptor with dry-set Portland cement or latex-Portland cement mortar. Fill all horizontal and vertical joints and corners with dry-set Portland cement or latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
- G. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with 3 coats of joint compound, feathered and finish sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.
1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.
 2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.
 3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.
- H. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:
1. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.
 2. Construction changes within the plane of the partition or ceiling.
 3. Ceiling dimensions exceed 30 feet in either direction.
 4. Wings of "L," "U," and "T" shaped ceiling areas are joined.

5. Expansion or control joints occur in the structural elements of the building.
6. Partition or furring abuts a structural element or dissimilar wall or ceiling.
7. Partition or furring runs exceed 30 feet without interruption.
8. Shown on approved shop drawings.
9. Where control joints are required, ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners.

I. Joint Treatment and Spackling

1. Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in 3 coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials that require a smooth surface, such as vinyl wall coverings.

3.3 FURRED WALLS AND PARTITIONS

- A. Use specified metal furring channels. Run metal furring channel framing members vertically, space 16" o.c. maximum. Fasten furring channels to concrete or masonry surfaces with power-driven fasteners or concrete stub nails spaced 16" o.c. maximum through alternate wing flanges (staggered) of furring channel. Furring channels shall be shimmed as necessary to provide a plumb and level backing for wallboard. At inside of exterior walls, an asphalt felt protection strip shall be installed between each furring channel and the wall. Furring channel and splices shall be provided by nesting channels at least 8" and securely anchoring to concrete or masonry with 2 fasteners in each wing.
- B. Wallboard Installation: Same as specified under Article 3.4 - "Metal Stud Partitions."

3.4 METAL STUD PARTITIONS

- A. Runner Installation: Use channel type. Align accurately at floor according to partition layout. Anchor runners securely 16" o.c. maximum with power-driven anchors to floor slab, with power-driven anchors to structural slab above. See "Stud Installation" below for runners over heads of metal doorframes. Where required, carefully remove sprayed-on fireproofing to allow partition to be properly installed.
- B. Stud Installation
1. Use channel type, positioned vertically in runners, spaced as noted on drawings, but not more than 16" o.c.
 2. Anchor studs to floor runners with screw fasteners. Provide snap-in or slotted hole slip joint bolt connections of studs to ceiling runners leaving space for movement.

- Anchor studs at partition intersections, partition corners and where partition abuts other construction to floor and ceiling runners with sheet metal screws through each stud flange and runner flange.
3. Connection at ceiling runner for non-rated partitions shall be snap-in or slotted hole slip joint bolt connection that shall allow for movement. Seal studs abutting other construction with 1/8" thick neoprene gasket continuously between stud and abutting construction.
 4. Connections for fire rated partitions at ceiling runners shall conform to UL Design #2079.
 5. Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.
 6. At jambs of door frames and borrowed light frames, install doubled-up studs (not back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws. Provide cross braces from hollow metal frames to underside of slab.
 7. Over heads of door frames, install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and securely anchor runner to adjacent vertical studs with sheet metal screws. Install cut-to-length vertical studs from runner (over heads of door frame) to ceiling runner 16" maximum o.c. and at vertical joints of wallboard, and securely anchor studs to runners with sheet metal screws.
 8. At control joints, in field of partition, install double-up studs (back to back) from floor to ceiling runner, with 1/4" thick continuous compressible gasket between studs. When necessary, splice studs with 8" minimum nested laps and attach flanges together with 2 sheet metal screws in each flange. All screws shall be self-tapping sheet metal screws.
- C. Runners and Studs at Chase Wall: As specified above for "Runners" and "Studs" and as specified herein. Chase walls shall have either a single or double row of floor and ceiling runners with metal studs 16" o.c. maximum and positioned vertically in the runners so that the studs are opposite each other in pairs with the flanges pointing in the same direction. Anchor all studs to runner flanges with sheet metal screws through each stud flange and runner flange following requirements of paragraph 3.4, B. Provide cross bracing between the rows of studs by attaching runner channels or studs set full width of chase attached to vertical studs with one self-tapping screw at each end. Space cross bracing not over 36" o.c. vertically.
- D. Wallboard Installation - Single Layer Application (Screw Attached)
1. Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.

2. Boards shall be fastened securely to metal studs with screws as specified. Where a free end occurs between studs, back blocking shall be required. Center abutting ends over studs. Correct work as necessary so that faces of boards are flush, smooth, true.
 3. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced 12" o.c. in the field of the board and 8" o.c. staggered along the abutting edges.
 4. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.
 5. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.
- E. Wallboard Installation - Double-Layer Application
1. General: See drawings for wallboard partition types required.
 2. First Layer (Screw Attached): Install as described above for single layer application.
 3. Second Layer (Screw Attached): Screw attach second layer, unless laminating method of attachment indicated on drawings or necessary to obtain required sound rating or fire rating. Install wallboard vertically with vertical joints offset 34" from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws 16" o.c. along vertical joints and 16" o.c. in the field of the wallboard. Screw through first layer into metal framing members.
 4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced 12" o.c. around perimeter of wallboard.
- F. Wallboard Installation - Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.
- G. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.
- H. Deflection of Structure Above: To allow for possible deflection of structure above partitions, provide top runners for non-rated partitions with 1-1/4" minimum flanges and do not screw studs or drywall to top runner. Where positive anchorage of studs to top runner is required, anchorage device shall be by means of slotted hole (in clip connection with screw attachment to web of steel through bushings located in slots of clips), or other anchorage device approved by Commissioner.

I. Control Joints

1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
2. Back by double framing members.
3. Attach control joint to face layer with 9/16" galvanized staples 6" o.c. at both flanges along entire length of joint.
4. Provide 2" wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

3.5 DRYWALL FASCIAS AND CEILINGS

- A. Furnish and install inserts, hanger clips and similar devices in coordination with other work.
- B. Secure hangers to inserts and clips. Clamp or bolt hangers to main runners.
- C. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
- D. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
- E. Metal Furring Channels: Space 16" o.c. maximum. Attach to 1-1/2" main runner channels with furring channel clips (on alternate sides of main runner channels). Furring channels shall not be let into or come in contact with abutting masonry walls. End splices shall be provided by nesting furring channels no less than 8" and securely wire tying. At any openings that interrupt the furring channels, install additional cross reinforcing to restore lateral stability.
- F. Mechanical accessories, hangers, splices, runner channels and other members used in suspension system shall be of metal, zinc coated, or coated with rust inhibitive paint, of suitable design and of adequate strength to support units securely without sagging, and such as to bring unit faces to finished indicated lines and levels.
 1. Provide special furring where ducts are over 24" wide.
- G. Apply board with its long dimension at right angles to channels. Locate board butt joints over center of furring channels. Attach board with 1" self-drilling drywall screws 12" o.c. in field of board; 8" o.c. at butt joints located not less than 3/8" from edges.

3.6 ERECTION AT COLUMN ENCLOSURES

- A. Metal furring supports shall be provided under work of this Section, and shall be cut to lengths as necessary for tight fit such that spacing is not more than 16" o.c.
- B. Board shall be fastened securely to supports with screws as specified. Place boards in position with minimum amount of joints. Where free ends occur between supports, back-blocking or furring shall be required. Center abutting ends over supports. Correct work as necessary so that faces of boards are flush, smooth and true. Provide clips or cross furring for attachment as required.

- C. All layers shall be screw attached to furring.
- D. When column finish called for on drawings to be in the same plane as drywall finish layer, maintain even, level plane.

3.7 FINISHING

- A. Taping: A thin, uniform layer of taping compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately, but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.
- B. Filling: After taping compound has hardened, topping compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least 4" on either side of the tape. No fill coat is necessary on interior angles.
- C. After topping compound is set, a finishing coat of topping compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound, and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.
- D. Fastener Depressions: Taping compound shall be applied to all fastener depressions followed, when hardened by at least 2 coats of topping compound, leaving all depressions level with the plane of the surface.
- E. Finishing Beads and Trim: Taping compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by 2 coats of topping compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.
- F. Level of finish for surface exposed to view shall conform to Level 4 of ASTM C 840 and GA-214 of the Gypsum Association.
- G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the Owner.

3.8 CLEANING AND ADJUSTMENT

- A. At the completion of installation of the work, all rubbish shall be removed from the building leaving floors broom clean. Excess material, scaffolding, tools and other equipment shall be removed from the building.
- B. Work shall be left in clean condition ready for painting or wall covering. All work shall be as approved by Commissioner.

- C. Cutting and Repairing: Include all cutting, fitting and repairing of the work included herein in connection with all mechanical trades and all other trades which come in conjunction with any part of the work, and leave all work complete and perfect after all trades have completed their work.

3.9 PROTECTION OF WORK

- A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

END OF SECTION

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SECTION 09310 - CERAMIC TILE

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the ceramic tile as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Ceramic floor and wall tiles.
 2. Marble saddles.
 3. Setting beds, grout and sealant.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast In Place Concrete - Section 03300.
- C. Gypsum Drywall - Section 09250.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: For cutting, installing and grouting of tile, use only thoroughly trained and experienced journeyman tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards.
- B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the following:
1. Manufacture all tile in accordance with Standard Grade Requirements of ANSI A-137.1.

2. Install tile in accordance with the recommendations contained in Handbook for Ceramic Tile Installation of the Tile Council of America, Inc., latest edition.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Samples

1. Before any tile is delivered to the job site, submit to the Architect sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of tile and grout specified.
2. Submit 6" length of marble saddles.

- C. Master Grade Certificates: Prior to opening tile containers, submit to the Architect a Master Grade Certificate, signed by an officer of the firm manufacturing the tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.
- D. Mock-ups
1. At an area on the site where approved by the Architect, provide a mock-up tile installation.
 - a. Make the mock-up approximately 3'0" x 3'0" in dimension.
 - b. Provide one mock-up for each type, class, and color of installation required under this Section.
 - c. The mock-ups may be used as part of the Work, and may be included in the finished Work, when so approved by the Architect.
 - d. Revise as necessary to secure the Architect's approval.
 2. The mock-ups, when approved by the Architect, will be used as datum for comparison with the remainder of the work of this Section for the purposes of acceptance or rejection.
 3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

1.6 LEED BUILDING PERFORMANCE CRITERIA

- A. The following criteria are REQUIRED for the products included in this section:
1. Ceramic tile shall contain a minimum of 25% (combined) post industrial/post consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
 2. Tiles manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.
 3. Adhesives or sealants used for work in this section shall meet the requirements of Green Building specifications, where applicable. Certification of these products shall be in accordance with the Submittal Requirements.

1.7 PRODUCT HANDLING

- A. Delivery and Storage
1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.
 2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.
- B. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at not less than 50 deg. F. in tiled areas during installation and for 7 days after completion.

1.9 EXTRA STOCK

- A. Upon completion of this portion of the Work, deliver to the Owner an extra stock of ceramic tile equaling approximately 5% of each material/color used, with all such extra stock neatly packaged in clearly labeled containers of boxes.

PART 2 PRODUCTS

2.1 TILE

- A. Refer to Finish Schedule for specific product requirements of size and color and basis of design manufacturer.
- B. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

2.2 MARBLE SADDLES

- A. Provide sound Group "A" white marble, min. 3/4" thick, with an abrasive hardness of not less than 10.0, when tested in accordance with ASTM C 241. Cut saddle to fit jamb profile, honed finish.

2.3 SETTING BEDS AND GROUT

- A. Latex Additives: As manufactured by Laticrete, Mapei or approved equal, as follows:
 - 1. Laticrete 272 premium floor and wall thin set mortar, fortified with Laticrete 333 Mortar Admix.
 - 2. Mapei Kerabond thin set mortar, fortified with Ker 310 Keralastic System additive.
- B. Wall and Base Tile: Over cement board use a Latex Portland cement mortar bond coat conforming to ANSI A118.4 and TCA Detail W-244; coat back of board with waterproof membrane as specified below.
- C. Floor Tile and Marble Saddle - Thin Set: Set floor tile and marble saddle using latex modified dry set Portland Cement mortar with waterproof membrane conforming to ANSI A118.4 and TCA Detail F-122.

- D. Water: Clean, fresh and suitable for drinking.
- E. Grout: Commercial Portland cement grout made by Laticrete, Mapei, or approved equal; color as selected by the Architect. Add latex additive to grout made by same manufacturer as grout.
- F. Physical Properties: The setting beds and grouts must meet the following physical requirements:
 - 1. Compressive Strength - 3000 psi min.
 - 2. Shear Bond Strength - 500 psi min.
 - 3. Water Absorption - 4.0% max.
 - 4. Service Rating (ASTM C 627) - Extra Heavy Duty.

2.4 SEALANT

- A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.
- B. Bond Breaker: Polyethylene tape, 3 mils thick, or other material recommended by sealant manufacturer.
- C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.
- D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Architect. Sealant shall be equivalent to 1700 Sanitary Sealant made by General Electric, or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels (Floors): + 1/8" in 10'-0" distance and 1/4" total max. variation from levels shown.
- B. Grind or fill concrete substrates as required to comply with allowable variations.

3.3 PREPARATION

- A. Coordinate the following with CSI Section 03300:

1. Steel trowel and fine broom finish concrete slabs that are to receive tile. Cure concrete slabs that are to receive tile before tile application. Do not use liquid curing compounds or other coatings that may prevent bonding of tile setting materials to slabs. Slab shall be dry at time of tile installation.

- B. Seal substrate with sealer as recommended by manufacturer of mortar or adhesive.

3.4 JOINTS IN TILE WORK

- A. Joint Widths: 1/16".

- B. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by Architect.

- C. Movement Joints: Conform to TCA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.

1. Provide sealant between tile and plumbing fixtures, mirrors, pipes, countertops and other dissimilar materials penetrating or adjacent to tile.

3.5 INSTALLATION

- A. Comply with the following installation standards:

1. Wall tile over cement board using dry set mortar - ANSI A108.5 and A108.10.
2. Floor tile using dry set mortar - ANSI A108.5 and A108.10.

- B. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.

1. Floors: 1/8" in 10'-0" run, any direction; +/- 1/8" at any location; 1/32" offset at any location.
2. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".
3. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.

- C. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.

- D. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.

- E. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.

- F. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

3.6 INSTALLATION OF MARBLE SADDLES

- A. Install saddles cut to profiles and sizes shown, accurately fitted to jambs, coped at stops, set in full bed of mortar herein specified, and with grouted edge joints as specified for floor tile.

3.7 CLEANING AND PROTECTION

- A. Upon completion of placement and grouting, clean all tile surfaces so they are free of foreign matter. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Apply to all clean completed tile walls and floors a protective coating of neutral cleaner solution, 1 part cleaner to 1 part water.
- C. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.
- D. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear. Prohibit foot and wheel traffic from using tiled floors for at least 3 days after grouting is completed. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

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SECTION 09510 - ACOUSTIC PANEL CEILINGS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the acoustic panel ceilings as shown on the drawings and/or specified herein, including but not limited to, the following:
1. Acoustical panel units in exposed "T" suspension system, including hangers and inserts.
 2. Provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.
 3. Cutting, drilling, scribing and fitting as required for electro-mechanical penetrations.
 4. Perimeter and column moldings, trim and accessories for acoustical ceilings.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Carpentry - Section 06200.
- C. Gypsum Drywall ceilings - Section 09250.
- D. Diffusers, grilles and related frames - Division 15.
- E. Lighting fixtures - Division 16.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Contractor's Association.
- B. Qualifications of Installers
 - 1. For the actual fabrication and installation of all components of the system, use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.
- C. The work is subject to the following standards:
 - 1. ASTM C 635 "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings," American Society for Testing and Materials.
 - 2. ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels," American Society for Testing and Materials.
- D. In addition to suspension system specified, provide seismic struts and seismic clips to meet seismic standards as required by prevailing Codes and Ordinances.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.

- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Shop Drawings: Submit completely dimensioned ceiling layouts for all areas where acoustical ceilings are required, showing:
1. Any deviations from reflected ceiling plan layouts, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into ceiling layout due to dimensional restrictions of field conditions.
 2. Direction and spacing of suspension members and location of hangers for carrying suspension members.
 3. Direction, sizes and types of acoustical units, showing suspension grid members, and starting point for each individual ceiling area.
 4. Moldings at perimeter of ceiling, at columns and elsewhere as required due to penetrations or exposure at edge of ceiling tiles.
 5. Location and direction of lights, air diffusers, air slots, and similar items in the ceiling plane.
 6. Details of construction and installation at all conditions.
 7. Materials, gauges, thickness and finishes.
- C. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.
1. 12" long sample of each components of suspension systems, including moldings.
 2. Acoustical units - full size.
- 1.6 LEED BUILDING PERFORMANCE CRITERIA
- A. The following criteria are required for the products included in this section:
1. Steel suspension members shall contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).

2. Adhesives or sealants used for work in this section shall meet the requirements of Green Building specifications in Division 1, where applicable. Certification of these products shall be in accordance with the Submittal Requirements.
3. Acoustic panels shall contain a minimum of 30% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.8 PROJECT CONDITIONS

- A. Do not install acoustical ceilings until wet-work in space is completed and nominally dry, work above ceilings has been completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.9 COORDINATION

- A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire suppression system components, and partition system.

1.10 EXTRA STOCK

- A. Extra Stock: Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.
 1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% of amount installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

- A. IACT-: Provide 5/8" thick, 24" x 24" mineral fiber panels with factory-applied scrubable finish equal to "Ceramaguard Fine Fissured," with square edge, as manufactured by Armstrong World Industries, or equal made by Celotex or USG Interiors, Inc. Panels shall have light reflectance value of 0.82. Panels shall meet ASTM E 1264, Type XX, Pattern C E, Class A, with a UL flame spread rating of 0-25.

2.2 SUSPENSION SYSTEM

- A. Suspension system must comply with the NYC Building Code Reference Standard RS 5-16.
- B. Provide exposed "T" suspension system, steel, with low sheen white baked enamel finish equal to "Silhouette", 9/16" exposed tee 2-way grid system made by Armstrong World Industries, or USG Interiors, Inc., Chicago Metallic Corp, or approved equal.
- C. The suspension system shall support the ceiling assembly shown on the drawings and specified herein, with a maximum deflection of 1/360 of the span, in accordance with ASTM C 635.
- D. Provide min. 12 gauge galvanized wire hangers, soft annealed steel conforming to ASTM A 641, prestretched, Class 1 zinc coating, soft temper, size so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire.
- E. Hanger for suspension system shall be 1" x 3/16", galvanized steel flats or 1/4" diameter galvanized pencil rods spaced 4'-0" o.c., conforming to New York City Code requirements.
- F. Main carrying channels, to which suspension systems shall be fastened, shall be 1-1/2" cold rolled galvanized steel channel; spaced 4'-0" o.c., conforming to New York City Code requirements.
- G. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than 5 times the hanger design load, as indicated in ASTM C 635.
- H. Suspension systems shall conform to ASTM C 635, intermediate duty.
- I. Provide manufacturer's standard wall moldings with off-white baked enamel finish to match suspension systems. For circular penetrations of ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas where acoustic panel ceilings are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the layout.

3.2 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
- 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.

3.3 INSTALLATION

- A. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.
- B. Install suspension systems to comply with ASTM C 636, with wire hangers supported only from building structural members. Locate hangers not more than 6" from each end and spaced 4'-0" along direct-hung runner, leveling to tolerance of 1/8" in 12'-0".
- C. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
- D. Space rod or flat iron (New York City) hangers not more than 4'-0" o.c. along main carrying channels; attach by clips or wire ties to building structure. Locate hangers not more than 6" from each end. Space main carrying channels 4'-0" o.c. Attach suspension system to carrying channels using clips or ties, leveling to a tolerance of 1/8" in 12'-0".
- E. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.
- F. Install edge moldings at edges of each acoustical ceiling area, and at locations where edge of acoustical units would otherwise be exposed after completion of the work.
 - 1. Secure moldings to building construction by fastening through vertical leg. Space holes not more than 3" from each end and not more than 16" o.c. between end holes. Fasten tight against vertical surfaces. Use continuous sealant between edge molding vertical leg and building wall/partition.
 - 2. Level moldings with ceiling suspension system, to a level tolerance of 1/8" in 12'-0".
- G. Install acoustical units in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- H. Install hold-down clips in toilet areas, and in areas where required by governing regulations; space 2'-0" o.c. on all cross tees.
- I. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplemental hangers furnished and installed by this Section of work.
- J. Where fixture or ceiling apparatus installation causes eccentric loading on runners, provide stabilizer bars to prevent rotation.

3.4 ADJUST AND CLEAN

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge molding, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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SECTION 09660 - RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the resilient tile flooring, as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Rubber tile.
 - 2. Rubber base.
 - 3. Transition strips.
 - 4. Accessories.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Cast In Place Concrete - Section 03300.
- C. Gypsum Drywall - Section 09250.
- D. Carpet - Section 09681.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:

- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
- c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
- d. 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.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. **Manufacturer's Data:** For information only, submit manufacturer's technical information and installation instructions for type of resilient tile.
- C. **Manufacturer's Letter of Certification:** Provide letter of certification indicating that installation of product will not be adversely affected by radiant floor heat. Manufacturer to select appropriate adhesive and submit for review.
- D. **Samples**

1. Submit full-size sample tiles for each type and color required, representative of the expected range of color and pattern variation. Sample submittals will be reviewed for color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
2. Submit 6" long samples of base and strips.

1.6 GREEN BUILDING PERFORMANCE REQUIREMENTS

- A. Resilient tile flooring and associated products shall contain post-industrial and/or post-consumer recycled content of 25 - 75%. Certification of recycled content shall be in accordance with the GREEN BUILDING Submittal Requirements of Division 1.

1.7 DELIVERY AND STORAGE

- A. Deliver materials to the project site in the manufacturer's original unopened containers, clearly marked to indicate pattern, gauge, lot number and sequence of materials.
- B. Carefully handle all materials and store in original containers at not less than 70 degrees F. for at least 48 hours before start of installation.

1.8 JOB CONDITIONS

- A. Continuously heat spaces to receive tile to a temperature of 70 degrees F. for at least 48 hours prior to installation, whenever project conditions are such that heating is required. Maintain 70 degrees F. temperature continuously during and after installation as recommended by the tile manufacturer, but for not less than 48 hours. Maintain a temperature of not less than 55 degrees F. in areas where work is completed.

1.9 EXTRA STOCK

- A. Upon completion of this portion of the Work, deliver to the Owner an extra stock of resilient tile flooring equaling approximately 5% of each material/color used, with all such extra stock neatly packaged in clearly labeled containers of boxes.

PART 2 PRODUCTS

2.1 TILE

- A. Provide 24" x 24" x 3mm thick profiled rubber tile conforming to ASTM F 1344, Class 1; product as manufactured by Nora Rubber Flooring, Pirelli, Roppe, or approved equal. Provide tile units with uniformly distributed color throughout the thickness of tile. Variations in shades and off-pattern matches between containers are not acceptable. See drawings for color and pattern.
 1. Tile Profile: Smooth or as shown on drawings.
 2. Basis of design: Noraplan environcare, manufactured by Nora Rubber Flooring, as shown on drawings, or approved equal.
 3. Color: See drawings.

2.2 BASE

- A. Provide 4" high x 0.125" thick, continuous rubber, top set cove base with pre-formed internal and external corner pieces. For areas to receive carpet, provide flat base, no cove. Base shall conform to ASTM F 1861, Type TS, Group 1 as manufactured by Nora Rubber Flooring, Burke Mercer, Flexco, Armstrong, or approved equal. See drawings for color.

2.3 ACCESSORIES

- A. Adhesives: Waterproof, stabilized type, as recommended by the tile manufacturer for the type of service indicated.
- B. Concrete Slab Primer: Non-staining type recommended by the tile manufacturer.
- C. Leveling Compound: Latex/Portland cement flash patching and leveling compound equal to No. 226 with 3701 admixture made by Laticrete or equal made by Mapei, H.B. Fuller or approved equal.
- D. Edging Strips: 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color as selected by the Commissioner from manufacturer's standards.
- E. Finish
 - 1. Cleaner shall be equal to "Super Shine All" made by Hillyard Chemical Co., or approved equal.
 - 2. Wax shall be equal to "Super Hil-Brite" made by Hillyard Chemical Co., or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where resilient tile flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels (Floors): $\pm 1/8"$ in 10'-0" distance and 1/4" total maximum variation from levels shown.
- B. Grind or fill concrete substrates as required to comply with allowable variation.

3.3 PREPARATION

- A. Etch concrete substrate as may be required to remove curing compounds or other substances that would interfere with proper bond of adhesive for tile. Rinse with water to remove all traces of treatment.

- B. Perform moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and are ready to receive tile installation.
- C. Concrete Primer: Apply concrete slab primer if recommended by tile manufacturer, prior to application of the adhesive. Apply in compliance with manufacturer's directions.

3.4 ALLOWABLE TOLERANCES

- A. Allowable Tolerances in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.

1. Floors: 1/8" in 10'-0" run, any direction; 1/32" offset at any location.

3.5 INSTALLATION

- A. Install tile only after all finishing operations, including painting, have been completed and permanent heating system is operating. Moisture content of concrete slabs, building air temperature and relative humidity must be within limits recommended by tile manufacturer.
- B. Place tile units with adhesive cement in strict compliance with the manufacturer's recommendations. Butt tile units tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce neat joints, laid tight, even and in straight, parallel lines. Extend tile units into toe spaces, door reveals, and into closet and similar openings.
- C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on the finish tile as marked in the subfloor. Use chalk or other non-permanent marking devices.
- D. Lay tile from center marks established with principal walls, discounting minor off-sets, so that tile at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
- E. Match tiles for color and pattern by using tile from cartons in the same sequence as manufactured and packaged. Cut tile neatly to and around all fixtures. Broken, cracked, chipped or deformed tile is not acceptable.
- F. Tightly cement tile to sub-base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks through tile, or other surface imperfections.
- G. Lay tile with grain in all tile running in the same direction.
- H. Place resilient edge strips tightly butted to tile and secure with adhesive. Provide edging strips at all unprotected edges of tile, unless otherwise shown.
- I. Bases: In all spaces where base is indicated, install bases tight to walls, partitions, columns, built-in cabinets, etc., without gaps at top or bulges at bottom, with tight joints and flush edges, with molded corner pieces at internal and external corners. Provide end stops adjacent to flush type door frames and where base does not terminate against an adjacent surface. Keep base in full contact with walls until adhesive sets.

3.6 CLEANING AND PROTECTION

- A. Remove any excess adhesive or other surface blemishes from tile, using neutral type cleaners as recommended by the tile manufacturer. Protect installed flooring from damage by use of heavy Kraft paper or other covering.
- B. Finishing: After completion of the project and just prior to the final inspection of the work, thoroughly clean tile floors and accessories. Apply 2 coats of wax and buff using materials as specified herein.

END OF SECTION

SECTION 09681 - CARPET

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the carpeting as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Carpet, glue down installation.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Concrete slab - CSI Section 03300.
- C. Resilient base - CSI Section 09660.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with not less than 3 years of experience in installation of commercial carpeting of type, quantity and installation methods similar to work of this Section.
- B. Manufacturer Qualifications: Firm (carpet mill) with not less than 3 years of production experience with carpet similar to types specified in this Section; and whose published product literature clearly indicates general compliance of products with requirements of this Section.
- C. General Terminology/ Information Standard: Refer to current edition of "Carpet Specifier's Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.
- D. Carpet used on Project must be from same dye lot for each carpet type.

1.5 SUBMITTALS**A. GREEN BUILDING SUBMITTAL REQUIREMENTS**

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data:** Submit manufacturer's complete technical product data for each type of carpet and accessory item required.
- C. Shop Drawings:** Submit carpet layout and seaming drawings, clearly indicating carpet directions, locations and methods of jointing seams and locations and types of edge strips. Indicate columns, doorways, enclosing wall/partitions, built-in cabinets and locations where cut-outs are required in carpet.
- D. Samples:** Submit 18" x 27" samples of each carpet required and 6" long samples of each type exposed edge stripping.

- E. Certification: Submit manufacturer's certification stating that carpet materials furnished comply with specified requirements.
 - 1. Include listing of mill register numbers for carpet furnished.
 - 2. Include supporting certified laboratory test data indicating that carpet meets or exceeds specified test requirements.
- F. Maintenance Data: Submit manufacturer's printed maintenance recommendations, including methods and frequency recommended for maintaining carpet in optimum conditions under anticipated traffic and use conditions.

1.6 LEED PERFORMANCE REQUIREMENTS

- A. All adhesives shall meet or exceed the VOC limits of the South Coast Air Quality Management District, Rule #1168.
- B. Sealants shall meet or exceed South Coast Air Quality Management District 1168 requirements for VOC limits.
- C. Emissions Testing: "Green Label Plus" program for emissions testing and emission standards for carpet, carpet adhesives, and carpet cushion; Carpet and Rug Institute, Dalton, GA.
- D. Installation: "Standard for Installation of Commercial Carpet," CRI 104, Carpet and Rug Institute, Dalton, GA.
- E. Carpet system shall comply with the Carpet and Rug Institute's Indoor Air Quality Green Label emissions testing program (ASTM D 5116) for carpet.

1.7 EXTRA STOCK

- A. Overrun: Produce and deliver to project at least 5 percent overrun on calculated yardage. Provide required overrun exclusive of carpet needed for proper installation, waste and usable scraps.

1.8 PRODUCT DELIVERY AND STORAGE

- A. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached. Store inside, in well ventilated area, protected from weather, moisture and soiling.

1.9 WARRANTY

- A. The manufacturer shall provide a warranty that the face yarn of the carpet will not wear more than 10 percent in five years. If the carpet wears more than 10 percent in 5 years, the manufacturer will replace the carpet including parts, labor and materials, to the Owner's satisfaction.

PART 2 PRODUCTS

2.1 CARPETING

- A. Refer to Finish Schedule on drawings for specific product requirements.

2.2 ACCESSORIES

- A. Provide vinyl edges, reducers and threshold plates where required. They shall be sized to be compatible with the thickness of the carpet, in a color as selected by the Commissioner, of a commercial quality as manufactured by Armstrong, Burke Mercer Industries or approved equal. The type shall be as required by site conditions, as is the custom of the trade, and installation shall be made as recommended by the manufacturer.
- B. Adhesive: Provide adhesive as recommended by the carpet manufacturer. Provide adhesive that complies with flame spread rating required for the carpet installation, if any.
- C. Leveling Compound: Latex/Portland cement flashing patching and leveling compound equal to No. 226 with 3701 admixture made by Laticrete or equal made by Mapei, H.B. Fuller or approved equal.
- D. Miscellaneous Materials: Provide the types of seaming, adhesives and tape, thread, and other accessory items recommended by the carpet manufacturer and installer for the conditions of installation and use.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where carpet is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 PRE-INSTALLATION REQUIREMENTS

- A. Floor shall be clean and free of cracks and protrusions. Any gaps or cracks more than 1/16" wide to be filled in with latex leveling compound. Protrusions must be sanded down smooth, the floor cleanly swept and vacuumed if necessary to remove all dust and grit.
- B. Floor temperature shall be 65 deg., at least 24 hours prior to installation; and 48 hours after carpet is installed.
- C. Conduct a moisture test. The presence of moisture in the concrete floor will interfere with the curing and subsequent performance of the adhesive. Conduct the test as follows:
 - 1. Drive a concrete nail a half inch into the floor. Then remove the nail.
 - 2. Place a small amount of anhydrous calcium chloride or calcium sulphate crystals over the hole.
 - 3. Cover the crystals and the hole with a piece of flat glass and seal the edges with waterproof tape or putty. Since concrete pourings vary, repeat the test every 1500 sq. ft.

4. Leave in place 72 hours any color change in the crystals indicates the presence of moisture. Do not apply carpet until slab is free of moisture and meets with approval of carpet adhesive manufacturer.
- D. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

3.3 INSTALLATION

A. General

1. Comply with manufacturer's instructions and recommendations. Place seams in the directions as accepted on shop drawings. Maintain direction of pattern and texture, including lay of carpeting.
2. Extend carpet under open-bottomed and raised-bottom obstructions, and under removable flanges of obstructions. Extend carpet into closets and alcoves of rooms indicated to be carpeted, unless another floor finish is indicated for such spaces. Extend carpet under all movable furniture and equipment, unless otherwise indicated.
3. Provide cut-outs for removable access devices in the substrate. Bind edges as neatly as possible and secure both sides of cuts to the substrate. Use double-faced tape on carpet cut-outs which must be lifted from the substrate to gain access to the devices. Cut only 3 sides wherever it is feasible to provide a carpet flat in lieu of a fully-removable cut-out.
4. Install vinyl carpet edge guard at every location where edge of carpet is exposed to traffic, except where another device is indicated.

B. Direct Glue-Down Carpet Installation

1. Select best location for a starting seam; strike a chalk line on the floor at this point. (Use white chalk; colored chalk should not be allowed on the job.)
2. Check the carpet for direction of pile lay.
3. Cut two lengths of carpet allowing about one inch to run up the walls for trimming.
4. Place the untrimmed edge of one length along the chalk line and stay-nail along its center line, parallel to the seam. During this procedure, work out any wrinkles allowing the carpet to lie smoothly on the floor. Stay-nail at approximately 12" - 18" intervals following the centerline of the cut along its entire length. Make sure carpet does not shift from the chalk line.
5. After checking for pile direction, unroll second length and overlap the edge of the first length by about 1" to 2". Stay-nail second length as in Para. 4 above.
6. Depending on construction, the carpet edge may be trimmed by one of the following techniques:
 - a. Utilizing a top cutter cut between the loops if rows are straight and the cut is not too long.

- b. Scribe cut using a top cutter or cushion back cutter to follow a row on one edge, then overlap and use this cut edge as a guide to trim the second or bottom edge.
 - c. Double cut using a top cutter, make a free hand cut through both overlapped edges. When cutting long areas, utilize an electric cutter.
 - d. All cut edges must be sealed prior to seaming using a premium latex carpet seaming adhesive.
7. Fold back both lengths towards stay-nails. Do not pull out any stay-nails or tear carpet.
 8. The exposed floor between the folded cuts shall be swept and vacuumed if necessary.
 9. Using a notched trowel 1/8" x 1/8" spread adhesive evenly, using a semi-circular motion to avoid excessive deposits and missed areas. The number of men required to spread the adhesive will depend on the areas to be covered. If the area is large, use 2 men, one on either side of the center, and have them work in opposite directions. Check the trowels occasionally to see that they are free of foreign matter and also that the 1/8" notch is maintained. It is important to allow sufficient open time in order to let the adhesive become tacky before adhering the carpet.
 10. After the adhesive is spread as described in Para. 9 above, lay the folded back edge of the first cut over the cement. To do this, the installers shall position themselves at intervals along the entire length of the fold and grasp the folded edge. Lift it up and walk towards the seam. The installer in the middle of the roll walks ahead, thus forming a wedge. Use a 100 lb. roller to smooth the fabric towards the seam.
 11. Next, grasp the folded edge of the second roll and place it over the adhesive as in Para. 10 (above) with the exception that this flap should be walked in evenly rather than using the wedge method. Walk in all but one ft. of this and fold this amount back again.
 12. The installer shall now slide this edge until it tightly abuts the edge of the first roll. Hold the edge in place by kneeling on it and work the wrinkles out toward the unglued side.
 13. Continue the above procedure throughout the installation.
 14. While the cement is still tacky, the carpet must be pressed down along the wall and creased - the excess shall be trimmed.
 15. Cross-seaming can be accomplished by Scribe Cutting. Overlap the ends approximately 4". Cut the end with the yarn leaning toward the seam from the back with a straight edge. Use this end as a guide to cut the other end utilizing a top cutter or similar tool.
 16. Seal these ends the same as all other cut edges.
 17. Exposed edges shall always be protected by a vinyl edging. The vinyl edge shall be fastened to the floor with contract cement.

18. Stains caused by adhesive can be removed using a dry chlorinated or similar solvent. Apply solvent with a clean cloth using a blotting action. Do not saturate carpet with solvent. Dry with rag or tissue using a blotting and not a rubbing motion.

3.4 CLEANING UP

- A. Upon completion of the carpeting installation in each area, visually inspect all carpet installed in that area and immediately remove all dirt, soil, and foreign substance from the exposed face; inspect all adjacent surfaces and remove all marks and stains caused by the carpet installation: remove all packaging materials, carpet scraps, and other debris from the carpet installation to the area of the job site set aside for its storage.
- B. Usable carpet pieces shall be turned over to the Owner.

3.5 PROTECTION

- A. Provide temporary, protection against soiling or damage of carpet for the remainder of the construction period.

END OF SECTION

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SECTION 09900 - PAINTING AND FINISHING

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the drawings and/or specified herein, including, but not limited to, the following:
1. Prime painting unprimed surfaces to be painted under this Section.
 2. Painting all items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.
 3. Painting all ferrous metal (except stainless steel) exposed to view.
 4. Painting all galvanized ferrous metals exposed to view.
 5. Painting interior concrete exposed to view.
 6. Painting gypsum drywall exposed to view.
 7. Clear transparent finish of windowsills.
 8. Stain and seal of exposed wood trusses and underside of wood decking.
 9. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.
 10. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
 11. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Shop priming is required on some, but not all of the items scheduled to be field painted. Refer to other Sections of work for complete description.
- C. Shop coat on machinery and equipment: Refer to the Sections under which various items of manufactured equipment with factory applied shop prime coats are furnished, including, but not necessarily limited to, the following Sections. All items of equipment furnished with prime coat finish shall be finish painted under this Section.
 - 1. Mechanical - Division 15.
 - 2. Plumbing - Division 15.
 - 3. Electrical - Division 16.
- D. Color coding of mechanical piping and electrical conduits - Division 15.
 - 1. This Color Coding consists of an adhesive tape system and is in addition to painting of piping and conduits under this Section, as specified above.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

- A. Items of equipment furnished with complete factory finish, except for items specified to be given a finish coat under this Section.
- B. Non-ferrous metals, except for items specified and/or indicated to be painted.
- C. Exposed galvanized ductwork.
- D. Wood deck and wood trusses (stained, not painted).
- E. Finished hardware, excepting hardware that is factory primed.
- F. Millwork and countertops.
- G. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

1.5 QUALITY ASSURANCE

- A. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces.
- B. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Commissioner in writing of any anticipated problems using the coating systems as specified with substrates primed by others.

- C. All paints must conform to the Volatile Organic Compounds (VOC) standards of prevailing codes and ordinances.

1.6 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

B. Materials List

1. Before any paint materials are delivered to the job site, submit to the Commissioner a complete list of all materials proposed to be furnished and installed under this portion of the work.
2. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this work by the Commissioner.

C. Samples

1. Accompanying the materials list, submit to the Commissioner copies of the full range of colors available in each of the proposed products.
2. Upon direction of the Commissioner, prepare and deliver to the Commissioner two identical sets of Samples of each of the selected colors and glosses painted onto 8-1/2" x 11" x 1/4" thick material; whenever possible, the material for Samples shall be the same material as that on which the coating will be applied in the work.

- D. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable alternate in this Section of these specifications, submit for the Commissioner's review the current recommended method of application published by the manufacturer of the proposed material.

1.7 LEED PERFORMANCE CRITERIA

- A. The following criteria are required for the products included in this section:

1. Adhesives, sealants, paints, and coatings used for work in this section shall meet the requirements of CSI Section 01015, Volatile Organic Compound (VOC) Limits for Adhesives and Sealants, where applicable. Certification of these products shall be in accordance with the Submittal Requirements.
2. Paints and coatings manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements.

1.8 PRODUCT HANDLING

- A. Deliver all paint materials to the job site in their original unopened containers with all labels intact and legible at time of use.

B. Protection

1. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
2. Use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
3. Use all means necessary to protect paint materials before, during and after application and to protect the installed work and materials of all other trades.

- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

1.9 EXTRA STOCK

- A. Upon completion of this portion of the Work, deliver to the Owner an extra stock of paint equaling approximately 10 percent of each color and gloss used and each coating material used, with all such extra stock tightly sealed in clearly labeled containers.

1.10 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
- D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 PRODUCTS

2.1 PAINT MANUFACTURERS

- A. Except as otherwise indicated, provide "Eco Spec" by Benjamin Moore Paints, or "Harmony" by Sherwin Williams, or approved equal. Comply with number of coats and required minimum mil thicknesses as specified herein. Names used herein are those of Benjamin Moore or Sherwin Williams; equivalent paint of listed manufacturers or others are acceptable subject to the approval of the Commissioner.

2.2 MATERIALS

- A. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.
- B. Colors and Glosses: All colors and glosses shall be as selected by the Commissioner. Certain colors will require paint manufacturer to prepare special factory mixes to match colors selected by the Commissioner. Color schedule (with gloss) shall be furnished by the Commissioner, or as indicated on the Drawings.
- C. Coloring Pigment: Products of or furnished by the manufacturer of the paint or enamel approved for the work.
- D. Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D 234 and D 260, respectively.
- E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D 13.
- F. Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not less than 4 lbs. of gum per gallon of alcohol.
- G. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacture.
- H. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

2.3 GENERAL STANDARDS

- A. The various surfaces shall be painted or finished as specified below in Article 2.4. However, the Commissioner reserves the right to change the finishes within the range of flat, semi-gloss or gloss, without additional cost to the Owner.
- B. All paints, varnishes, enamels, lacquers, stains and similar materials must be delivered in the original containers with the seals unbroken and label intact and with the manufacturer's instructions printed thereon.
- C. All painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.
- D. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.
- E. Paint shall arrive on the job color-mixed except for tinting of under-coats and possible thinning.
- F. All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.
- G. It shall be the responsibility of the Contractor to see that all mixed colors match the color selection made by the Commissioner prior to application of the coating.

2.4 SCHEDULE OF FINISHES

- A. NOTE: Refer to Finish Schedule for colors.
- B. Exterior Galvanized Ferrous Metal
 - 1. Water Based Alkyd
 - a. First Coat: Super Spec HP Acrylic Gloss Enamel P28
 - b. Second Coat: HP Acrylic Gloss Enamel P28
 - c. Third Coat: HP Acrylic Gloss Enamel P28
 - or
 - d.. First Coat: S-W Envirospec DTM Acrylic Coating.
 - e.. Second Coat: S-W Envirospec Aquaclad Water Based Alkyd
 - f.. Third Coat: S-W Envirospec Aquaclad Water Based Alkyd
 - g. Or approved equal.
- C. Interior Ferrous Metal
 - 1. Semi-Gloss Finish/Enamel
 - a. Primer: 1 coat super spec acrylic metal primer P04
 - b. First Coat: 1 coat Eco Spec WB interior latex semi gloss 376
 - c. Second Coat: 1 coat Eco Spec WB interior latex semi gloss 376
 - d. Total DFT not less than: 3.0 mils
 - e. Or approved equal.
 - 2. Semi-Gloss Finish/Alkyd
 - a. Primer: 1 coat super spec acrylic metal primer P04
 - First Coat: 1 coat Eco Spec WB interior latex semi gloss 376

Second Coat 1 coat Eco Spec WB interior latex semi gloss 376
Or approved equal.
Total DFT not less than: 4.0 mils

D. Interior Drywall

Flat Finish/Vinyl Acrylic Latex
Primer: 1 coat eco spec wb interior latex primer 372
First Coat: 1 coat eco spec wb latex flat 373
Second Coat: 1 coat eco spec wb latex flat 373
Or approved equal.
Total DFT not less than: 3.6 mils

Eggshell Acrylic Latex Enamel
Primer: 1 coat eco spec wb interior latex primer 372
First Coat: 1 coat eco spec wb interior latex eggshell 374
Second Coat: 1 coat eco spec wb interior latex eggshell 374
Or approved equal.
Total DFT not less than: 2.2 mils

E. Interior Concrete

Semi-Gloss Acrylic Latex Enamel
Primer: Fresh start primer 023
First Coat: 1 coat eco spec wb interior latex semi gloss 376
Second Coat: 1 coat eco spec wb interior latex semi gloss 376
Or approved equal.
a. Total DFT not less than: 2.2 mils

F. Interior Painted Wood

Semi-Gloss Finish/Alkyd
Primer: 1 coat fresh start all purpose 100% acrylic primer 023
First Coat: 1 coat eco spec wb interior latex semi gloss 376
Second Coat: 1 coat eco spec wb interior latex semi gloss 376
Or approved equal.
a. Total DFT not less than: 3.6 mils
or

Eggshell Acrylic Latex Enamel
Primer: 1 coat Pristine Eco Spec Primer/Sealer First Coat (231)
First Coat: 1 coat Pristine Eco Spec Interior Latex Eggshell Enamel (223)
Second Coat: 1 coat Pristine Eco Spec Interior Latex Eggshell Enamel (223)
Or approved equal.
Total DFT not less than: 2.2 mils

G. Transparent Finish, Interior (on wood)

1. Transparent Finish for Window Sills, Casework and Trim
 - a. AWI Factory Finish System No. TR-1, standard lacquer.
 - b. AWI Premium Grade.

- c. First Coat: WoodClassics Interior Oil Stain A49-200 Series.
 - b. Second Coat: WoodCalssics Fastdry Sanding sealer.
 - c. Third Coat: WoodClassics Fastdry Oil Varnish
 - d. Degree of Sheen: low.
 - e. Unfilled Finish.
 - f. Or approved equal.
2. Semi-Transparent Finish for Wood Trusses and underside of Wood Deck (interior)
 - a. One Coat: Penetrating Stain and Sealer Olympic Wood Protector Stain + Sealant
 - b. Color: 718 Naturaltone.
 - c. Or Approved equal.
- 3.2

2.5 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

- A. Paint all exposed piping, conduits, ductwork and mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment. The Contractor is cautioned not to paint or otherwise disturb moving parts in the mechanical systems. Mask or otherwise protect all parts as required to prevent damage.
- B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment, where indicated on Drawings: Latex Enamel Undercoater and one coat Acrylic Latex Flat.
- C. Exposed Covered Piping, Duct Work and Equipment: Primer/Sealer and one coat Acrylic Latex Flat.
- D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Latex Enamel Undercoater and two coats Latex Semi-Gloss.
- E. Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to match original finish. Do not paint over name plates and labels.
- F. All surfaces of insulation and all other work to be painted shall be wiped or washed clean before any painting is started.
- G. All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is required.
- H. All items of Mechanical and Electrical trades which are furnished painted under their respective Contracts shall be carefully coordinated with the work of this Section so as to leave no doubt as to what items are scheduled to be painted under this Section.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 GENERAL WORKMANSHIP REQUIREMENTS

- A. Only skilled mechanics shall be employed. Application may be by brush or roller. Spray application only upon acceptance from the Commissioner in writing.
- B. The Contractor shall furnish the Commissioner a schedule showing when he expects to have completed the respective coats of paint for the various areas and surfaces. This schedule shall be kept current as the job progresses.
- C. Protect painting work at all times, and protect all adjacent work and materials by suitable covering or other method during progress of the work. Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and leave the work in clean, orderly and acceptable condition.
- D. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide ample in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.
- E. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.
- F. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.
- G. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the Owner.
- H. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.
- I. All suction spots or "hot spots" in plaster after the application of the first coat shall be touched up before applying the second coat.
- J. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

3.3 PREPARATION OF SURFACES

A. General

- 1. The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished shall be perfectly dry, clean and smooth.
- 2. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

B. Metal Surfaces

1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.
2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces, where solder flux has been used, with benzene. Clean surfaces by flushing with mineral spirits. For aluminum surfaces, wipe down with an oil free solvent prior to application of any pre-treatment.
3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal." Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.
4. Galvanized Metal: Prepare surface as per the requirements of ASTM D 6386.
5. Metal Filler: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with an approved metal filler suitable for the purpose and meeting the requirements of the related Section of work; after setting, sand to a smooth, hard finish, flush with adjoining surface.

- C. Gypsum Drywall Surfaces: Scrape off all projections and splatters, spackles all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards established in CSI Section 09250 Gypsum Drywall.

- D. Wood Surfaces: Sand to remove all roughness, loose edges, splinters and then brush to remove dust. Wash off grease or dirt with an approved cleaner. Fill all cracks, splits, nail holes, screw holes, and surface defects with putty after the priming coat has been applied. Putty shall be brought up flush with the surface and sanded smooth and touched-up with primer when dry.

- E. Testing for Moisture Content: Contractor shall test all concrete and drywall surfaces for moisture content using a reliable electronic moisture meter. Contractor shall also test latex type fillers for moisture content before application of top coats of paint. Do not apply any paint or sealer to any surface or to latex type filler where the moisture content exceeds 7 percent as measured by the electronic moisture meter.

- F. Touch-Up: Prime paint all patched portions in addition to all other specified coats.

3.4 MATERIALS PREPARATION

- A. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.

- C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
- D. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.5 APPLICATION

A. General

1. Apply paint by brush or roller in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.
2. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper, or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - a. "Exposed surfaces" is defined as those areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.
6. Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.
7. Finish doors on tops, bottoms, and side edges the same as the faces, unless otherwise indicated.
8. Enamel finish applied to metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface.

B. Scheduling Painting

1. Apply the first coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 2. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- C. Prime Coats: Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- D. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.
- E. "Touching-Up" of Factory Finishes: Unless otherwise specified or shown, materials with a factory finish shall not be painted at the project site. To "touch-up," the Contractor shall use the factory finished material manufacturer's recommended paint materials to repair abraded, chipped, or otherwise defective surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as acceptable to the Commissioner.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.7 CLEAN UP

- A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
- B. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION

SECTION 10100 - VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the visual display boards as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
1. Porcelain on metal markerboards.
 2. Enclosed bulletin boards.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Gypsum Drywall - Section 09250.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: For installation of visual display boards, use only personnel who are thoroughly trained and experienced in the skills involved and who are completely familiar with the manufacturer's recommended methods of installation.
- B. Installation Methods: The recommended installation methods of the manufacturer shall become the basis for acceptance or rejection of actual installation methods used in the work.
- C. Manufacturer: Furnish all visual display boards by one manufacturer for entire project.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.
- C. Shop Drawings: Submit for each type of visual display board. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.

- D. Samples: Submit full range of color samples for each type of visual display board, trim and accessories required. Provide 12" square samples of sheet materials and 12" lengths of trim members for color verification after selections have been made.

1.6 SPECIAL PROJECT WARRANTY

- A. Warranty on Porcelain Enamel Markerboards: Provide written warranty, signed by manufacturer, agreeing to replace, within warranty period of 25 years porcelain enamel markerboards which do not retain original writing and erasing qualities, defined to include surfaces which become slick and shiny, or exhibit crazing, cracking or flaking; provide manufacturer's instructions for handling, installing, protecting and maintaining markerboards have been adhered to during the warranty period. Replacement is limited to material replacement only and does not include labor for removal and reinstallation.

1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MARKERBOARDS

- A. Fixed type whiteboards type similar and equal to Claridge "LCS 2048 Deluxe Units" porcelain enamel steel with aluminum trim that will accept magnetic aids, or approved equal.
 - 1. Materials: 24 gauge in white color with hardwood core and backed with a 0.015 aluminum sheet.
 - 2. Backing: 1/4" hardboard backing material.
 - 3. See drawings for size, locations, and configurations of assemblies.
- B. Trim: Extruded aluminum, designed for concealed fastenings, clear anodized finish with marker tray.
- C. Accessories: For each board, provide one box of LCS markers (packed 12 to a box) with assorted colors, or equivalent from approved equal.
- D. Fabrication
 - 1. Boards shall be factory assembled using hot-type neoprene contact adhesive, applied to both surfaces automatically. Substrate shall have a minimum 80% covering of 1.5-2.00 dry mils of adhesive.
 - 2. Panel units shall have uniform pressure applied mechanically over the entire area of the panel.

- E. Manufacturers: Provide chalkboards manufactured by Greensteel, Inc., Claridge Products and Equipment Inc., Carolina Chalkboard Co., or approved equal.

2.2 ENCLOSED BULLETIN BOARDS

- A. Provide Arco Enclosed Bulletin Boards as manufactured by Arco Products Inc., or approved equal; product shall incorporate the following:
 1. Acrylic glazing.
 2. Aluminum frame extrusions, with satin anodized finish.
 3. Concealed mounting hangers.
 4. Reinforced corner construction.
 5. Continuous hinges.
 6. Cylinder locks.
 7. See drawings for sizes, locations and additional information.

2.3 ACCESSORIES

- A. Provide clips, anchors and fasteners required for complete installation.

2.4 FABRICATION

- A. Assembly: Provide factory-assembled chalkboard and tackboard units unless field-assembled units indicated.
- B. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Commissioner.
 1. Provide manufacturer's standard vertical joint system between abutting sections of chalkboard.
 2. Provide mullion trim at joints between chalkboard and tackboards.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where visual display boards are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Deliver factory-built visual display board units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Commissioner. When overall

dimensions require delivery in separate units, prefit at factory, disassembled for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.

- B. Install units in locations and mounting heights as shown on drawings and in accordance with manufacturer's instructions, keeping perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
- C. Coordinate job-assembled units with grounds, trim and accessories. Join all parts with neat, precision fit.

3.3 ADJUST AND CLEAN

- A. Verify accessories required for each unit properly installed and operating units properly functioning.
- B. Clean units in accordance with manufacturer's instructions.

END OF SECTION

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SECTION 10260 - CORNER GUARDS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the corner guards as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
B. Aerated Autoclaved Concrete Units - Section 04225.
C. Gypsum Drywall - Section 09250

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
- a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
- 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.

- 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Samples: Two samples of corner guards each 12" long shall be delivered to the Commissioner.
- C. Shop Drawings: Submit shop drawings for corner guards showing all anchorage devices.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Stainless Steel Corner Guards: Surface mounted (cement-on), 1/4" radius, 16 gauge satin finish type 304 stainless steel; product as manufactured by InPro Corp., or approved equal, 48" long x 1-1/2" per leg.
1. Provide appropriate stainless steel flat head fastening devices and other required fittings in same finish as corner guard.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where corner guards are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install units to comply with approved shop drawings and manufacturer's instructions.

- B. Corner guards shall be set in alignment with the corner bead of the gypsum wallboard substrate.
- C. Corner guards should be mounted above the wall base.
- D. Install on all outside GWB corners.

3.3 ADJUST AND CLEAN

- A. Clean surfaces promptly after installation, exercise care to avoid damage to surfaces.
- B. Protect corner guards from damage until acceptance of work.

END OF SECTION

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SECTION 10400 - SIGNAGE

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the signage as shown on the drawings and/or specified herein, including, but not limited to the following:
1. Toilet Rooms.
 2. Maximum headroom signs.
 3. Utility, mechanical and ancillary spaces.
 4. Maximum Occupancy signs.
 5. Room signs.
 6. Exterior building sign, made to Bronx River Alliance (BRA) Starlight Park standards.
 7. Window glass decal signage.
 8. Other signage shown on drawings.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- C. Samples: Submit samples of each sign showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.
- D. Shop Drawings: Submit shop drawings for fabrication and erection of signage. Include plans, elevations, and large-scale details of sign wording and lettering layout. Show anchorage and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

1.5 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products manufactured by SDGNY (Sign Design Group of New York- basis of design), A. R. K. Ramos, Andco Industries, ASI Sign Systems, Big Apple Group, or approved equal.

2.2 MATERIALS

- A. Cast-Acrylic Sheet: Manufacturer's standard in color(s) as selected by Commissioner.
- B. Graphic Content and Style: Provide sign copy that complies with requirements as directed by Commissioner for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.
- C. Engraved Copy: Machine engraved letters, numbers, symbols, and other graphic devices into panel sign on face indicated to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Opaque Acrylic Sheet: Fill engraved copy with enamel.
- D. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.
 - 1. Panel Material: Opaque acrylic sheet.
 - 2. Raised-Copy Thickness: Not less than 1/32".

2.3 DIMENSIONAL LETTERS AND NUMBERS

- A. Fabricated Channel Characters: Form exposed faces and sides of characters to produce surfaces free from warp and distortion. Include internal bracing for stability and attachment of mounting accessories. Comply with the following requirements.
 - 1. Character Material: Stainless steel sheet, not less than 0.050" thick for face and 0.031" thick for returns.
 - 2. Finish: Satin.
 - 3. Size and spacing per drawings.

2.4 BUILDING IDENTIFICATION SIGN

- A. Provide pole-supported 2-sided building identification sign Type X, as shown on drawings. Fabricate sign and colors per latest Bronx River Alliance design standards and sample. See Drawings for additional information.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where signage is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install units and components at the locations directed by the Commissioner, securely mounted with concealed theft-resistant fasteners. Attach to substrates in accordance with the manufacturer's instructions.
- B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Commissioner.

END OF SECTION*

SECTION 10500 - LOCKERS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.
- B. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 Green Building Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Lockers.
- B. Work of this Section includes all labor, materials, equipment, and services necessary to provide and install the lockers as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.

1.4 QUALITY ASSURANCE

- A. LEED BUILDING - General Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the environmental goals for the project, which include achieving a LEED Building Silver Rating. minimum. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, 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 substantially compromise the stated LEED BUILDING criteria.

1.5 SUBMITTALS**A. GREEN BUILDING SUBMITTAL REQUIREMENTS**

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. Product Data: Submit manufacturer's product information and color metal samples.

1.6 DELIVERY AND STORAGE

- A. Deliver products to project site in manufacturer's undamaged protective containers.
- B. Delay delivery until spaces to receive them have been fully enclosed and utility rough-ins are complete.

PART 2 PRODUCTS

2.1 LOCKERS

- A. Lockers shall be powder-coated steel, as manufactured by SchoolLockers, Salt Lake City, Utah or approved equal.
1. Size: Provide 36-1/2" high single tier (half-height) lockers with legs.
 2. Materials: All major steel parts shall be of mild cold rolled commercial quality steel.
 3. Finish: All material shall be power washed and phosphate treated for maximum finish color adhesion. All components shall be finished with a hybrid epoxy/polyester powder, electrostatically applied to ensure uniform thickness and baked to cure.
 4. Construction: All lockers shall be built on a unit principal with common intermediate uprights separating units.
 5. Door Frames: Shall be 16 gauge, channel shape. Vertical members shall have a additional flange to provide a continuous door strike. Cross frame members shall also be 16 gauge channel shaped, including intermediate cross frames on double or triple tier lockers.
 6. Doors: Cross frame members including intermediate cross frames on double or triple tier lockers. on both the lock and hinge side, with single formations across bottom and top with louvers for ventilation.
 7. Body: Bolt spacing in locker body construction not to exceed 9" o.c. All locker body components shall be made of cold rolled steel specially formed for added strength and rigidity and to ensure tight joints at fastening points. Tops and bottoms shall be 24-gauge with three sides formed 90° and the front offset formed to be flush with the horizontal frame member. Shelves shall be 24-gauge with four sides formed to 90°, the front edge shall have a second bend. Backs and sides shall be 24 gauge.
 8. Hinges: .074" thick, 2" high, double spun, full loop, tight pin, five-knuckle butt hinges, projection welded to door frame and securely fastened to the door with 2 steel rivets. Doors over 48" high shall have three hinges; all other doors shall have two hinges.
 9. Handles: Shall be one-piece 20 gauge deep drawn stainless steel cup designed to accommodate locks.
 10. Latching: On single, double, triple, and two person lockers the lifting trigger shall be 14-gauge steel, attached to the latching channel. The trigger shall have a padlock eye for use with 9/32" diameter padlock shackle. Doors to have latch clip engaging frame at three points on doors over 42" high and two points on all other doors. Locking device to be positive automatic type, whereby locker door may be locked when open, then closing without unlocking. A rubber silencer shall be firmly secured to the frame at each latch hook. Four, five and six tier lockers shall have an 11-gauge frame hook secured to the frame. The frame hook shall have a padlock hasp protruding through the recessed handle.

11. Hooks: Single tier lockers 48" or higher have a shelf. If under 18" deep, locker shall have three wall hooks and one ceiling hook. Single tier lockers 18" deep or more shall have a coat rod instead of a ceiling hook.
12. Number Plates: Each locker shall have a polished aluminum number plate riveted to door face with black numerals ½" high.
13. Color: All lockers shall be apinted inside and outside with the same color. Color selected from manufacture's standards.
14. Assembly: All lockr components assembled by use of rivets.
15. Base: Provide recessed base (zee base) for toespace, front face and ends of locker rows.
16. Locks: Key or combination padlocks are not required.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where appliances are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Lockers shall be installed in accordnce with manufacturers' installtion instructions and shall be elvel and plumb with flush surfaces and rigid attachments to anchoring surfaces.
- B. Touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of 5 feet.
- C. Promptly remove from the job site all cartons and packing material associated with the work of this Section.

END OF SECTION

SECTION 10522 - FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the fire extinguishers and cabinets as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Autoclaved Aerated Concrete Units - Section 04225.
- C. Gypsum Drywall - Section 09250.

1.4 QUALITY ASSURANCE

- A. Provide portable fire extinguishers, cabinets and accessories by one manufacturer.
- B. UL-Listed Products: Provide new portable fire extinguishers that are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

- 1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:

- 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
- b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials. Where color selections by Architect are required, include color charts showing full range of manufacturer's standard colors and designs available.
- C. Samples: Submit samples, 6" square, of each required finish. Prepare samples on metal of same gauge as metal to be used in the work. Where normal color variations are to be expected, include 2 or more units in each sample showing the limits of such variations.
- 1.6 LEED BUILDING PERFORMANCE CRITERIA
- A. The following criteria are REQUIRED for the products included in this section:
1. Every effort shall be made to maximize post industrial/post consumer waste but fire extinguishers and cabinets shall contain a minimum of 50% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is

based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of Item 1.5 above.

2. Fire extinguishers and cabinets manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of Item 1.5 above.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following:
 1. Larsen's Mfg. Co. (basis for project design).
 2. J.L. Industries.
 3. Potter Roemer.
 4. Or Architect approved equal.

2.2 EXTINGUISHERS

- A. General: Provide fire extinguishers for each locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.
- B. Abbreviations indicated below to identify extinguisher type related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher.
- C. Multi-Purpose Dry Chemical Type: UL rated 2A-10B:C, 5 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires. See drawing for types.

2.3 MOUNTING BRACKETS

- A. Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher specified, in manufacturer's standard enamel finish; color to match extinguisher.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where fire extinguishers and cabinets are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install items included in this Section in locations indicated and at heights to comply with applicable regulations of governing authorities.
 - 1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
 - 2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
- B. Where exact location of cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by the Architect.

3.3 IDENTIFICATION

- A. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" painted on door by silk-screen process. Provide lettering on door as selected by Architect from manufacturer's standard letter sizes, styles, colors and layouts.
- B. Identify bracket-mounted extinguishers with red letter decals spelling 'FIRE EXTINGUISHER' applied to wall surface. Letter size, style and location as selected by the Commissioner.

3.4 SERVICE

- A. Determine the approximate completion date of the work and then inspect, charge, and tag the fire extinguishers at a date not more than 10 days before or not less than one day before actual completion date of the work.

END OF SECTION

SECTION 10800 - TOILET ACCESSORIES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the toilet accessories as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
B. Gypsum Drywall - Section 09250.
C. Ceramic Tile - Section 09310.

1.4 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units. Height of accessories shall be installed in compliance with prevailing Handicap Code.
C. Products: Unless otherwise noted, provide products of same manufacturer for each type of unit and for units exposed in same areas.

1.5 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all installed products and materials of this Section, complete the ENVIRONMENTAL MATERIALS REPORTING FORM (blank copy included in Section 01332). Information to be supplied for this Form shall include:
 - 1). Cost breakdowns for the materials included in the Contractor or sub-contractor's work. Cost breakdowns shall include total installed cost and material-only cost.
 - 2). The percentages (by weight) of post-consumer and/or pre-consumer recycled content in the supplied product(s).
 - 3). Indication of whether the manufacturing location of the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles.
 - 4). Indication of whether the location (source) of the raw materials used to manufacture the supplied product(s) is within 500 miles of the project site. Provide this distance if less than 500 miles. Also indicate the percent by weight of the material or product that meets this regional requirement.
 - b. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - c. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - d. 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.
 2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.
- B. Product Data: Submit manufacturer's technical data, catalogue cuts and installation instructions for each toilet accessory.
- C. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work
- D. Submit schedule of accessories indicating quantity and location of each item.

1.6 PRODUCT HANDLING

- A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

PART 2 PRODUCTS

- 2.1 All accessories by ASI (basis of design), Brobrick or approved equal, or as noted below.

2.2 MATERIALS

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge minimum, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Galvanized Steel Sheet: ASTM A653, G60.
- D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.
- E. Mirrors: ASTM C1503, mirror glazing quality, clear glass mirrors, nominal 1/4" thick.

2.3 FASTENING DEVICES

- A. Exposed Fasteners: Theftproof type, chrome plated, or stainless steel; match finishes on which they are being used.
- B. Concealed Fasteners: Galvanized (ASTM A123) or cadmium plated.
- C. No exposed fastening devices permitted on exposed frames.
- D. For metal stud drywall partitions, provide 10 gauge galvanized sheet concealed anchor plates for securing surface mounted accessories.

2.4 FABRICATION

- A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.
- B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.
- C. Recessed Toilet Accessories, General: Fabricate units of all welded construction, without mitered corners. Hang doors of access panels with full-length stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

3.2 SHOWER

- A. Shower receptacle to be ADA complaint Model APFQ3698BF625-RF (receiver flange) by Freedom Showers or approved equal, with the following optional accessories:
 - 1. collapsible water retainer.
 - 2. folding seats.
 - 3. caulkless drain.
 - 4. L-shaped grab bar.
 - 5. weighted shower curtain and rod.
 - 6. pressure balance valve with hand-held shower and slide bar.

2.5 ACCESSORY SCHEDULE

- A. Refer to Accessory Schedule on Drawings for specific product requirements.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where toilet accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work. Confirm adequate blocking is installed.

3.2 PREPARATION

- A. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum drywall partitions. Coordinate the work to assure that base plates and anchoring frames are in the proper position to secure the accessories.
- B. Verify by measurements taken at the job site those dimensions affecting the work. Bring field dimensions that are at variance with those on the approved shop drawings to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of fabrication of items affected.
- C. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

3.3 INSTALLATION

- A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.
- B. Concealed anchor assemblies for gypsum drywall partitions shall be securely anchored to metal studs to accommodate accessories. Assemblies shall consist of plates and/or angles tack welded to studs.

- C. Secure accessories in place, at their designated locations by means of theftproof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.
- D. Unless otherwise indicated, accessories shall conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, such locations shall be as directed by the Commissioner.
- E. Installed accessories shall operate quietly and smoothly for use intended. Doors and operating hardware shall function without binding or unnecessary friction. Dispenser type accessories shall be keyed alike. Prior to final acceptance, master key and one duplicate key shall be given to the Commissioner.
- F. The Commissioner shall be the sole judge of workmanship. Workmanship shall be of the highest quality. Open joints, weld marks, poor connections, etc., will not be permitted. The Commissioner has the right to reject any accessory if he/she feels the workmanship is below the standards of this project.
- G. Grab bars shall be installed so that they can support a 300 lb. load for five minutes per ASTM F446.

3.4 CLEANING AND PROTECTION

- A. Upon completion of the installation, clean accessories of dirt, paint and foreign matter.
- B. During the installation of accessories and until finally installed and accepted, protect accessories with gummed canvas or other means in order to maintain the accessories in acceptable condition.
- C. Replace and/or repair installed work that is damaged or defective to the Owner's satisfaction, at no additional cost.

END OF SECTION

B. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - b. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - c. 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.
2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

1.7 DELIVERY AND STORAGE

- A. Deliver products to project site in manufacturer's undamaged protective containers.
- B. Delay delivery until spaces to receive them have been fully enclosed and utility rough-ins are complete.

PART 2 PRODUCTS

2.1 APPLIANCES

- A. Refrigerator: See Drawings
- B. Microwave Oven: See Drawings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where appliances are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

- B. Install the work of this Section in strict accordance with the original design, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use.
- C. Upon completion of installation and hookup to utilities, put each operating component of each appliance through at least 5 complete operating cycles, adjusting as needed to secure optimum operation level.
- D. Touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of 5 feet.
- E. Promptly remove from the job site all cartons and packing material associated with the work of this Section, disposing per requirements of Green Building Division 1.

END OF SECTION

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SECTION 12480 - FLOOR MATS AND FRAMES

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED 2.2 Silver Certification, at a minimum. Specific project goals which may impact this and other sections of this specification 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. The Contractor shall ensure that the requirements related to these goals, 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 GREEN BUILDING Performance Criteria described in Division 1.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the floor mats and frames as shown on the drawings and/or specified herein.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Concrete topping slab - Section 03320.
- C. Resilient Tile Flooring – Section 09660

1.4 SUBMITTALS

A. GREEN BUILDING SUBMITTAL REQUIREMENTS

1. The Contractor and its sub-contractors shall submit the GREEN BUILDING Certification items listed herein. GREEN BUILDING Submittals shall include the following:
 - a. For all interior field-applied adhesives, sealants, and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy included in Section 01335). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs./gallon.
 - b. Provide back-up documentation to validate all information provided on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except Cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Green Building specifications in Division 1.
 - c. 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.

2. The GREEN BUILDING Submittal information outlined above shall be assembled into one (1) package per Specification section. Incomplete or inaccurate LEED Submittals may be used as the basis for rejecting the submitted products or assemblies.

- B. Product Data: Submit manufacturer's specifications and installation instructions or entrance mat. Include methods of installation for each type of substrate.
- C. Samples: Submit samples for each type and color of exposed entrance mat, frames and accessories required. Provide 12" square samples of mat materials and 12" lengths of frame members.
- D. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining and rehandling of removable entrance mat units.

1.5 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

PART 2 PRODUCTS

2.1 MAT AND FRAME

- A. Product: Provide "ENVIRONtread" M-775 roll up mat with recessed F-9 aluminum frame as manufactured by Arden Architectural Specialties Inc., or approved equal. Match product with recess depth as shown on Drawings.
- B. Materials:
 - 1. Aluminum Frame: Extruded aluminum, ASTM B 221, alloy 6063-T5, with butted corners; light bronze finish.
 - 2. Aluminum Rail: ASTM B 221, alloy 6063-T5; mill finish.
 - 3. Tread Insert: Nylon-reinforced buffed rubber mechanically secured to tread rails.
 - 4. Fasteners: Non-corrosive screws and anchors for securing frames together and to floors.
- C. Construction: Flexible low-density polyethylene hinge retained in a "captive" aluminum tread port, with drain holes to allow debris and moisture to flow through the mat and continuous bottom cushions to reduce noise. Fillers shall be serrated black vinyl for use when tread spacing cannot be maintain, or to fill irregular frame conditions.

2.2 FABRICATION

- A. Shop-fabricate mat and frame to greatest extent possible in sizes shown. Where not otherwise shown, provide single unit for each installation, but do not exceed manufacturers maximum size recommendation for units intended for removal and

cleaning. Where joints are necessary, space symmetrically and away from normal traffic lanes. Verify sizes by field measurement before shop fabrication.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where floor mats and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturers instructions, at locations shown and with top of products level with adjoining finished flooring where applicable.
- B. Coordinate top of product surfaces with swinging doors and adjacent finished flooring products to provide under-door clearance and smooth level walking surface.
 - 1. Provide necessary shims, spacers, and anchorages for proper location and secure attachment of frames to concrete.

3.3 PROTECTION

- A. Upon completion of frame installations, provide temporary filler of plywood or fiberboard in grate recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near time of Substantial Completion.
- B. Install product when no further wheeled construction traffic will occur and wet type operations including painting and decorating are complete.

END OF SECTION

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SECTION 13650 - PHOTOVOLTAIC SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The work described in this specification is the responsibility of the Contractor. The Contractor must have adequate experience and capability to perform (or to effectively hire, oversee, and manage appropriate subcontractors to perform) the scope of work described below. The Contractor shall have adequate experience and capability to provide a properly operating, utility-interactive, Photovoltaic Power System in accordance with the Contract.
- B. Any deviation, from the Scope of Work, Materials, Construction Methods, or any other aspect of this bid specification, proposed by the contractor, shall be approved in writing by the Commissioner prior to implementation of such deviation and this approval shall become part of the contract with the Contractor. References to "or approved equal" made in this specification shall be subject to such approval by the Commissioner.

1.2 SECTION INCLUDES

- A. This Section includes grid connected net-metering 47.84 kWp roof-mounted photovoltaic power system, (consisting of 210 solar panels (208 active and 2 inactive, or as shown on drawings) arranged in ten (10) combiner box / inverter configurations with all associated balance of system), without a storage means. Provide all conduits, transition boxes, junction boxes and pull lines shown on drawings, including a DAS system connected with lobby display and internet link. Provide six (6) spare panels.

1.3 RELATED SECTIONS

- A. Green Building requirements in Division 1.
- B. Volatile Organic Compound (VOC) Limits For Adhesives, Sealants and Architectural Coatings - CSI Section 01335 (for interior components only).
- C. Sheet Metal Roofing – Section 07610.
- D. Resource Monitoring Display –Section 13845.
- E. Grounding and Wiring – Division 16 Electrical.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. PV Module.

2. DC Disconnect.
3. Inverter.
4. AC Disconnect.
5. AC Panelboard.
6. NEMA enclosure
7. DAS.
8. Metal Roof Panel Clips.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, components, and location and identification of each field connection. Show access, workspace, and clearance requirements; details of control panels; and all associated equipment.

1. Wiring Diagrams: Detail DC and AC interconnecting wiring; and power, signal, and control wiring.
2. Elevation and details of control and indication displays.

C. Qualification Data: For testing agency.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For photovoltaic system equipment to include in emergency, operation, and maintenance manuals.

G. Warranty: Special warranty specified in this Section.

1.5 GREEN BUILDING REQUIREMENTS

A. Submit relevant EMRF forms for Work of this Section, particularly for VOC limits for interior components.

1.6 QUALITY ASSURANCE

A. Contractor shall provide proof of work experience in the form of copies of electrical inspection reports for similar sized PV systems.

B. Contractor shall demonstrate expertise in providing and installing effective, reliable, photovoltaic power systems including data acquisition systems for these kinds of applications.

C. PV module manufacturer must have adequate experience in the industry and a product that is applicable for this project. The manufacturer must be able to provide PV modules as described in Part 2.

D. The inverter manufacturer must have adequate experience in the industry and a product that is applicable for this project. The manufacturer must be able to provide an inverter as described in Part 2 and the manufacturer must have at least 3 years

- I. BOS materials shall include but not be limited to: conduit (with the exceptions noted in Section 1.04), wire, over-current protection devices, junction boxes, pull boxes, enclosures, hardware, fasteners, surge suppression devices and any other accessories or materials needed to properly install the PV System and the DAS.
 - J. Installation shall be done in accordance with this specification and shall include:
 - 1. Installing and wiring the module into the skylight system in all locations indicated on drawings.
 - 2. Installing source circuit combiners, sub-array disconnects, and DAS sensors at the rooftop location.
 - 3. Conduit and wiring within the rooftop PV array.
 - 4. Wiring from the rooftop PV array and DAS to the DC combiner box, DC-AC inverter, AC Disconnect and to panel PVP in mechanical room.
 - 5. Installation of disconnects, combiner, DC-AC inverter, isolation transformer, conduit, wire, BOS, and DAS to panel PVP in mechanical room.
 - 6. Wiring from the PV system AC disconnect (along roof line), through the AC utility disconnect, to the point of utility interconnection in a load center within
 - 7. The mechanical room (load center and interconnection circuit
 - 8. Breaker shall be provided by others room 1.06.
 - 9. Interconnection of PV System with utility grid,
 - 10. Labeling and placards to meet code and utility requirements,
 - 11. Labeling to identify system components,
 - 12. Labeling of wires for polarity, circuit, phase,
 - 13. Installation of DAS software on PC.
 - 14. Installation of data collection with Section 15845- Resource Monitoring Display.
 - 15. Verification/inspection/testing of installation work,
 - 16. Hosting of all pertinent inspections.
 - 17. System commissioning.
 - K. Contractor shall be responsible for system operation testing, system commissioning, and customer training.
- 1.10 OTHER WORK
- A. Panelboard and Circuit Breakers at point of interconnection in mechanical shall be provided and installed by the Contractor in accordance with NEC 690.64 (B).
- 1.11 DELIVERY, STORAGE, AND HANDLING
- A. Deliver equipment in fully enclosed vehicles.
 - B. Store equipment in spaces having environments controlled within manufacturers' written instructions for ambient temperature and humidity conditions for non-operating equipment.
 - C. All materials shall be stored and handled on site in a manner that does not damage or have the potential to damage the facility (for instance: roof membrane shall be protected and roof structure shall not be overloaded).

- D. All material shall be stored, delivered, and handled in a manner that does not endanger personnel at the site.
- E. All materials shall be handled with adequate and appropriate equipment.

1.12 WARRANTY

- A. Contractor shall warranty complete system to be free from defects in materials or workmanship for a period of two years following the date of the electrical inspection approval.
 - 1. This warranty shall include service at the site to repair or replace components documented to be defective during that one-year period.
 - 2. Contractor may utilize manufacturer's warranties to obtain replacements for defective materials and components but the Contractor shall provide troubleshooting services to document failures; shall obtain appropriate service/support from manufacturer; and shall be responsible for labor, transportation, and disposal costs involved in removing defective materials and components and installing replacements during that one-year period.
- B. PV modules shall have a 20-year (minimum) warranty that power output at Standard Test Conditions (STC) shall remain at 80% or greater of power rating at STC. STC is defined as irradiance of 1000 Watts per square meter, ambient temperature of 25 degrees C, and spectral distribution of AM 1.5.
- C. Inverter and transformer shall have a 5-year (minimum) warranty.

1.13 OPERATION AND MAINTENANCE MANUAL

- A. Contractor shall provide a comprehensive Operation and Maintenance Manual for the PV System.
- B. Manual shall include specification sheets and manufacturers' Operation and Maintenance Manuals for all primary components as well as a description and guidance for overall system operation.

PART 2 - PRODUCTS

2.1 PHOTOVOLTAIC MODULE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product which are in compliance with New York State Department of Public Service Certified Interconnection Equipment documentation.
- B. The PV array shall incorporate Sunpower 230 modules, manufactured by Sunpower Corporation, San Jose CA (or approved equal) resulting in the footprint and energy production shown on the design documents. The Contractor shall also provide 4 spare solar panel modules for City of New York, packed and labeled.

experience in the manufacture of battery-less, grid-interactive, inverters for commercial applications.

- E. The DAS manufacturer shall demonstrate that it possesses expertise in data acquisition technology with a focus on grid-interactive PV systems in educational settings. The manufacturer must be able to supply a data acquisition system with capabilities as described in Part 2.
- F. Testing Agency Qualifications: Member company of the International Electrical Testing Association or is an NRTL.
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- H. Photovoltaic System: IEC 1215 Certification, IEEE 1262 Certification, UL listing with Class C or better fire rating
- I. DC-AC Inverter shall meet UL1741 standards.
- J. Interconnection shall meet standards required by the public utility commission or local utility, as appropriate.
- K. Comply with NFPA 70 Article 690 and NFPA 101.

1.7 LICENSING AND QUALIFICATIONS

- A. Contractor shall be properly licensed and insured to conduct the business of selling and installing PV systems in Bronx County in the state of New York.
- B. Contractor shall meet the insurance requirements outlined by the project manual.
- C. Contractor shall be a licensed Contractor or shall have on the job a licensed Contractor with PV capability and experience.
- D. Contractor shall meet all certification, and experience requirements associated with any incentives being applied for.
- E. Contractor shall meet all insurance requirements associated with any incentives being applied for.
- F. Installation crewmembers shall be skilled workers trained, experienced, and regularly active in PV System installation.

1.8 WORKMANSHIP

- A. Only skilled workers trained, experienced, and regularly active in PV System installation shall be utilized for the work described in this section.

- B. Work shall be performed in accordance with the installation and operation instructions provided by equipment manufacturers and in accordance with this bid specification.
- C. All work shall be conducted in a professional manner with appropriate courtesy toward and coordination with other workers on site.
- D. All work shall be conducted in a safe manner in accordance with all appropriate safety guidelines and regulations.
- E. Work areas shall be kept clean and orderly. Any waste, excess material, or packaging shall be promptly removed and disposed of properly.

1.9 SCOPE OF WORK

- A. The Contractor shall provide the materials, parts, labor, tools and equipment necessary to install and warrant the Grid-Interactive Photovoltaic Power System (PV System) described in this specification. The PV System shall include a Data Acquisition System (DAS).
- B. The Contractor shall be responsible for obtaining all applicable approvals, permits, Site certifications, and inspections associated with the PV System, its installation, and its interconnection to the utility grid. This includes Code-required NRTL Site Certification (per local law 49) or other inspections, final submission to NYC Electrical Advisory Board, and Net-Metering application (i.e. "distributed production") to Con-Edison, and any other inspections required by NYC agencies or utilities. Net-Metering Application to be filed within three weeks of start of construction, with copies to Owners Representative and Design Team.
- C. Contractor shall host all pertinent inspections, be responsible for correcting any identified deficiencies, and host any needed re-inspections.
- D. Contractor shall assist customer in applying for utility interconnection approval.
- E. The Contractor shall be responsible for installing the PV System and associated materials and equipment in accordance with all appropriate electrical, building, and occupational safety codes.
- F. Materials shall include, but not be limited to, the primary components of the PV System, the Data Acquisition System (DAS), and all necessary balance of system (BOS) materials.
- G. The primary components of the PV System shall include a rooftop PV Array, DC source circuit combiner boxes (NEMA 3R), DC disconnects (NEMA 3R), electrical room disconnects and combiner, DC-AC inverter, and isolation transformer as specified in Part 2 of this section.
- H. The DAS shall include (as described in Part 2 of this section) rooftop environmental sensors, sensors in the mechanical room to measure power parameters, a data-logger and meter in the mechanical room, PC software for electronically communicating and sharing data, and an interactive lobby kiosk.

- C. Individual PV modules shall have a rated power (at STC) of 230 Watts or more to keep the number of wiring connections in the system to a reasonable number. The total array power rating shall be at least 48 kWp at STC.

2.2 DC DISCONNECTS

- A. Sub-array DC disconnects shall be designed and rated for DC power disconnecting (under load) the combined output of 6 series strings of 8 modules each, or as shown on drawings for inverter, combiner, and string configurations.
- B. Square D HU361 Safety Switches, or approved equal, shall be used to perform this function.

2.3 WIRE AND CONDUIT

- A. Exterior and interior conduit associated with the PV system shall be EMT of appropriate inside diameter for the number and size of wires to be run.
- B. Exposed PV module wiring shall be kept to a minimum, shall be properly rated for sunlight resistance, shall be properly rated for the hot temperatures associated with the PV array (90 degrees C insulation) and shall be properly secured to avoid physical damage from wind, snow, or other environmental factors. Means of securing exposed wiring must be sunlight resistant and able to withstand expected rooftop environmental factors over the life of the system.
- C. DAS signal wire shall meet all the DAS manufacturer's guidelines and shall not be run in the same conduit as electrical power wiring.
- D. Provide conduit from the rooftop to the mechanical room (including a separate one for DAS signal wire).
- E. All wire shall be UL listed, new, stranded copper and continuous for each wiring run.
- F. Insulation shall be rated for 600V.
- G. All conductor terminations must be rated for 600V and be UL listed.
- H. Power wire shall be sized for a voltage drop of 2% or less between PV modules and inverter.

2.4 DC to AC POWER INVERTER

- A. The DC to AC Power Inverters shall be a SMA Sunny Boy SWR 3000U, 4000U and 5000U as shown on drawings, or approved equal, with a 1-phase, 60Hz, 208VAC output capability of 2500W, Coordinate with drawings for inverter and string configurations. Manufacturer shall provide appropriate sized inverters to match design.
- B. The inverter shall be a grid-interactive, non battery-based model.

- C. The inverter shall be designed to accept the PV array output and shall be listed to UL1741 standards and shall be acceptable to the local utility and the New York State Department of Public Service Certified Interconnection Equipment documentation. The inverter shall start, synchronize, operate, and disconnect automatically without the need for user action or intervention. The inverter shall be capable of operating in parallel with other grid interactive inverters.
- D. The inverter shall have the following protective functions: AC over/under voltage, AC under/over frequency, over temperature, AC and DC over current, DC over voltage.

2.5 2.05 Mechanical Room Disconnects and Circuit Combiner

- A. Each sub-array shall have a Square D HU361 disconnect, or approved equal, in the electrical room for troubleshooting purposes. These disconnects shall be rated for 600VDC load make/load break and shall be equipped with a DC surge suppression device (Delta LA602DC, or approved equal).
- B. The seven sub-array circuits shall then be combined using a Connect Energy PCBHV-07-30 fused circuit combiner (or approved equal) as shown in the attached electrical schematic.
- C. The DC to AC Inverter shall be accompanied by a single throw 600V DC Disconnect rated for load make/load break (Xantrex part # 1-151434-02, or approved equal). The sub-array disconnects do not serve this function because they do not satisfy NEC 690.14 (C)(4).
- D. The Isolation transformer shall be accompanied by a single-throw, fused, AC Disconnect rated for load make/load break of 208VAC 3-phase power (Xantrex part # 1-150830-04, or approved equal). This AC Disconnect shall incorporate an AC surge suppression device, Delta LA603R, or approved equal.
- E. An AC utility disconnect shall be installed in accordance with the utility requirements between the isolation transformer and the point of utility interconnection. Contractor shall work with the utility to locate this disconnect where it shall meet accessibility requirements, minimize vandalism risk, and maximize safety. This disconnect shall be a Xantrex part # 1-150830-01, or approved equal.
- F. The load center and the 3-phase, 208VAC 60A circuit breaker in the mechanical room, which shall serve as the PV System's point of interconnection to the utility power system, shall be provided by others in accordance with NEC690.64 (B).

2.6 DATA ACQUISITION SYSTEM

- A. The Data Acquisition System (DAS) shall be a custom Heliotronics Epiphany Series System designed to meet the specifications below (or approved equal).
- B. The DAS shall be designed for use with 208 VAC 3 phase power and 600VDC power.
- C. The rooftop sensors shall measure Ambient Temperature, Module Temperature, Wind Speed, and Plane-of-Array Irradiance.

- D. Mechanical room sensors shall measure current, voltage, and power in kilowatts (kW) and energy in kilowatt-hours (kWh) on both the AC side and the DC side.
- E. Mechanical room sensors shall accommodate the large wiring associated with a 49 kW PV system.
- F. There shall be a kWh meter installed in the mechanical room to display total AC kWh output. This meter shall meet MTC specifications:
The PV system must have dedicated meter that records only the AC output from the inverter of the PV system. This meter is separate from the utility billing meter and should not interfere with utility billing or net-metering. The PV system meter must be a standard utility revenue quality meter that conforms with applicable American National Standards Institute (ANSI) C-12 standards with a visible display for cumulative energy (kWh) produced by the PV system. All system components, including meters, must comply with all applicable codes & standards. The meter should be installed on the AC output side of the inverter, and must be available for periodic testing and/or recalibration, if necessary.
- G. The DAS and associated software shall be PC-based. The PC shall be provided by Contractor.
- H. The DAS shall sample required parameters at least 30 times per minute and log 15-minute averages. Logged kWh data shall not be lost as a result of a power outage.
- I. DAS PC software shall be designed to capture data from the data logger and display it in an informative and educational format on an interactive touchscreen monitor.
- J. The DAS software shall capture data (15 minute averages) for the life of the system in a common recording format (Comma Separated Values or Access Compatible Database) thereby allowing manipulation, plotting, and upload of the data.
- K. The DAS shall incorporate all data with an interactive lobby kiosk that displays pertinent system data, as described in Section 13845 -Building Energy Monitoring And Display.

2.7 PRIMARY COMPONENTS

- A. PV Modules
SunPower Corporation
Silicon Valley
San Jose, CA
- B. DC to AC Power Inverter, Source Circuit Combiner
SMA America, Inc.
Grass Valley, CA
- C. Data Acquisition System
Heliotronics
Hingham, MA

D. Panel Clips

S5, Metal Roof Innovations, LTD.
Colorado Springs, CO

G. Or approved equal.

2.8 ENCLOSURES

- A. NEMA 250, Type 4R exterior-grade steel cabinets with access to components through hinged doors with flush tumbler lock and latch for all outdoor applications.
- B. Finish: Manufacturer's standard baked-enamel finish over corrosion-resistant prime treatment.

2.9 SOURCE QUALITY CONTROL

- A. Factory test complete inverter system before shipment.
- B. Observation of Test: Give 14 days' advance notice of tests and provide access for Owner's representative to observe tests at Owner's option.
- C. Report test results. Include the following data:
 - 1. Description of input source and output loads used. Describe actions required to simulate source load variation and various operating conditions and malfunctions.
 - 2. List of indications, parameter values, and system responses considered satisfactory for each test action. Include tabulation of actual observations during test.
 - 3. List of instruments and equipment used in factory tests.

PART 3 - EXECUTION

3.1 SAFETY PRECAUTIONS

- A. Contractor shall ensure that all work under his/her control is conducted in accordance with all applicable safety codes and requirements and practices including but not limited to OSHA requirements, local and state safety codes, and specific job requirements.
- B. Contractor shall participate in site safety meetings and shall communicate all appropriate safety information to employees and subcontractors in a timely manner.
- C. Contractor shall be responsible for knowing how to safely install a high voltage PV power system and how to ensure that circuits are de-energized prior to conducting work on them. PV power systems involve special safety challenges because PV modules generate electricity whenever they are exposed to sunlight. In high voltage PV

systems there is the potential for shock and arc capable of causing serious injury or death.

- D. Contractor shall be responsible for ensuring that other workers on site are not exposed to undue hazards associated with the PV installation.
- E. Contractor shall be responsible for conducting a safe operation and for ensuring that appropriate protective equipment is utilized by personnel under his/her direction.
- F. Contractor shall be responsible for ensuring that all employees and subcontractors under his/her direction have the appropriate experience and training to safely accomplish the tasks being assigned to them.
- G. Contractor shall report all accidents at the jobsite involving employees and/or subcontractors.
- H. Contractor shall identify safety hazards and risks and communicate them to appropriate personnel prior to the commencement of work.
- I. Contractor shall ensure that there shall always be a minimum of two people working together.

3.2 INSTALLATION

- A. All components shall be installed in accordance with manufacturers' manuals, guidelines, and instructions.
- B. All work shall be done in accordance with applicable codes and in accordance with the authority having jurisdiction.
- C. The Contractor shall arrange a pre-installation conference with all appropriate parties to communicate procedures, safety information, schedules, and responsibilities and to coordinate with other work efforts.
- D. All DC wiring and components shall be labeled for polarity and circuit. All AC wiring and components shall be labeled for phase.
- E. All DAS wiring shall be labeled.
- F. All connections shall be torqued to manufacturers' specifications.
- G. All metal components including module frames shall be grounded in accordance with applicable codes and listings.
- H. Contractor shall be responsible for removing and properly disposing of any excess or waste material generated in association with the delivery and installation of the PV System.
- I. Work area and system components shall be clean and orderly during installation and at the completion of the project.

- J. All components shall be properly labeled. Labels shall conform to the requirements of all applicable codes. Exterior labels shall be rated for outdoor use. Location of PV System disconnects shall be described at the Service Entrance.
- K. All fuses shall be removed and all circuit breakers and switches shall be left in the open position between system installation and system testing.
- L. Installation of all panel clips and hold-downs shall be done per manufacturers instructions, and fully coordinated with standing seam metal roofing installation.

3.3 FIELD TESTING OF PV MODULES

- A. All individual PV modules shall be field tested at the project site during the installation process to verify performance.
- B. Open Circuit Voltage (Voc) and Short Circuit Current (Isc) shall be measured and recorded along with the module serial number, ambient temperature, and plane-of array irradiance. Testing shall occur under reasonably clear weather conditions and during mid-day hours. Testing records shall be submitted to the Architect.
- C. Measurements shall be compared to values provided by module manufacturer to determine whether each module is operating properly. Contractor shall return defective modules to the module manufacturer for warranty replacement.

3.4 CONNECTIONS

- A. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams, unless otherwise indicated.
- B. Ground equipment according to Division 16 Section "Grounding and Bonding."
 - 1. Separately Derived Systems: Make grounding connections to grounding electrodes and bonding connections to metallic piping systems as indicated; comply with NFPA 70.
- C. Connect wiring according to Division 16.

3.5 IDENTIFICATION

- A. Identify equipment and components according to Division 16.

3.6 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. Tests and Inspections:

1. Inspect interiors of enclosures for integrity of mechanical and electrical connections, component type and labeling verification, and ratings of installed components.
2. Test manual and automatic operational features and system protective and alarm functions.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specifications. Certify compliance with test parameters.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.**3.7 INSTALLATION INSPECTION****A. After the system has been installed but before it is energized, the Contractor shall conduct an inspection to verify that:**

1. All components are installed in a neat, workmanlike manner.
2. All components and materials are in new condition and installed in accordance with manufacturers' manuals and guidelines.
3. Appropriate torque has been used in tightening wire connections and fasteners (random checks).
4. Appropriate fasteners have been used throughout the system.
5. All outdoor components and materials are rated for such use and expected to last for the life of the system.
6. All wiring is new, continuous, copper, 600V rated, with proper insulation for its location, and properly secured and protected for the life of the system.
7. All non-current carrying metal materials are properly grounded.
8. PV negative conductors are not switched.
9. All conductors are labeled as to proper circuit and proper polarity.
10. Surge suppressors are installed and correctly wired.
11. DAS has been properly installed and wired.

B. Contractor shall arrange for and host electrical inspection of the PV system.**3.8 PRE-COMMISSIONING TESTING****A. With all disconnects open, all fuses removed and all circuit breakers off, Contractor shall use a digital multi-meter to confirm that conductor polarities are correct and connected to the correct terminals.****B. Contractor shall carefully test the outputs of individual series strings (Voc and Isc), and sub-arrays (Voc) to identify and correct any inconsistencies. Testing shall occur under reasonably clear weather conditions and during mid-day hours and test results shall be recorded and submitted to architect.**

- C. Testing should proceed from series strings to sub-arrays on the roof and then to the electrical room DC disconnects and circuit combiner. Polarities shall be checked at every step. Fuses shall be installed and switches closed only after polarities and wiring have been checked thoroughly.
- D. Pre-commissioning testing shall stop at the inverter DC disconnects. This disconnect shall remain in the open position.

3.9 COMMISSIONING AND PERFORMANCE TESTING

- A. Contractor shall ensure that commissioning and performance testing involve the inverter manufacturer or the inverter manufacturer's designated representative.
- B. Inverter start-up and commissioning shall occur only after all AC and DC connections to the inverter and transformer and point of interconnection load center have been checked for polarity, phase, labeling, and torque.
- C. Inverter start-up shall be accomplished via the manufacturer's procedures and checklists.
- D. Testing of the inverter's output performance shall be conducted during reasonably clear weather conditions and during mid-day hours. System AC output in kW shall be measured along with ambient temperature (at the array and in the mechanical room) and plane-of-array irradiance. AC inverter output shall be measured for the whole system and also for each individual sub-array (with all other sub-arrays disconnected). Measurements shall be recorded and submitted to the architect.
- E. Contractor shall verify that the system performs properly over the course of a day including: automatic morning start-up, full power daytime operation, and automatic nighttime shut down.
- F. Proper operation of the DAS shall be verified during performance testing.
- G. Any anomalous or unsatisfactory performance shall be corrected and the system retested.
- H. The Contractor shall arrange for and host the utility inspection and shall coordinate with the utility to address any issues brought forward by the utility.

3.10 ACCEPTANCE

- A. Once the inverter and the system have successfully undergone electrical inspection, commissioning and performance testing, and utility inspection, the Contractor shall present the system Operation and Maintenance Manual to City of New York and conduct a 3 hour session to familiarize appropriate facility representatives with system start-up, operation, and shut down and with the DAS.
- B. Manual shall include as-built electrical and mechanical drawings, product cut sheets, manufacturers' operation and maintenance manuals, maintenance schedules and procedures, troubleshooting procedures, warranty information, and contact information.

- C. Appropriate facility representatives shall be trained on the operation of the DAS, its measurement capabilities, the use of its software, and its educational opportunities.
- D. At this point the City of New York shall sign a written acceptance statement and assume ownership of the system.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train City of New York's designated maintenance personnel to adjust, operate, and maintain photovoltaic system

END OF SECTION*

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SECTION 13845 – RESOURCE MONITORING DISPLAY

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. RESOURCE DASHBOARD

1. Overview
 - a. Vendor shall provide a single, comprehensive solution that can connect to disparate building systems and summarize resource consumption and production data plus other relevant information for the following audiences: non-technical building occupants and visitors, building staff, facility managers and executives/stakeholders.
2. PC-optimized and kiosk-optimized dashboards
 - a. Solution must include both a web-based dashboard optimized for display on an interactive wall-mounted touchscreen kiosk in the building lobby/entranceway, and another web-based dashboard optimized for a personal computer.
3. SaaS
 - a. Solution must be a Software as a Service (SaaS) option, not requiring software installation with on-site servers. The SaaS structure should enable configuration, maintenance and upgrades to occur over the internet.

B. DEFINITIONS

1. City of New York
 - a. The end user organization or agent of the end user organization that will implement the Resource Monitoring Display or Resource Dashboard.
2. Dashboard users
 - a. Non-technical individuals that are the primary audience for the resource dashboard unless otherwise noted. Dashboard users could include, for example, individuals that are working in, living in, studying in, visiting, or otherwise affiliated with a building included on an organization's Resource Dashboard.
3. Kiosk-optimized dashboard
 - a. The web-based version of the dashboard whose look and feel is optimized for display on an interactive touchscreen kiosk in a building lobby/entranceway or other public area and optimally displayed on a screen that supports a 1360x768 resolution.
4. PC-optimized dashboard
 - a. The web-based version of the dashboard whose look and feel is optimized for use by individuals accessing the dashboard via a personal computer.

- a. PC- and kiosk-optimized dashboards must allow users to overlay historical data points over the real-time data points for various time periods (today vs yesterday, this week vs last week, this year vs last year etc.)
 - b. The dashboard should display a percent reduction/increase value for each unit of time (hour, day, month etc.) as the cursor scrolls over the historical data point.
3. Unit equivalents
 - a. PC- and kiosk-optimized dashboards must allow users to view measured resources in various unit equivalents, including but not limited to kilowatt-hours (for electricity), kilo-BTUs (for non-electric energy resources), pounds of CO2 (for all carbon-producing resources), and dollars (for all resources).
 - b. Kiosk-optimized dashboard must additionally allow users to view measured energy resources in gallons of gasoline, appliance usage-hours, miles driven in a car and hamburgers. These unit equivalents should be designed and specified with the objective of assisting an audience of non-technical users in understanding and interpreting resource consumption levels.
 4. Normalization
 - a. PC- and kiosk-optimized dashboards must support normalized comparisons based on building occupancy and square footage.
 5. End use breakdowns
 - a. PC- and kiosk-optimized dashboards must allow users to view and compare resource consumption across all sub-metered end uses.
 6. Renewables
 - a. PC- and kiosk-optimized dashboards must display performance data for photovoltaic, solar thermal, and geothermal systems. They must also show real-time and historical production, savings and payback trajectory, and other monitored variables. Resource Dashboard should do so in the context of data-enabled illustrations.
 7. Energy orb
 - a. Kiosk-optimized dashboard must include an energy orb for each building to serve as a quick color indicator of the building's current energy performance in comparison to previous performance during the same time of day and day of the week.
 8. Interpretive gauges
 - a. PC-optimized dashboard must include interpretive gauges that use dynamic, animated landscapes to visualize resource consumption and production in an engaging and informative way.
 9. Peer comparison
 - a. PC- and kiosk-optimized dashboards must give users the ability to compare consumption of buildings based on building type and resource type. If sub-metering exists, solution must also allow comparisons within a building (between floors or wings). Users must be able to conduct comparisons using normalized (per occupant or per square foot) data.

I. DASHBOARD ENGAGEMENT & COMMUNICATION TOOLS

1. Green features
 - a. PC- and kiosk-optimized dashboards must allow users to view up to 30 of the building's or group of buildings' green features. The green features tool must use custom imagery and text.
2. LEED credit checklist
 - a. PC- and kiosk-optimized dashboards must allow users to view the list of LEED prerequisites and credits achieved by the building
3. Budgets
 - a. PC-optimized dashboard must be able to display actual performance vs monthly budgets. Budget function must visualize progress in terms of kilowatt-hours, dollars and carbon dioxide emissions.
4. Conservation Commitments with Online Social Media
 - a. PC-optimized dashboard must allow users to commit to specific conservation behavior action items, which must be fully customizable.
 - b. The commitments function must be connected to Online Social Media such that users can elect to have their commitments displayed on their personal profile.
5. Green tips
 - a. PC- and kiosk-optimized dashboards must be able to display rotating, randomly generated tips on energy and water conservation how-to.
6. Event tagging
 - a. PC-optimized dashboard must allow managers to record and display building operations and maintenance activities, events and other relevant information in a continuous and easily accessible log viewable both by the manager and end users.
7. Online Social Media feed
 - a. PC-optimized dashboard must be able to display a specified number of status updates by one or more specified users, thus allowing the organization's sustainability team to easily post messages to the Dashboard.
8. Embedded video
 - a. PC- and kiosk-optimized dashboards must be able to display embedded videos. PC-optimized dashboard should allow City of New York to display multi-video stream.
9. Current and forecast weather
 - a. PC- and kiosk-optimized dashboards must be able to display zipcode-specific current and forecasted weather without the need for an on-site weather station
10. Events calendar
 - a. Kiosk-optimized Dashboard must be able to display events managed in Google Calendar.

1.4 SUBMITTALS

J. PRODUCT DATA

1. Submit Manufacturer's Data on kiosk display touch screen.

A. SHOP DRAWINGS

2. Submit complete detailed system architecture drawing showing all control panels, DDC workstation, lobby educational display monitor,

- weatherstation interface, integrated subsystems interface (lighting, electrical, ground source heat pumps, photovoltaics, rainwater harvesting) Include narrative description of all integration protocols and interface requirements for all systems described in this specification.
3. Submit complete color "snapshots" of lobby touchscreen educational display for all floorplans, mechanical, electrical and plumbing systems required to meet City of New Yorks' building energy usage and savings display requirements as described herein.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design

1. The basis of design for the resource dashboard solution is Lucid's Building Dashboard product. Acceptable manufacturers of the Resource dashboard include Lucid, QA Graphics, Quality Attributes Software, OR APPROVED EQUAL.

PART 3 EXECUTION

3.1 DASHBOARD MANAGEMENT & REPORTING

A. DASHBOARD MANAGEMENT

1. Dashboard management
 - a. Solution must include a password-protected web-based support interface that allows authorized users to manage dashboard content directly, and not require changes to have to happen through support requests.
2. Dashboard access traffic monitoring and analysis
 - a. Vendor must provide an interface for tracking and reporting visitor activity on the PC-optimized version of the dashboard. Metrics such as unique visitors and total visitors must be available for each dashboard, and should be trackable over time.
3. Green Features content management
 - a. Solution must include a web-based interface for managing the Green Features and Sustainability initiatives content (images and text) rendered on the dashboard
4. Budget management
 - a. Solution must include a web-based interface that allows authorized users to set and modify energy and water use budgets/goals.
5. Commitments management and metrics
 - a. Solution must include an interface for managing Conservation Commitments. Interface must allow manager to define commitment sets that target specific audiences and span different time periods and view which users have committed to which conservation actions.
6. Energy competition management

- a. Solution must include an interface for managing competitions between buildings or individual floors and custom groups. The interface must also include a record of previous competitions.
7. Building profile management
 - a. Solution must include an interface for managing building meta-data, including but not limited to occupancy, square footage, map coordinates, building type, and building profile picture (avatar).
8. Manual data entry
 - a. Solution must allow authorized users to submit manual meter reads or billing data, in order to enable non-realtime buildings to be incorporated into the dashboard.

B. Executive PDF Reports

1. Overview
 - a. Solution must be able to provide print-ready PDF reports of high-level metrics for presentation to executives and stakeholders.
2. Load profile analysis
 - a. PDF reports must be able to illustrate the typical load profile of a building/meter for any day of the week
3. Building performance analysis
 - a. PDF reports must be able to include metrics on building performance over user-specified month or year. Users must be able to normalize these metrics on a per square foot and per person basis.
4. Peak load versus base load analysis
 - a. PDF reports must provide analysis of consumption peaks vs building base load over different timescales.
5. Biggest consumers increasing/decreasing usage analysis
 - a. PDF reports must be able to display largest percent change across building portfolio; i.e. buildings posting highest reductions or increases in consumption versus a reference period.

3.2 DASHBOARD IMPLEMENTATION, SERVICE & SUPPORT

A. Implementation

1. Hardware installation
 - a. The City of New York must be responsible for the installation of all hardware, including but not limited to hardware purchased from the Vendor.
2. Integration specialist
 - a. Vendor must provide integration expertise to ensure successful integration with BMS and/or meters.
3. Dashboard set-up

- a. Once a contract has been signed, the Vendor shall provide a Customer Requirements Checklist that the City of New York will complete to allow the Vendor to set up the dashboard according to the City of New York's specifications.
 - b. Completing the Checklist entails providing the Vendor with images and text, answering a few questions about the City of New York's buildings, and selecting other options, such as unit equivalents, that are the best fit for the City of New York.
4. Training
 - a. The Vendor must provide training to the City of New York's project team, including a kick-off meeting to discuss best practices for program opportunities such as competitions.

B. Service

1. Service format
 - a. Solution must provide service on a license/subscription basis. City of New York must have the opportunity to renew service at the end of each purchased service period.
2. One year of service
 - a. Purchase of the dashboard must include one year of service.
3. Hosted data service must include secure, cloud hosting of all collected consumption data.
4. Software updates
 - a. Service must include upgrades to the dashboard software upon new releases of purchased features and functionality.
5. Support provided
 - a. Service must include the support activities listed in the Support section below.
6. Service start date
 - a. Service must begin on the contract Effective Date.

C. Technical Support

1. Uptime monitoring and alerts
 - a. Vendor must provide and maintain a network operations center (NOC) for uptime monitoring of all data acquisition devices and meters.
 - b. Solution must be able to alert responsible parties by email and/or SMS of component failure.
2. Issue tracking system
 - a. Vendor must provide access to a web-based issue/ticket tracking system and maintain record of all incidents during the life of the system.

3. Documentation and FAQs
 - a. Vendor must provide reference documentation and/or in-line dashboard configuration help to City of New York.
4. Telephone support with no automated menus
 - a. Vendor must provide telephone support from a dedicated support agent.
5. Email support
 - a. Vendor must provide easy access to support from a dedicated support agent via email.
6. Clearly defined support hours
 - a. Vendor must document hours of support availability and expected turnaround time for support requests
7. Professional escalation
 - a. Vendor must make engineering professionals available via established escalation protocols.

D. Dashboard Utilization Support

1. Dashboard utilization and program implementation consulting
 - a. Vendor must provide expertise via a designated vendor to assist City of New York in integrating the dashboard into new and existing sustainability and occupant engagement and behavior change initiatives.
2. Competition resource kit
 - a. Vendor must provide City of New York with a competition resource kit that includes outreach and organizing tips, sample marketing collateral, research papers, and other resources.
3. Dashboard launch kit
 - a. Vendor must provide City of New York with a dashboard launch kit that includes sample press releases, dashboard badges that can be placed on the City of New York's webpage, and social networking outreach tips.

END OF SECTION

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SECTION 15000 - SPECIAL REQUIREMENTS FOR MECHANICAL AND ELECTRICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions, wherever applicable to Mechanical and Electrical Work.
- B. Where items of the General Conditions are repeated in this Section of the Specifications, it is intended to qualify or to call particular attention to them; it is not intended that any other parts of the General Conditions shall be assumed to be omitted if not repeated herein.
- C. This Section applies equally and specifically to all Contractors and Subcontractors supplying labor and/or equipment and/or materials as required under the Heating, Ventilating and Air Conditioning, Plumbing, and Electrical Sections of the Specifications.

1.2 DEFINITIONS

- A. "The Contractor" or "Each Contractor" means specifically, the Contractor or Subcontractor working under his respective Section (Heating, Ventilating and Air Conditioning, Plumbing, Sprinkler or Electrical) of this Specification.
- B. "Provide" means to supply, erect, install, and connect up in complete readiness for regular operation, the particular work referred to.
- C. "Furnish" means to supply and deliver to the job.
- D. "Piping" includes, in addition to pipe, all fittings, valves, hangers, and other accessories related to such piping.
- E. "Concealed" means hidden from sight as in chases, furred spaces, shafts, hung ceilings, or embedded in construction.
- F. "Exposed" means "not concealed" as defined above. Work in trenches, crawl spaces, and tunnels shall be considered "exposed" unless otherwise specifically noted.
- G. "Approved equal" means any equipment or material which, in the opinion of the Architect, is equal in quality, durability, appearance, strength, design, performance, physical dimensions, and arrangement to the equipment or material specified, and will function adequately in accordance with the general design.
- H. "Governmental" means all municipal, state and federal governmental agencies.
- I. Where any device or part of equipment is herein referred to in the singular number (such as "the pump"), such reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the Drawings.

- J. "HVAC" means Heating, Ventilating and Air Conditioning.
- K. "Plumbing Contractor" means the Contractor doing Plumbing Work.

1.3 CODES AND STANDARDS

- A. N.Y. State Uniform Fire Prevention and Building Code
- B. NFPA National Fire Protection Association
- C. ASME American Society of Mechanical Engineers
- D. ANSI American National Standards Institute
- E. ASTM American Society for Testing Materials
- F. AWWA American Water Works Association
- G. IBR Institute of Boiler and Radiator Manufacturers
- H. NEMA National Electrical Manufacturers Association
- I. ASHRAE American Society of Heating, Refrigeration and Air Conditioning Engineers
- J. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.
- K. ARI Air Conditioning and Refrigeration Institute
- L. UL Underwriters' Laboratories
- M. AMCA Air Moving and Conditioning Association
- N. ADC Air Diffusion Council
- O. AABC Associated Air Balance Council
- P. 1980 National Standard Plumbing Code with all New Jersey State Amendments.
- Q. Local Water Company Rules and Regulations
- R. NFPA-90A Air Conditioning and Ventilation Systems
- S. National Electric Code
- T. New York City Electrical Code

1.4 INTENT

- A. It is the intention of the Specifications and Drawings to call for finished work, tested, and ready for operation. All materials, equipment, and apparatus shall be new and

of first-class quality.

- B. Any apparatus, appliance, material, or work not shown on Drawings, but mentioned in the Specifications, or vice versa, or any incidental accessories, or minor details not shown but necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided without additional expense to the Owner.

1.5 DRAWINGS

- A. The Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of equipment; ducts, conduits, piping, and fixtures.
- B. The locations of all items shown on the Drawings or called for in the Specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect before being installed. Do not scale Drawings.
- C. Follow Drawings in laying out work and check Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom and space conditions appear inadequate, Architect shall be notified before proceeding with installation.
- D. If directed by the Architect, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- E. Piping or ductwork connected to equipment may require different size connection than indicated on the Drawings. The Contractor shall provide transition pieces as required at the equipment.

1.6 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. Any questions or disagreements arising as to the true intent of this Specification or the Drawings or the kind and quality of work required thereby shall be decided by the Architect, whose interpretations thereof shall be final, conclusive, and binding on all parties.
- B. In case of disagreement between Drawings and Specifications, or within either document itself, the better quality, greater quantity or more costly work shall be included in the Contract Price and the matter referred to the Architect's attention for decision and/or adjustment.
- C. Maintain an awareness to avoid space conflict with other trades.

- D. Purchase the equipment and material required in accordance with field measurements taken at the proper time during the construction progress.

1.7 VISITING THE SITE

- A. Before submitting the final proposal, examine the site of the proposed work to determine the existing conditions that may affect the work, as this Section will be held responsible for any assumptions.

1.8 EQUIPMENT AND MATERIALS

- A. The proposal and bid must cover all items on the Drawings and in the Specifications exactly as drawn and specified.
- B. If material or equipment is installed before the Contractor obtained "No Objections" comment from Architect, and/or in the opinion of the Architect the material or equipment does not meet the intent of the Drawings and Specifications, the removal and replacement shall be made at no extra cost to the Owner.
- C. The materials, workmanship, design, and arrangement of all work installed under the Contract shall be subject to the approval of the Architect.
- D. If material or equipment is installed before the Contractor obtained "No Objections" comment from the Architect, trade installing same shall be liable for the removal and replacement at no extra charge to the Owner if, in the opinion of the Architect, the material or equipment does not meet the intent of the Drawings and Specifications.
- E. The words "or approved equal" are understood to follow:
 - 1. The name of any manufacturer, vendor, equipment or materials;
 - 2. Any trade name, plate number, or catalog number;
 - 3. Any detailed description used to define equipment or material; except where otherwise indicated on the Drawings or in the Specifications.
 - 4. It is the intent of these Specifications that wherever a manufacturer of a product is specified, and the terms "other approved" or "or approved equal" are used, the substituted item must conform in all respects to the specified item. Consideration will not be given to claim that the substituted item meets the performance requirements with lesser construction (such as lesser heat exchange surface, etc.) Performance as delineated in schedules and in the Specifications shall be interpreted as minimum performance.
- F. All equipment and materials required for installation under these Specifications shall be new and without blemish or defect. All electrical equipment shall bear labels attesting to Underwriters' Laboratories approval. Where no specific indication as to the type or quality of the material or equipment is indicated, a first class standard

article shall be furnished.

- G. Where it is proposed to use an item of equipment other than that specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring, or of any other part of the mechanical, electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefore shall, with the review of the Architect and subsequent comments by the Architect "Conforms" or "Conforms as Noted" on the shop drawings, be prepared at no additional cost to the Owner.
- H. Where such deviation from contract documents requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the Drawings, furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring, and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.
- I. All equipment of one type (such as fan, coils, etc.) shall be the product of the same manufacturer.
- J. Note that the comments "A Conforms" or "Conforms as Noted" marked on the shop drawings or other information submitted in accordance with the requirements herein before specified does not assure that the Engineer, Architect, or any other Owner's representative attests to the dimensional accuracy or dimensional suitability of the material or equipment involved or the mechanical performance of equipment. Comments on the shop drawings do not invalidate the Plans and Specifications if the shop drawings are in conflict with the Plans and Specifications.

1.9 SHOP DRAWINGS

- A. Prior to delivery to job site, but sufficiently in advance of requirements necessary to allow Commissioner ample time for review, submit 7 copies (or as stated in "General Conditions") of shop drawings of all equipment, materials, piping, sleeves, conduit, ductwork, and wiring diagrams, and further obtain written comments "Conforms" or "Conforms as Noted" for same from the Commissioner, before installing any of these items.
- B. For piping, sheet metal, sleeve layout, and reflected ceiling plan shop drawings, submit a sepia transparency. After the transparency is notated and corrected by the Commissioner, it will be returned. Then the required number of corrected prints will be prepared.
- C. Shop drawings shall consist of manufacturer's certified scale drawings, cuts, or catalogs, including descriptive literature and complete certified characteristics of equipment, showing dimensions, capacity, code requirements, motor and drive testing, as indicated on the Drawings or Specifications.
- D. Certified performance curves for all pumping and fan equipment shall be submitted

for review.

- E. Samples of materials or equipment, when requested by the Architect, shall be submitted for review.
- F. Samples, drawings, specifications, catalogs, etc., submitted for review, shall be properly labeled indicating project name, specific service for which material or equipment is to be used, Section and Article number of Specifications.
- G. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested, shall be specific and identification in catalog, pamphlet, etc., of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.
- H. The comments "Conforms" or "Conforms as Noted" rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are reviewed, said review does not in any way relieve responsibility, or necessity, of furnishing material or performing work as required by the Contract Drawings and Specifications.
- I. "CONFORMS, AS NOTED" means, unless otherwise noted on the drawings to approve for construction, fabrication and/or manufacture subject the provision that the work shall be carried out in compliance with all annotations and/or corrections indicated on the shop drawings and in accordance with the requirements of the Contract Documents. If also marked "RESUBMIT", "CONFORMS AS NOTED" is invalid and a corrected submittal of the drawing is required.
- J. Prior to submission of shop drawings, thoroughly check each shop drawing, reject those not conforming to the Specifications, and indicate (by signature) that the shop drawings submitted meet Contract requirements. Deviations and/or exceptions to the contract documents should be clearly noted as being deviations and/or exceptions. The contractor will later be required to correct such deviations and/or exception at his own expense, if they have not been noted and approved on the shop drawing.
- K. All shop drawings showing routing of ductwork, piping and conduit, shall be not less than d" = 1'-0" scale.
- L. Incorporate a numbering system to help keep track of shop drawing submittals as follows:
 - 1. H.....HVAC shop drawings
 - 2. P.....Plumbing shop drawings
 - 3. E.....Electrical shop drawings
- M. Concurrent numbers shall follow the prefix letter. Example: H-1, H-2, etc. In

addition, shop drawings requiring resubmission should bear the number of the original submission and bear a suffix as follows: H-1A (second submission), H-1B (third submission), etc.

- N. Label resubmitted shop drawings with a stamp indicating the submittal number, for example: SECOND SUBMISSION; THIRD SUBMISSION, etc. and send separate transmittals for each item being submitted so that one transmittal does not cover more than one specific item or group of items from one manufacturer.
- O. Before request for acceptance and final payment for the work, write a letter to the Commissioner, stating that all shop drawings are brought to a condition "Conforms" or "Conforms as Noted". Any outstanding shop drawings must be cleared with the Commissioner,.

1.10 RECORD DRAWINGS

- A. Furnish the City of New York, at completion, two (2) sets of reduced size photo reproductions 152" x 23" maximum drawing size) at no additional cost to the City of New York. The drawings shall be Xerox reproduced and bound.
- B. During construction keep an accurate record of all deviations between the work as shown on the Drawings and that which is actually installed
- C. Make a complete record of all changes and revisions in the original design which exist in the complete work.
- D. Furnishing above transparencies and preparing these Record Drawings shall be at no additional cost to the City of New York. When all revisions showing the work as finally installed are made, the corrected Mylar transparencies shall be submitted for review by the Commissioner.

1.11 LAWS, ORDINANCES, PERMITS AND FEES

- A. Give all necessary notices, obtain all permits and pay all governmental taxes, fees, and other costs in connection with the work; file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required Certificates of Inspection for the work and deliver to the Architect before request for acceptance and final payment for the work.
- B. Include in the work, without extra cost to the City of New York, any labor, materials, services, apparatus, drawings, (in addition to Contract Drawings and Documents) in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- C. All materials furnished and all work installed shall comply with the rules and recommendations of the National Fire Protection Association, with all requirements of local utility companies, with the recommendations of the fire insurance rating

organization having jurisdiction, and with the requirements of all governmental departments having jurisdiction.

1.12 ORGANIZATION OF WORK

- A. The work throughout shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineers, Owners and Architects, who will jointly interpret the meaning of the Drawings and Specifications, and shall have the power to reject any work and materials which, in their judgment, are not in full accordance therewith.
- B. The work called for under this Contract shall be carried on simultaneously with the work of other trades in a manner such as not to delay the overall progress of the work. Furnish promptly to other trades involved at the project, all information and measurements relating to the work which they may require. Cooperate with them in order to secure the harmony necessary in the interest of the project as a whole.
- C. Furnish and install all work as fast as possible to meet all construction schedules.
- D. Keep a competent superintendent in charge of the work at all times. Such superintendent shall be replaced if unsatisfactory to the Commissioner.
- E. Upon award of contract, consult with the Architect and negotiate with subcontractors and manufacturers, and within thirty (30) days submit five (5) copies of a preliminary list of major equipment, for approval, complete with name of manufacturer, dates of purchase orders, and delivery dates to the site. Also submit within thirty (30) days, five (5) copies of a preliminary schedule of installation of the various systems. This list shall be revised monthly and five (5) copies shall be submitted. The second submittal shall contain the names of manufacturers of scheduled equipment (with names, addresses, and telephone numbers of local representatives).
- F. Maintain a complete file of shop drawings at all times available to the Commissioner's representative.
- G. Every facility shall be provided to permit inspection of the work by the Commissioner's representative during the course of construction.
- H. Where items of equipment and/or materials are indicated in the Specifications as being furnished by other trades for installation, assume responsibility for the unloading of such equipment and/or materials from the delivery trucks, and for providing safe storage for same as required pending installation.
- I. Where the work is to be installed in close proximity to work of other trades, or where there is evidence that the work is to interfere with work of other trades, assist in working out space conditions to make a satisfactory adjustment.
- J. If so directed by the Commissioner, prepare composite working drawings and sections at a suitable scale not less than $d'' = 1'-0''$ clearly showing how the work is

to be installed in relation to the work of other trades. If the installation is made before coordinating with other trades, make all necessary changes in the work without extra charge to the City of New York.

- K. Before submitting shop drawings for sleeves, piping and ductwork, the Heating, Ventilating and Air Conditioning Subcontractor shall prepare a combined d" = 1'-0" scale shop drawing for piping and ductwork indicating location of piping and ductwork with dimensions for each floor and Mechanical Rooms. A transparent copy of these shop drawings shall be given to the
- L. Electrical Contractor. The Electrical Contractor shall indicate the location of all lighting fixtures and conduit runs on these shop drawings. The Electrical Contractor shall give the transparent copy of these shop drawings, with lighting fixtures and conduit runs indicated to the Plumbing Contractor. The Plumbing and Sprinkler Contractor shall indicate his piping on these shop drawings. Each Contractor shall keep each transparent copy not more than three (3) working days.
- M. The Heating, Ventilating and Air Conditioning Contractor shall arrange a Coordination Meeting for each floor and Mechanical Equipment Room with Plumbing and Electrical Contractors under the supervision of the General Contractor. After coordination, each Contractor shall sign the transparent copy. The Heating, Ventilating and Air Conditioning Contractor shall submit these drawings to the Architect for review and he shall call any conflicts that could not be resolved in the coordination meetings, and/or deviation from original design, to the Architect's attention. After receiving written review from the Architect, each Contractor shall prepare the shop drawings as required under the paragraph "Shop Drawings" in the Specifications.

1.13 PROTECTION OF WORK AND PROPERTY

- A. Maintain and protect all equipment, materials and tools from loss or damage from all causes until final acceptance by the Owner.
- B. Assume responsibility for the protection of any finished work or other trades from damage or defacement by the operations and remedy any such injury or damages.
- C. Ascertain from examination of the Architectural Drawings whether any special temporary openings in the building will be required for the admission of apparatus provided under the Contract and notify the Architect accordingly. In the event of failure to give sufficient notice to the Architect in time to arrange for these openings during construction, assume all costs of providing such openings thereafter.

1.14 ACCESS DOORS IN FINISHED CONSTRUCTION

- A. Install all work so that all parts required are readily accessible for inspection, operation, maintenance and repair. Minor deviations from the Drawings may be made to accomplish this, but changes of magnitude shall not be made without prior written review from the Architect.

- B. Wherever mechanisms requiring access for maintenance, reading of instruments, or for operation are concealed in the structure and wherever else indicated on the Drawings, supply access doors of sizes necessary to provide ready access to the concealed items. Group together valves, controls, dampers, traps, expansion joints, cleanouts, gauges, switches, and other equipment requiring access in walls and furred spaces to reduce the number of access doors.
- C. Access doors shall be Milcor Style A, B or K, L or M, as manufactured by Inland Steel Products Co. or approved equal. Minimum access door shall be 12" x 12". For installation in plastered wall or ceiling, provide Style "K" or "L" as required. For installation in masonry walls, provide Style "M". For installation in acoustical tile surfaces, provide Style "AT". For installation in acoustical plaster surfaces provide Style "AP". Fire resistive access doors for suspended dry wall ceiling shall be Style ATR's. Provide fire rated access doors at fire rated shafts, stairwells, corridors and at all other walls with Fire Rating.
- D. Access doors shall be installed in building structure under a separate Section.
- E. All plumbing, electric and heating and ventilating access doors etc., shall be provided with Corbin #2722-1/2 master keyed cylinder locks. These locks shall be supplied and installed by the respective Contractor. These cylinder locks shall be purchased through the General Contractor's subcontractor for hardware after submission and review of the panel schedule as hereinafter specified.
- F. Prepare a schedule showing location of all panels, cabinets, etc. to receive the Corbin lock. This schedule shall designate, by building and room number, the panel or cabinet location and shall be submitted to the Architect. This schedule is required for use in preparation of keying information. Locks shall not be purchased prior to review of this schedule.

1.15 PIPE EXPANSION

- A. All pipe connections shall be installed to allow for freedom of movement of the pipe during the expansion and contraction; anchors and guides shall be provided where necessary and/or when shown on the Drawings. Anchors and guides shall be subject to the review of the Architect.

1.16 BASES AND SUPPORTS

- A. Provide all bases and supports not part of the building structure of required size, type and strength, as approved by the Architect, for all equipment and materials furnished by him. All equipment, bases, and supports shall be adequately anchored to the building structure to prevent shifting of position under operating conditions.
- B. The Section furnishing the equipment shall provide not less than six-inch high concrete bases for all pumps, refrigeration machines, compressors, and rotating machinery. Bases shall extend six inches beyond machinery base in all directions,

with top edge chamfered. Provide 2" x 6" steel dowels into floors to anchor bases. Provide anchor bolts set in pipe sleeves, two sizes larger than anchor bolts for securing machinery. After anchor bolts are aligned with equipment bases, fill sleeves with concrete and allow to set.

- C. Concrete bases are specified under other Sections of the Specification. Each Contractor shall furnish dimensioned drawings to the General Contractor. Steel dowels, sleeves and anchor bolts shall be furnished and set by the Contractor.

1.17 SEISMIC RESTRAINTS

- A. All mechanical and electrical systems including equipment, conduit, piping and ductwork shall be installed so as to resist seismic loading as indicated in section 15050 of the specification.
- B. The section installing the equipment shall provide required seismic restraints.

1.18 SLEEVES, PIPE AND CONDUIT INSERTS AND ANCHOR BOLTS

- A. Provide and assume responsibility for the location and maintenance in proper position of all sleeves, inserts, and anchor bolts required for the work. In the event that failure to do so requires cutting and patching of finished work, it shall be done without additional cost to the Owner.
- B. All pipes and conduits passing through masonry walls or partitions shall be provided with sleeves having an internal diameter larger than the outside diameter of the pipe or insulation enclosing the pipe or conduit. Sleeves shall be Schedule 40 black steel pipe.
- C. Sleeves through foundation walls shall be James B. Clow & Sons No. F-1430 or F-1435 cast iron wall sleeve with intermediate integral flange. Sleeves shall be set with ends flush with each face of wall. The space between sleeve and pipe shall be packed with a mechanical rubber seal, such as "Link Seal" manufactured by Thunderline Corp., and then with oakum to within 2" of each face of the wall. The remaining space shall be packed and made watertight with a waterproof compound.
- D. Sleeves through concrete floors or interior masonry walls shall be Schedule 40 black steel pipe, set flush with finished wall surfaces, but extending 2" above finished floors. The open sleeve space shall be packed with non-combustible materials.
- E. Sleeves through non-masonry partitions shall be 22 gauge galvanized sheet steel, set flush with finished surfaces of partitions.
- F. Inserts shall be preset concrete inserts with steel reinforced rods through the insert and both ends hooked over the reinforced mesh. Inserts shall be of individual type of malleable iron construction with accommodation for removable nuts and threaded rods up to 1/2" diameter, permitting lateral adjustment, except as otherwise noted. Individual inserts shall be Grinnell Fig. 279 up to 5" pipe and conduit, Fig. 282, 6"

and up to 8" pipe and conduit, Fig. 152 above 8" and up to 12" pipe and conduit. For figures 282 and 152, they shall come with an opening at the tip to allow reinforcing rods up to 2" diameter to be passed through the insert body. Rods shall extend a minimum of 4" on either side of the insert. Pipes larger than 12" shall be suspended from steel members only.

- G. In general, all piping and conduit shall be supported from structural steel building members only or approved malleable steel inserts imbedded in concrete pours. Inserts shall not be located in the same deck flute as ceiling tabs nor within 2 feet in any direction from ceiling tabs. Inserts shall not be spaced closer than 4 feet on center in all directions.
- H. Where layout revisions are required, and are approved after concrete deck is poured, piping conduit 3" and smaller may be supported at Intermediate Points by Phillips' " expansion bolts with lead shields, provided main supports are welded to structural steel and are not more than twenty feet on centers.
- I. The Contractor shall have the option of providing 18 gauge sheet metal sleeves in lieu of Schedule 40 steel pipe.
- J. Piping and conduit 3" and smaller shall be supported from existing slab by "Phillips" expansion bolts with lead shields. Piping 4" and larger shall be supported by means of 4" x 4" x d" clip knee angle with " expansion bolt in shear and supporting rod at 90E from another bolt or using two expansion bolts per hanging post - pipes 8' and larger shall be supported from steel building members.
- K. Provide sleeves for pipes passing through roofs. Sleeves passing through roofs shall be as detailed on drawings extending min. 12" above finished roof. All pipes passing through roof shall be minimum of 10" from walls or other construction to permit proper flashing. Provide counter flashing.
- L. Where sleeves pass through waterproofed floors, they shall be IPS brass pipe sleeves of the required diameter, brazed at the bottom to 18" x 18", 16-ounce copper flashing for bond with waterproofing. The tops of the sleeves shall extend 2" above finished floor.
- M. All hangers, rods and supports shall be installed prior to construction fireproofing.
- N. The required fire resistance rating of floor or floor/ceiling assemblies and walls shall be maintained where a penetration is made for electrical, mechanical, plumbing pipes, conduits, ducts and systems. Fire stopping shall be provided at openings around vents, pipes, ducts, conduits at floor levels and walls with non-combustible materials, such as rockwool or equal.
- O. For openings around pipes and conduits and/or sleeves, 3M product Caulk CP 25 and Putty 303 is approved equal.

1.19 ESCUTCHEONS

- A. Provide escutcheons on pipes wherever they pass through ceilings, walls, or partitions.
- B. Escutcheons or pipes passing through outside walls shall be Ritter Pattern and Casting Co., No. 1, solid, cast brass, flat type secured to pipe with set screw.
- C. Escutcheons for pipes passing through floors shall be Ritter Pattern and Casting Co., No. 36A, split-hinged, cast brass type, designed to fit pipe on one end and cover sleeve projecting through floor on the other end.
- D. Escutcheons for pipes passing through interior walls, partitions, and ceilings shall be Ritter Pattern and Casting Co., No. 3A, split-hinged, cast brass chromium plated type.

1.20 MANUFACTURERS' IDENTIFICATION

- A. Manufacturer's nameplate, name or trademark, shall be permanently affixed to all equipment and material furnished under this Specification. Where such equipment is in a finished occupied space, the nameplate shall be in a concealed but accessible location. The nameplate of a Subcontractor or Distributor will not be acceptable.

1.21 EQUIPMENT NAMEPLATES

- A. Provide for each item of equipment, including panel boards, disconnects, breakers, starters, switches, and all control devices, pumps, fans, compressors, boilers, etc., a permanently attached nameplate made of black surface, white core laminated bakelite with incised letters. Subcontractor furnishing equipment shall provide nameplate. Pneumatic, electric and mechanically actuated gauges shall have a brief, but complete description of their function. Stating the air pressure or voltage range alone is not acceptable. Nameplates shall be a minimum of 3" long by 12" wide and shall bear the equipment name and item number in 2" high white letters as designated in the equipment schedule. Mounting screws shall have chrome plated acorn headed screws.

1.22 TAGS AND CHARTS

- A. Furnish and attach to each valve as hereinafter specified, a 12" diameter brass tag with 2" indented numerals filled with durable black compound. Tags shall be securely attached to stems of valves with copper wire and "S" hooks.
- B. Valve charts shall consist of schematic drawings of piping layouts, showing and identifying each valve and describing the function. Upon completion of the work, one (1) copy of each chart, sealed to rigid backboard with clear lacquer placed under glass and framed, shall be hung in a conspicuous location in the main equipment room, unless otherwise directed by the Architect. Two (2) additional unmounted copies in 82" x 11" leather ring binders shall be delivered to the

Architect. Also furnish three (3) copies of schematic flow chart with corresponding valve numbers noted on chart.

- C. Provide tags for the following valves:
 1. Zone control, bypass, shut-off, check and balancing valves.
 2. Building and area shut-off and balancing valves.
 3. Control, by-pass, shut-off, balancing and drain valves for major pieces of equipment such as boilers, domestic hot water heaters, heat exchangers, refrigeration machines, pumps, heating, ventilating and air conditioning units, cooling towers, etc.
 4. System drain valves, safety and relief valves. Vacuum breakers.

1.23 IDENTIFICATION

- A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.
- B. Markers shall be snap-on type as manufactured by Seton Nameplate Corp., New Haven, Conn. (Setmark System), Bunting Stamp Co. Inc., Pittsburgh, P.A. or approved equal. Markers shall completely encircle the pipe with a substantial overlap. No adhesive shall be used. They shall be manufactured of U.L. approved, self-extinguishing plastic. When the pipe including insulation (if any) is larger than 6 inches diameter, markers shall be strap-on type.
- C. Provide identification for piping, ductwork and conduit for electrical work.
- D. Pipe shall be lettered and valves tagged in accordance with the schedule below. Lettering shall be located near each valve and branch connection and at intervals of not over 40 feet (10 feet on fire lines) on straight runs of pipe. Provide flow arrows for all piping at each marker. Adjacent to the legend, stencil the size of the pipe, conduit or ductwork. Letter Colors are as follows: Yellow with black letters, green with white letters, blue with white letters and red with white letters.

STENCIL AND VALVE TAG SCHEDULE

Service	Stencil Designation	Color	Tag Designation
Cold Water	Cold Water	Green	C.W.
Hot Water (Plumbing)	Hot Water-Deg. F.	Yellow	H.W.-Deg. F.
Hot Water Circulating	Hot Water Cir.	Yellow	H.W.C.

Fire Standpipe	Fire Standpipe	Red	FSP
Sprinkler	Sprinkler	Red	SP
Drinking Water Supply	Drinking Water	Green	D.W.
Drinking Water Return	Chilled Water Ret.	Green	D.W.R.
Service	Designation	Color	Designation
Chilled Water Supply	Chilled Water	Green	CHWS
Chilled Water Ret.	Chilled Water Return	Green	CHWR
Dual Temperature Water Supply	Dual Temp. Water Supply	Green	CHS
	Dual Temp. Water Ret.	Green	CHR
Gas	Gas	Yellow	G
Sanitary Sewer	San. Sewer	Green	---
Storm Sewer	Storm Sewer	Green	---
Combined Sewer	Comb. Sewer	Green	---
Storm Water Piping	St. W.	Green	---
Soil Piping	Soil	Green	---
Waste Piping	Waste	Green	---
Vent Piping	Vent	Green	---
Air Conditioning Drain Safety Valve	Air Conditioning Drain	Green	---
Discharge	Safety V. Disch.	Yellow	S.V.D.
Relief Vent	Relief V.	Yellow	---
Heating Water	Heat. Water Sup.	Green	H.W.S.

Supply

Heating Water Return	Heat. Water Ret.	Green	H.W.R.
Fuel Oil Supply	Fuel Oil S.	Yellow	F.O.S.
Fuel Oil Return	Fuel Oil R.	Yellow	F.O.R.
Air Conditioned Supply Air	A.C. Supply Air	Green	---
Return Air	R.A.	Green	---
Exhaust Air	E.A.	Yellow	---
Outside Air	O.A.	Green	---
Mixed Air	M.A.	Green	---

- E. Tanks, pumps, fans and other equipment shall be stenciled to show the number, if any, and service.
- F. Exposed conduits for alarm and communication systems shall be banded at intervals of not over 10 feet. Bands shall be of the following colors:

Fire Alarm System	Red
Water flow and Sprinkler Supervisory System.....	Red & Yellow
Combined Fire Alarm and Watchmen's Report System	Red & Blue
Watchmen's Report System	Blue
Security System.....	Blue & Yellow
Civil Defense System.....	Yellow
Clock System.....	Green
Mechanical & Electrical Supervisory System.....	Green & Blue
Telephone System.....	Green & Yellow

- G. Where required, provide signage "HIGH VOLTAGE" in black letters two inches high, stenciled at 10-foot intervals over a continuous painted orange background.

- H. Except where other means of identification are specified, electric cabinets, switchboards, motor control centers, transformers, system control boards, disconnecting switches, remote control switches, individual motor starters and motor control pushbutton stations shall be stenciled to show the service and number, if any, of the equipment controlled, as appropriate. Panel boards and other electrical equipment located in finished areas, such as offices, shall have the identification placed on the inside of the cabinet doors.
- I. Cabinets housing 460Y/265 Volt panel boards shall have "460/265 volt" stenciled in 2-inch high yellow letters on the inside of the cabinet doors.
- J. Cabinet housing emergency lighting panel boards shall have the word "EMERGENCY" stenciled in 2-inch high red letters on the outside of the cabinet, in addition to other lettering required above.
- K. The bolted covers of housings for disconnecting switches or links in bus ducts between network transformers and switchboards shall be lettered to identify the equipment within.
- L. Serial numbers shall be stenciled on the tanks and covers of transformers having their nameplates attached to the high voltage switch chamber covers.

1.24 DRIP PANS

- A. Examine the drawings, and in cooperation with the Electrical Work confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than three feet from a vertical line to electric switchboards, panel boards, or similar equipment.
- B. Where the installation of piping does not comply with the requirements of foregoing paragraph, where feasible the piping shall be relocated.
- C. Provide copper gutters as follows:
 - 1. Provide a gutter of 16 ounce cold rolled copper under every pipe which is within 2'-0" (two feet) of being vertically over any motor, electrical controllers, switchboards, panel boards, or the like.
 - 2. Each gutter shall be soldered and made watertight, properly suspended; and carefully pitched to a convenient point for draining. Provide a : inch drain, to nearest floor drain or slopsink.
 - 3. In lieu of such separate gutters, a continuous protecting sheet of similar construction, adequately supported and braced, properly rimmed, pitched and drained, may be provided over any such motor, and extending 3'-0" in all directions beyond the motor, over which such piping has to run.

1.25 TOOLS

- A. All special tools for proper operation and maintenance of the equipment shall be delivered to the Owner's representative and a receipt requested for same at no additional cost to the Owner.

1.26 QUIET OPERATION

- A. All equipment and material shall operate under all conditions of load without any sound or vibration which in the opinion of the Architect is objectionable. Where sound or vibration conditions arise which are considered objectionable by the Architect, eliminate same in a manner reviewed by the Architect.

1.27 RUBBISH REMOVAL

- A. See to it that the project is at all times maintained free of all rubbish, rubble, waste material, packaging materials, etc. accumulating as a result of his work. Assume responsibility for the cleaning up of packaging removed from materials and equipment furnished by other trades for the installation. Note that final acceptance of the work is contingent upon the project being free of all excess and waste materials resulting from the work.
- B. Clean all parts of the building exterior spaces and adjacent roads, sidewalks, and pavement, free from material and debris resulting from the execution of the work. Debris resulting from interior construction shall be neatly stacked on each floor near elevators, material hoists and rubbish chutes, as directed by the Architect or his representative. Debris resulting from exterior construction shall be similarly stacked. All debris so stacked will be removed under other Sections. Excess material will not be permitted to accumulate either on the interior, exterior or on sidewalk.

1.28 CLEANING, PIPING, DUCTS AND EQUIPMENT

- A. Clean all piping, ducts, and equipment of all foreign substances inside and out before being placed in operation.
- B. If any part of a system should be stopped by foreign matter after being placed in operation, the system shall be disconnected, cleaned, and reconnected wherever necessary to locate and remove obstructions. Any work damaged in the course of removing obstructions shall be repaired when the system is reconnected at no additional cost to the Owner.
- C. During construction, properly cap all pipes and equipment nozzles so as to prevent the entrance of sand, dirt, etc.

1.29 DELIVERY OF MATERIAL

- A. Deliver the material and store same in spaces indicated by the Architect and assume full responsibility for damage to structure caused by any overloading of the material.

1.30 EXCAVATION AND BACKFILL

- A. All excavation trenching, backfilling and compaction shall be done by each Contractor.
- B. Unclassified excavation shall include the excavation of all materials encountered in the work, such as earth, boulders, rock, shale, rubble, masonry or timber foundations, stumps and all materials without classification. Do all excavation, trenching and backfilling necessary to construct and complete the utility and all its appurtenances. All excavation shall be made by open cut from the surface. No tunneling will be allowed except by written consent of the Architect. Provide all necessary shoring and bracing. Care shall be taken to avoid undermining of all existing utilities, footings or foundations. Take full responsibility for any additional work resulting from his excavating and trenching.
- C. Locations and elevations of pipe lines, conduits, cables, etc., shown are not to be used as final for installation of work; however, they are to be followed as closely as possible, ground conditions permitting. Exact locations of grade shall be determined on job.
- D. Under no circumstances, lay pipe or conduit or install appurtenances in water. Keep trenches free from water. Perform all necessary pumping as required to keep trenches free from water at no additional cost to the Owner.
- E. Before starting the excavation work, strip all existing sod and soil within entire limits of this Contract, which is suitable for top soil and stockpile in location approved by the Architect.
- F. Take precaution by frequently spraying excavation area during excavation with water, in order to prevent dust being blown. Stockpiles of fill and topsoil shall also be kept moist by water spray.
- G. Where existing utilities are encountered, support, shore and protect said existing utilities and allow ample time for such measures as may be necessary for continuances of such services.
- H. Notch under pipe bells to provide solid bearing for the entire body of pipe.
- I. Excavation for utilities, and appurtenances (such as manholes, etc.), shall be to required depths below existing or finished grades. Note areas of cut and/or fill and schedule and perform work accordingly. Where utilities are installed in filled areas, fill shall be compacted to 95% of its maximum density, by the Contractor, who is installing the particular utility, before installing in the utility line, manhole or other appurtenances.
- J. Excavations shall be sheeted and braced where necessary. Assume responsibility for all damage to persons, structures, and property resulting from the quality,

strength, placing, maintaining and removing or lack of sheeting. Repair or replace any existing underground piping or conduit disturbed or damaged.

- K. Width of trenches shall be adequate for work required to be done in trench for proper installation of the utility system.
- L. All steel sheeting ordered left in place shall be cut off at least 6" below the bottom of the pavement foundation or 2 feet below natural ground in unpaved areas. Provide and maintain all such safeguards necessary for the protection of persons, the safety of cell traffic movement and the protection of all the structures encountered. No trench shall be opened more than 200 feet in advance of the completed work without permission of the Architect.
- M. As soon as the joints are inspected and tested for acceptance, backfill material consisting of sand or approved earth shall be evenly and carefully placed and tamped around and over the pipe in layers not exceeding six (6) inches in thickness to one (1) foot over the top of the pipe. Backfill for the remainder of the trench shall be approved material and shall contain no stone more than six (6) inches in its largest dimensions. From a point one (1) foot over the top of the pipe, the backfill shall be deposited in thoroughly rammed and compacted layers not over twelve (12) inches thick. No backfilling shall be done with frozen earth. The trench shall be brought to an elevation so as to allow the placement of the temporary pavement in paved areas and to the surface of the ground as it existed prior to the work in non-paved areas. Should there be a deficiency of proper material for this purpose, furnish and place such additional material as may be directed by the Commissioner. When so directed, the backfill shall be trench backfill to a depth to be determined by the Commissioner. Generally, backfilling shall be to final grade, or subgrade to receive other Section's work. Compaction shall be to 95% maximum density under pavement and 92% under grass areas.
- N. All backfill shall be tamped and shall be done so far as practicable by suitable mechanical means. The machine used shall be of a type satisfactory to the Architect, as to power of blows and area of rammer and shall be used in such a manner as to thoroughly compact the backfill to a degree which will insure against later settlement. The Commissioner reserves the right to require flushing of trench, in addition to tamping, where, in his opinion, same will further settle the backfill.
- O. Excavated material suitable and required for backfilling shall be stockpiled in the area selected by the Commissioner. All excavated material in excess of that required for backfilling shall be immediately removed to location directed by Architect. The Contractor shall leave clear and in good order all roadways and sidewalks affected by the construction. Where unstable or backfilled ground is encountered, the Contractor shall furnish and install suitable concrete or brick pier supports at each joint and on ten (10) foot centers maximum.

1.31 GRADING

- A. Grade the excavated area to its original grade and restore the area to its original

position. The entire area in the vicinity of construction where excavation, filling and backfilling has been done shall be raked clean of all trash and other debris. After completion of this work all trash and debris shall be removed from the premises. Cleaning of the premises shall be done at intervals, sufficiently often to maintain an orderly appearance of the construction area and as directed by the Commissioner.

- B. Final grading shall be done under other Sections of the Specifications.

1.32 PAINTING

- A. All finish painting is specified under other Sections of the Specifications.
- B. Paint all unpainted, non-insulated, non-galvanized, ferrous metal surfaces of pipes, conduits, ducts, equipment, fixtures, hangers, supports and accessories as follows:
 - 1. Exposed - One prime coat of oil-varnish based paint.
 - 2. Underground - Two coats of black asphaltum paint.
- C. The inside of all ductwork where visible through openings shall be painted with two prime coats of dull black paint.
- D. Nameplates on all equipment shall be cleaned and left free of paint.
- E. All lead bends and lead safes and flashing shall be painted with two coats of waterproof black asphaltum varnish.

1.33 LUBRICATION

- A. Assume responsibility that all rotating equipment is properly lubricated as soon as it is connected by the Electrical Subcontractor before operation of this equipment is started. Assume responsibility for any damage to any equipment that is turned on without previously having been oiled or greased when connected up.

1.34 TESTS

- A. All piping, wiring, and equipment shall be tested as specified under the various sections of the work. Labor, materials, instruments and power required for testing shall be furnished under the particular Section of the Specifications.
- B. Tests shall be performed satisfaction of the Commissioner. The Commissioner, or his/her representative will be present at such test, when deemed necessary and such other parties as may have legal jurisdiction.
- C. Pressure tests shall be applied to piping only before connection of equipment and installation of insulation. In no case shall piping, equipment, or accessories be subjected to pressure exceeding their rating.

- D. All defective work shall be promptly repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the review of the Commissioner.
- E. Any damages resulting from tests shall be repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Commissioner.
- F. The duration of tests shall be as determined by all authorities having jurisdiction, but in no case less than the time prescribed in each Section of the Specifications.
- G. Equipment and systems which normally operate during certain seasons of the year shall be tested during the appropriate season. Tests shall be performed on individual equipment, systems, and their controls. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, functioning, and performance, the latter shall be operated simultaneously with the equipment or system being tested.
- H. The electrical work shall include providing any assistance (such as removal of switchboard and panel board trims and covers, pull and junction box covers, etc.) deemed necessary by the Commissioner to check compliance with the Drawings and Specifications.

1.35 OPERATING INSTRUCTIONS

- A. Two months prior to the completion of all work and the final inspection of the installation by the Owner, five (5) copies of a complete Instruction Manual, bound in booklet form and suitably indexed, shall be submitted to the Commissioner for review. All written material contained in the manual shall be typewritten or printed.
- B. The Manual shall contain the following items:
 - Table of Contents (Plumbing, HVAC and Electrical)
 - I. Introduction - Explanation of Manual and its use.
 - II. Description of Systems
 - 1. Complete schematic drawings of all systems.
 - 2. Functional and sequential description of all systems.
 - 3. Relationship of system where applicable to the supervisory data system.
 - III. Systems Operation
 - 1. Start-up procedures.
 - 2. Shut-down procedures.

3. Reset and adjustment and balancing procedures.
4. Seasonal operation.
5. All posted instruction charts.

V. Maintenance

1. Cleaning and replacement - lines, components, filters, strainers, ducts, fans, etc.
2. Lubrication.
3. Charging and filling.
4. Purging and draining.
5. Systems trouble shooting charts.
6. Instruments checking and calibration.
7. Procedures for checking out functions with remote (Supervisory Data Console) indication and control.
8. Recommended list of spare parts.

V. Listing of Manufacturers

VI. Manufacturer's Data (Where multiple model, type and size listings are included, clearly and conspicuously indicate those that are pertinent to this installation).

1. Description - Literature, drawings, illustrations, certified performance charts, technical data, etc.
2. Operation.
3. Maintenance - including complete trouble-shooting charts.
4. Parts List.
5. Names, addresses and telephone numbers of local recommended repair and service companies.
6. Guarantee data.
7. Model No. and Serial No. of all equipment.

1.36 INSTRUCTION OF OWNER'S PERSONNEL

- A. After completion of all work and all tests and at such time as designated by the Architect, provide the necessary skilled personnel to operate the entire installation for a period of Fourteen (14) consecutive days eight (8) hours each.
- B. During the operating period, fully instruct the City of New York's representative in the complete operation, adjustment and maintenance of the entire installation.

1.37 GUARANTEE

- A. The Contractor guarantees by his acceptance of the Contract that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified, and that if during a period of one year from date of completion and acceptance of work any such defects in workmanship, material or performance appear, he shall immediately replace, repair, or otherwise correct the defect or deficiency without cost to the Owner within a reasonable time. Notify the Architect in writing of the time required to do work. For heating systems the

guarantee period must include one continuous heating season from November 1st to April 1st. For cooling systems the guarantee period must include one continuous cooling season from May 1st to October 1st.

- B. Replace or repair to the satisfaction of the Commissioner any and all damage done to the building or its contents or to the work of other trades in consequence of work performed in fulfilling guarantee.
- C. The date of acceptance shall be the date of final payment by the Commissioner or notice of acceptance by the Commissioner whichever is later.

1.38 OPERATION PRIOR TO COMPLETION

- A. The Owner may require operation of parts or all of the installation for the beneficial occupancy prior to final completion and acceptance of the building.
- B. The operation shall not be construed to mean acceptance of the work by the Engineer for the Commissioner. The Commissioner will furnish supervisory personnel to direct operation of the entire system and the Contractor shall continue to assume this responsibility until final acceptance.

1.39 INSTALLATION OF MOTORS AND CONTROL EQUIPMENT

- A. The Electrical Contractor shall furnish and install power wiring for all electrical devices, individual motor starters furnished to him at the job site by other trades.
- B. The HVAC Contractor shall provide all wiring for the Automatic Temperature Controls, and condenser water treatment controls, except as otherwise specified herein.
- C. The Electrical Contractor shall, except where otherwise noted, provide wiring for all Plumbing and Sprinkler Control and Alarm Systems. The Plumbing Contractor shall provide all devices in connection with same.
- D. For single phase motors which are not interlocked with other motors and which have temperature control or motor control devices in the power circuit, furnishing of control devices, installation and wiring shall be by the Electrical Contractor.
- E. For all HVAC 3-phase motors or HVAC equipment, temperature control wiring, motor control wiring and associated interlocks shall be provided by the HVAC Contractor, including the installation of all control devices. For all plumbing and sprinkler 3 phase motors and equipment control, wiring motor control, wiring and associated interlocks shall be provided by the electrical contractor, including the installation of all control devices.
- F. Electrically operated equipment supplied by other trades, which are to be installed and wired by the Electrical Contractor, shall be delivered with detailed instructions

for their installation and wiring in sufficient time and proper sequence to meet the work schedule.

- G. Each contractor shall furnish all electrical motors, starters and other motor control devices for motor driven equipment required for the work. In his work, the Electrical Contractor shall provide the code required disconnect switches for all motors, except where otherwise noted. The setting of all motors, required for mechanical equipment, including unmounted motors, shall be done as part of the mechanical work.
- H. Equipment which includes a group of electrical control devices mounted in a single enclosure or on a common base with equipment, shall be supplied completely wired as a unit with terminal boxes or leads ready for external wiring.
- I. All electrical items furnished and/or installed as part of the mechanical work shall conform to NEMA Standards, to the requirements of the National Fire Protection Association, and to the requirements of any local authority having jurisdiction. Any field modifications required to insure such conformance shall be included as part of the mechanical work.
- J. The furnishing of floor mounted motor starting equipment shall include the purchase and delivery of channel sills for mounting.
- K. Whether or not shown on the drawings, the Electrical Contractor shall furnish and install a local disconnect switch at each motor which is not in sight from the controller location.
- L. The supplying of any and all "field instruction" diagrams deemed necessary by the Architect for the complete delineation of electrical wiring for mechanical equipment shall be included as part of the mechanical work.
- M. The drawings describing the electrical or the mechanical work may include explanatory wiring diagrams indicating the function intended for the motor control circuits of certain motors. The "field instructions" wiring diagrams required as part of the mechanical work shall conform to these intended functions.

1.40 ELECTRIC MOTORS

- A. Each Contractor shall provide all electric motors required for driving all motor driven equipment required to be furnished under his Section of the Specification.
- B. All motors shall be designed for 3 phase, 60 cycle alternating current operation with 208 volts across the motor terminals, except that, unless otherwise specified herein, all motors a HP and smaller shall be designed for single phase, 60 cycle alternating current at 120 volts across the terminals. Before ordering motors, ascertain the actual voltages and other current characteristics that will be available and permissible for each motor. Report the same in writing to the Architect and obtain approval before ordering motors. The designation of current characteristics in these

Specifications does not relieve the responsibility for ascertaining the actual conditions of electric service available for each motor or for the proper operation of all motors under the actual conditions.

- C. The speed, horsepower, type and other essential data for each motor, if not given under paragraphs describing the various motor driven apparatus, or in schedules on the drawings shall be obtained from the manufacturer of the respective apparatus and shall be submitted to the Architect for his review. All two speed motors shall be single winding type.
- D. Provide oversized motor junction box for 2 speed motors.
- E. All motors shall be built in accordance with the latest rules of the National Electrical Manufacturers Assn., and of the Institute of Electrical and Electronic Engineers and also as hereinafter specified.
- F. Motors 2 HP and larger shall have Class B insulation. All motors shall be rated for continuous duty and shall be designed for temperature rises not to exceed 55EC. for fully enclosed type, 55EC. for splashproof types and 40 EC. for all other motors excepting as otherwise specified herein. Motors shall be capable of withstanding momentary overloads of fifty (50%) without injurious heating. They shall operate without excessive heating, flashing or sparking under any conditions within the specified capacity of load and speed. All motors shall operate quietly and shall be replaced if, in the Architect's opinion, they do not do so. All motors which are in the airstream of air conditioning units, shall be totally enclosed type.
- G. Motors 2 HP and larger shall have ball or roller bearings with pressure grease lubrication, except where otherwise noted.
- H. Direct connected motors shall be furnished without an adjustable base. All motors connected to driven equipment by belt shall be furnished with adjustable sliding bases, except fractional motors with slotted mounting holes.
- I. All motor leads shall be permanently identified and supplied with connectors.
- J. Motors shall have nameplates giving manufacturer's name, serial number, horsepower, speed, voltage, phase and current characteristics.
- K. The insulation resistance between starter conductors and frames of motors at the time of final inspection shall be not less than one-half megohm.
- L. All motors shall be of the proper type for the duty and shall have sufficient torque to start and run the equipment to which they are connected and starting currents and running currents shall not exceed the limits imposed by the laws or rules and regulations of the public authorities having jurisdiction or of the electrical utility company. All motors shall have sufficient horsepower capacity and rated duty to operate the apparatus to which they are connected so as to give the speeds and performances specified, but the horsepower shall be in no case less than that

started herein or shown on the drawings. A schedule giving the characteristics of the motors proposed for each type of service shall be submitted to the Architect for approval.

- M. The maximum full load speed of each direct connected motor shall be suitable for the equipment it drives.
- N. Except where V-belt drive is specified, the fan wheels for ventilating fans shall be mounted on the motor shafts, which shall be designed for this duty.
- O. All motors except motors furnished as an integral part of equipment and factory installed on the equipment, shall be of same manufacture.
- P. Polyphase motors shall be squirrel cage induction high efficiency energy saver type, suitable for the starting torque and current requirements.
- Q. Single phase motors shall be of the capacitor start induction run or split phase type as required for proper operation of the driven equipment.
- R. The efficiency of energy efficient motors shall be verified in accordance with NEMA standard NG1-12.53a. Minimum acceptable efficiency shall be as follows:

Rating	H.P.	Efficiency
200/460 Volts 3 Phase, 60 c/s 1.15 Service Factor 40E C. Ambient	1 HP	82.5%
	1.5 HP	84.0%
	2 HP	84.0%
	3 HP	86.5%
	5 HP	87.5%
	7.5 HP	88.5%
	10 HP	89.5%
	15 HP	91%
	20 HP	91%
	25 HP	91.7%
30 HP	92.4%	

1.41 INDIVIDUAL MOTOR STARTERS

- A. For single-phase motors a HP or smaller, starters shall be manual, 120 volts, single-pole or 240 volts, 2-pole with thermal overload protection and pilot light. Where interlocking or automatic control (other than for unit and cabinet heaters) is required, starters shall be combination circuit breaker and magnetic starter with pilot light.
- B. For 3-phase motors 2 HP and over, starters shall be full-voltage combination circuit breaker and magnetic across-the-line contactor, rated 208 or 480 volts, 3-pole. All magnetic starters shall have three thermal overloads.

- C. For motors requiring electric interlocks, or automatic control features, starters shall be equipped with the necessary auxiliary relays and contacts to provide the control features desired. Such starters shall be also provided with "hand-off-auto" pushbuttons mounted in cover. For two-speed motors, provide "high-low-off-auto" four position selector switch. Furnish adjustable 20-second time delay between high and low speeds for motors 10 HP and above.
- D. In addition to any auxiliary contacts required for interlocking purposes, each magnetic starter shall be equipped with one normally open auxiliary control circuit contact either for "sealing in" or as a spare for future use.
- E. Indicating lights shall be transformer or series resistor type. There shall be one red light for each single speed motor to indicate when motor is running. For multiple speed motors one indicating light for each speed shall be provided.
- F. The starter disconnecting means shall be circuit breakers. The external operating handle shall clearly indicate "ON" or "OFF" position of the switch and shall be interlocked with the door to require throwing the handle to the "OFF" position to open the door. The handle shall be arranged for locking both the door closed and the disconnect in the "OFF" position with up to 3 padlocks. Provide defeat device in cover to permit opening door in "ON" position.
- G. Circuit breakers in combination starter units shall be of the magnetic trip type with an adjustable trip setting for selecting instantaneous trip points of fault protection (motor circuit protector). Field adjustment of the instantaneous trip shall be performed by the Electrical Contractor. Select the trip setting at approximately 10 times the motor nameplate full-load current. If the circuit breaker trips on starting, incrementally increase the settings. In no case shall the trip setting exceed 13 times the motor full-load current.
- H. Overload heaters shall be furnished for all starters and shall be sized in range of 115 to 125 percent of full load current. The motor starters shall be shipped with the overload heaters inside the compartment but not installed. The Electrical Contractor shall verify the ratings of the heater coils based on the motor nameplate data before installing the overloads. The Contractor supplying the starter shall replace any improperly selected heaters.
- I. A transformer shall be supplied in each starter unit for 120 volt control voltage. Transformer capacity shall be adequate to supply the holding coil requirements plus the solenoids, e-p switches, relays and other devices required to be controlled from the starter. A fuse shall be supplied in one secondary terminal of the control transformer. The other terminal shall be grounded to the housing of the starter. Fuses shall be also provided in the transformer primary leads per the National Electrical Code.
- J. All enclosures shall be NEMA Type I sheet steel with hinged cover for general purpose indoor application, unless otherwise indicated. Enclosures shall be arranged for equipment or wall mounting. Weatherproof NEMA Type 4 enclosures

shall be provided for all outdoor starters.

- K. Each starters shall be clearly identified by engraved nameplates after installation. The nameplates shall be bakelite black plates with 2" high white letters and shall be securely fastened to starter with mounting screws made of non-corrosive metals.
- L. Stainless steel flush mounted starter and enclosures shall be provided for all starters located in the kitchen and dishwasher areas.
- M. All starters, except those furnished as an integral part of equipment and factory installed on the equipment, shall be of the same manufacturer.
- N. Starters shall be as manufactured by Westinghouse, General Electric, Square D, Eaton/Cutler-Hammer, or Allen-Bradley.
- O. Shop drawings shall be provided with dimensions, ratings, wiring diagrams and schedule of nameplates for approval prior to fabrication.

1.42 MOTOR CONTROLLERS

- A. Motor controllers shall be defined as control devices such as pushbuttons, switches, etc. which are not mounted in starter cover, required for remote control of motors.
- B. Unless otherwise noted, motor controllers shall be housed in NEMA Type 1 general purpose enclosures. Outdoor controllers shall be provided with weather proof NEMA Type 4 enclosures. Provide nameplate to indicate the motor with which they are associated.
- C. The controllers to be installed in finished area shall be flush mounted.
- D. The Electrical Contractor shall install and provide wiring for motor controllers. The contractor providing the motor shall furnish the controllers.
- E. Unless otherwise noted, pushbuttons shall be of the normal duty, spring return momentary type.
- F. Selector switches and pushbuttons shall be equipped with nameplates indicating the function of each of their positions as noted in the list of electric motors and motor controls or shown on the drawings.
- G. Pilot light shall be transformer or series resistor type for operation at 120 V.
- H. Pilot lights shall be equipped with nameplates indicating the operating conditions they annunciate as noted in the list of electric motors and motor controls or shown on the drawings.

1.43 SEMI-FINAL AND FINAL SITE VISITS FOR OBSERVATION

- A. As the project approaches completion, the Commissioner shall determine a period of time in which they shall perform a Semi-Final Site Visit to observe the Mechanical and Electrical installation. At the conclusion of this Semi-Final Site Visit, a Semi-Final Punchlist shall be issued to the appropriate contractor for the deficiencies in the work of his trade. Complete all work and perform all corrective measures as required by the Semi-Final Punchlist. After this corrective and completion work has been accomplished, in writing, advise the Commissioner, Architect and the Engineer that every item on the Semi-Final Punchlist has been completed. After the Commissioner, Architect and Engineer make a Final Site Visit to observe the Mechanical and Electrical installation and make a Punchlist, a similar letter of Compliance shall be forwarded through channels.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 15050 - SEISMIC RESTRAINTS FOR ISOLATED AND UNISOLATED EQUIPMENT, PIPING, DUCTWORK AND TANKS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinated and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. It is the intent of this specification to provide the basis of seismic design for all mechanical and electrical systems including equipment, conduit, piping and ductwork within the building. Provide seismic restraints, complete, as shown and specified per Contract Documents.
- B. Seismic isolation in this section replaces standard isolation systems specified.
- C. The work of this section includes, but is not limited to the following:
 - 1. Vibration isolation elements for piping and equipment.
 - 2. Equipment isolation bases.
 - 3. Seismic restraints for isolated piping, equipment and ductwork.
 - 4. Seismic restraints for isolated and unisolated piping, conduit, equipment, ductwork, tanks, stacks, VAV boxes and other equipment.
- D. Work specified elsewhere:
 - 1. Basic isolation systems for equipment, piping and ductwork.

1.3 QUALITY ASSURANCE

- A. Only firms regularly engaged in design, manufacturer and installation of this equipment whose products have been installed by them and are in satisfactory use in similar services for not less than 3 years will be acceptable.

1.4 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings.
 - 1. Descriptive Data
 - a. Catalog cuts and data sheets on specific vibration isolators and

restraints to be utilized showing compliance with the specifications.

- b. An itemized list showing the items of equipment or piping to be isolated, the isolator type of model number selected, isolator type of model number selected, isolator loading and deflection and reference to specific drawings showing base construction where applicable.
- c. An itemized list of equipment piping and ductwork not isolated to be seismically restrained.
- d. Seismic restraint calculations.
- e. Structural or civil engineers stamp verifying design and calculations for seismic restraining system used. (To be submitted to Owner for record purposes only. Not for design engineer's review.)

2. Shop Drawings

- a. Drawings showing equipment base constructions for each machine, including dimensions, structural member sizes and support point locations.
- b. Drawings showing methods of suspension, support guides for piping and ductwork.
- c. Drawings showing methods for isolation of pipes and ductwork piercing walls and slabs.
- d. Concrete and steel details for bases including anchor bolt locations.
- e. Number and location of seismic restraints and anchors for each piece of equipment.
- f. Specific details of restraints including anchor bolts for mounting and maximum loading at each location, for each piece of equipment and or pipe and duct locations.

1.5 COORDINATION

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical

Work.

1.7 CODE AND STANDARD REQUIREMENTS

- A. BOCA National Building Code, latest edition or as required by local code.
- B. SMACNA Guidelines for Seismic Restraints of Mechanical System.
- C. NFPA 13, latest edition or as required by local code.

1.8 MANUFACTURER RESPONSIBILITIES

- A. Manufacturer of vibration isolation and seismic control equipment shall have the following responsibilities:
 - 1. Determine vibration isolation and seismic restraints of mechanical system.
 - 2. Provide piping and equipment isolation system and seismic restraints as scheduled or specified.
 - 3. Guarantee specified isolation systems 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, piping and ductwork without failure and permanent displacement of the equipment. Life safety equipment such as fire pumps, sprinkler piping, emergency generators 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. Substitution of "internally isolated" mechanical equipment in lieu of the specified isolation of this Section must be approved for individual equipment units and is acceptable only if above accelerations are certified in writing by equipment manufacturer and stamped by a licensed civil or structural engineer.

PART 2 - PRODUCTS

2.1 SEISMIC RESTRAINTS

- A. General
 - 1. All vibration isolation and seismic devices shall be the product of a single manufacturer. Products of other manufacturers are acceptable provided their systems strictly comply with the design intent, performance, deflection and structural design of the base manufacturer.
 - 2. Shall be capable of safely accepting one-half "g" external forces without

failure or one "g" for life safety equipment. Shall maintain equipment, piping, duct and pressure reducing boxes in a captive position. Shall not short circuit vibration isolation systems or transmit objectionable vibration or noise. Shall be provided on all equipment as scheduled on drawings. Calculations by registered civil or structural engineer shall be submitted to verify snubber capacities for each isolated piece of equipment.

- a. Spring Seismic Restraint, Type I: Shall comply with general characteristics of spring isolators. Shall incorporate snubbing restraints in all directions. Shall be capable of supporting equipment at a fixed elevation during equipment erection. Cast or aluminum housings are not acceptable. System to be field bolted to deck with 1 G acceleration capability.

Mason Type SSLFH, or approved equal.

- b. Seismic Restraint, Type II: Each corner or side shall incorporate a seismic restraint having a minimum e" thick resilient pad limit stops working in all directions. Restraints shall be made of plate, structural members or square metal tubing concentric within a welded assembly incorporated resilient pads. Angle bumpers are not acceptable. System to be field bolted to deck with 1 G acceleration capability.

Mason Type Z-1011 and Z-1225 or as approved.

- c. Seismic Restraint, Type III: Metal cable type with approved end fastening devices to equipment and structure. See details on drawings. System to be field bolted to deck or overhead structural members using two sided beam clamps to steel or appropriately designed insert for concrete. All parts of system including cables, clamps, excluding fastenings are to be single vendor furnished to assure seismic compliance.

Mason Type Ace Seismic Restraining System or approved equal.

- d. Seismic Restraint, Type IV: Double deflection neoprene isolator encased in ductile iron casing minimum .30 static deflection. System to be field bolted to deck with 1 G acceleration capacity.

Mason Type BR, RBA or approved equal.

- e. Seismic Restrain, Type V: Non-isolated equipment to be field bolted or welded (powder shots not acceptable) to resist seismic forces unless under 100# shear force required.

- B. The above systems shall replace the general mounting types in the standard isolation specification when this section applies. The following substitutions apply to Section 15810 of the specification.

1. Type B is replaced by seismic restraint Type I.
2. Type C is acceptable with manufacturer's statement of G force capability certified by an independent structural or civil engineer. Minimum 1 G level. This type of isolation shall be installed with Type III restraint.
3. Type A is replaced by seismic restraint Type IV.
4. Type B rails are acceptable only if unitized and isolated with seismic restraint Type I, II, or IV.
5. Type G and J bases are acceptable with seismic restraint isolation system Type I, II or IV.
6. Type Y and R bases are acceptable.
7. Type E and Type F isolators shall be installed with Type III restraint.
8. Type Y curbs are acceptable provided they are rated for 1G of acceleration and shall be wind restrained for 110 mph wind loads. Curbs shall have NRCA approval. Curbs shall be welded to building steel or bolted to concrete decks to attain acceleration criteria.
9. Type R supports are acceptable provided that system design permits a minimum 1G of acceleration. Curbs shall be welded to building steel or bolted to concrete decks to attain acceleration criteria.

C. Non-Isolated Curb Type B-6

1. Curb mounted rooftop equipment shall be mounted on structural curbs that meet 1 G acceleration criteria. Curbs shall accept standard 2" roof insulation and be waterproofed in accordance with NRCA standard.
2. Curbs shall be sound attenuating type which will utilize standard 2" roof insulation for sound attenuation or will required 2" of interior lining.
3. Curbs to be welded to building steel or bolted to concrete decks to attain acceleration criteria.
4. Curbs shall be Mason Type B-6000 or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine location where control and equipment are to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's written instructions, approved shop drawings and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.

3.3 GENERAL

- A. All equipment whether isolated or not shall be bolted to structure to allow for minimum one-half "g" of acceleration, 1G for life safety systems. Bolt points and diameter of inserts shall be submitted and verified as part of the contractors submission for each piece of equipment and certified by a licensed civil or structural engineer.
- B. All structurally suspended overhead equipment isolated or unisolated shall be four point independently braced with Type III seismic restraining system.
- C. Install seismic restraining system Type III: taugt for overhead suspended unisolated equipment, piping or ductwork and slack with 1/2" cable deflection for isolated systems.
- D. Seismically restrain all piping and ductwork with Type III restraining system in accordance with guideline as outlined below.
 - 1. Piping, schedule 10, 20 or 40 weld or mechanical; joint braced at 40 foot intervals and at turns of more than 4 feet. Lateral bracing 80 foot intervals. No hub piping to be braced at 20 foot intervals or 40 feet using 1/2 G acceleration rated couplings.
 - 2. Ductwork to be braced every 30 feet and at every turn and duct run ends. Lateral bracing every 60 feet.
 - 3. Piping to be restrained as per SMACNA standards.
 - 4. Ductwork to be restrained as per SMACNA standards.
- E. If equipment is mounted on housekeeping pads, pads to be properly doweled or expansion shielded to deck to meet acceleration criteria.
- F. Seismic restraints are not required for the following:
 - 1. Gas piping less than 1" I.D.
 - 2. Piping in Mechanical Equipment Rooms (MER) less than 1 1/4" I.D.

3. Piping other than gas, and MER piping less than 2½" I.D.
 4. All rectangular ducts less than 6 sq. ft. in cross sectional area.
 5. All round ducts less than 28" in diameter.
 6. All piping suspended by individual hangers 12" in length or less from the top of the pipe to the bottom of the support for the hanger. 6" or less for fire protection mains.
 7. All ducts suspended by hangers 12" or less in length from the top of the duct to the bottom of the support for the hanger.
- G. Where base anchoring is insufficient to resist seismic forces supplementary restraining such as seismic restraint system Type III shall be used above systems center of gravity to suitably resist "g" force levels. Vertically mounted tanks may require this additional restraint.
- H. For overhead supported equipment, overstress of the building structure must not occur. Bracing can occur from:
1. Flanges of structural beams.
 2. Upper or lower truss chords in bar joist construction at panel points.
 3. Cast in place inserts on drilled and shielded inserts in concrete structures.
- I. Pipe risers through cored shafts require no further seismic bracing. (Core diameter to be maximum 2" larger than pipe O.D.)

3.4 SEISMIC RESTRAINT FOR NON-ISOLATED EQUIPMENT

A. Mechanical Equipment, HVAC

1. All ceiling suspended piping and ductwork not excluded by diameter or distance requirement from support.

Seismic Restraint Type III.

2. All ceiling mounted equipment including but not limited to fans, AHU's, tanks, VAV boxes and unit heaters.

Note: If VAV box is rigidly attached to ductwork (no flex) it is considered part of the ductwork. All diffusers mounted in Acoustical Tile ceilings (ATC) to be four point independently cable braced to deck unless ATC meets Seismic Zone II requirements, if this is met, earthquake clips shall secure fixture to T-bar structure.

- a. Seismic Restrain Type III.

- 3. All floor mounted equipment.
 - a. Seismic Restraint Type V.

B. Plumbing

- 1. All ceiling suspended piping not excluded by diameter or distance requirement from support.
Seismic Restraint Type III.
- 2. All ceiling mounted equipment.
Seismic Restraint Type III.
- 3. All floor mounted equipment, including but not limited to tanks, stacks, boilers, domestic water heaters, etc.
Seismic Restraint Type V.

C. Electrical

- 1. All ceiling suspended conduit not excluded by diameter or distance requirement from support.
Seismic Restraint Type III.
- 2. All ceiling mounted equipment including bus ducts.

Note: If equipment is rigidly fastened to conduit, diameter and distance requirement from support applies.

Seismic Restraint Type III.
- 3. All non-isolated floor and wall mounted equipment including transformers, switchgear, etc.

Seismic Restraint Type V.
- 4. All ceiling mounted lighting fixtures are to be independently hung and cable braced utilizing S.R. Type III Cables. Fixtures, part of lighting grids shall meet local codes for suspension and be four point independently cable braced to deck unless acoustic tile ceiling meets seismic zone II requirements. If this is met, earthquake clips shall secure fixture to T-Bar construction.

3.5 FIELD QUALITY CONTROL

- A. Obtain inspection and approval of any installation to be covered or enclosed,

prior to such closure.

- B. Upon completion of installation herein specified, the local representative of the manufacturer shall inspect the completed system and report, in writing, any installation error, improperly selected devices or other faults in the system that could affect the performance of the system. Contractor shall submit a report to the Architect, including the manufacturer's representative final report, indicating all materials reported as improperly installed or requiring correction and include a report by the Contractor on steps taken to properly complete the installation.

END OF SECTION

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SECTION 15100 - GENERAL PROVISIONS FOR PLUMBINGPART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Except as otherwise specified under "Related Work Not Included", the work of this Contract consists of furnishing all labor, materials, equipment and appliances necessary and required to completely do all Plumbing Work as indicated on the Drawings or described or referred to in the Specifications, including, but not limited to the following:
1. Complete exterior domestic water systems, including replacement and/or removal of existing mains and services, new services, curb valves, thrust blocks and connections as shown on drawings.
 2. Master domestic water meter assemblies.
 3. Complete interior storm water drainage systems with leaders, roof and area drains, and piping system conveying storm water drainage to site storm drainage system.
 4. Complete interior sanitary, soil, waste and vent piping systems, including all required connections to all plumbing fixtures and equipment, house sewer, and connections to the existing interior piping or to the site sanitary sewer system.
 5. Complete interior domestic cold water system including connections to the site water system piping and connection to all fixtures and equipment requiring cold water. (Except WCs, boathouse hose bibs and green lawn to be fed from Rainwater tank.)
 6. Complete interior domestic hot water distribution systems including connections to all fixtures and equipment requiring hot water and connections to new hot water heaters.
 7. Plumbing fixtures and trim for same.
 8. Furnishing of access doors for installation under another Division or Section of these specifications.
 9. Excavation and backfill for all work herein specified shall be done by the General Contractor.
 10. Make all plumbing connections required for equipment furnished under other Divisions or Sections of these Specifications.
 11. Hose bibs, wall hydrants and plaster traps, shock absorbers, vacuum breakers and backflow preventers.
 12. Sleeves, hangers and supports.

13. Insulation for piping and equipment.
14. Apply for, obtain and pay for all permits, certificates, inspections and approvals required in connection with all Plumbing Work.
15. Shop drawings, samples and instructional manuals, tests and adjustments.
16. (not used).
17. Sump pump assemblies.
18. All interlocking control wiring and conduit.
19. Concrete pads for pumps and equipment.
20. Color coding and stenciling of all piping systems.
21. Cutting and rough patching.
22. Cap flashing and prime painting.
23. Tests for all systems provided under this Section of the Specifications.
24. The Contractor shall, as part of the Contract, furnish and install all incidentals, such as piping, fittings, valves, etc., required to complete the installation of the equipment. The Contractor shall be responsible for providing and connecting all fixtures and equipment.
25. All work described in these Specifications and not shown on the Drawings, or vice versa, shall be installed in a manner similar to the work shown or described.

1.2 RELATED WORK NOT INCLUDED

- A. The following principal items of Plumbing Work shall be provided under other Sections:
 1. Finish painting.
 2. Furnishing and installation of toilet room accessories.
 3. Installation of access doors.
 4. Base flashing for roof drains, and piping passing through roofs.
 5. Finish painting.
 6. Drainage piping from HVAC equipment to and spilling over floor drain, mop sink, sump or roof, except as noted.

7. Finish patching.
8. Sheet metal gutters and leaders.

1.3 LIST OF SHOP DRAWINGS

A. Submit shop drawings prior to installation covering the following items:

1. Plumbing fixtures, equipment, including rain water storage tank and support, plumbing fixture trimmings, shut-off valves, faucets, supports, accessories and traps.
2. Valve tags, color coding and valve charts.
3. Vacuum breaker, backflow preventors and shock absorbers.
4. Insulation for piping and equipment.
5. All drains including floor, funnel, shower, roof and area drains.
6. Hose bibbs and wall hydrants.
7. Sleeves, escutcheons, hangers and inserts.
8. Gauges and thermometers.
9. All types of piping, fittings, valves, etc.
10. Vibration isolators.
11. Rain water circulating pumps, hot water heaters and accessories.
12. Domestic hot water circulating pumps.
13. Detailed plumbing piping layout, coordinated with all other trades.
14. Detailed coordinated sleeves and insert drawings for approval by Owners Representative. In addition, the Contractor shall indicate all piping sleeved through beams.

B. The above listed items are to be considered major equipment and do not limit the Contractor's responsibility from submitting shop drawings for all equipment and accessories which are to be provided under this Section of the Contract.

1.4 QUALITY ASSURANCE

A. Manufacturer's Instructions: In addition to the requirements of these Specifications, comply with the manufacturer's instructions and recommendations for all phases of the work.

- B. Standards and Codes
NYC BUILDING CODE
- C. All work and material not specifically described, but required for a complete and proper installation of the work of this Section, shall be provided by the Contractor and shall be new, first quality of their respective kinds, and subject to approval of the Architect.
- D. All water supply connections to plumbing fixtures and other equipment to be installed under this Division shall be in accordance with the rules relative to submerged inlets and protective methods to be applied to prevent contamination of water as required by Local and State Regulations.

1.5 CONCRETE WORK

- A. All concrete equipment bases that are installed on vibration isolators, all anchor and thrust blocks and all piping supports in trenches shall be provided under the work of this Section. All formed and poured-in-place concrete work including equipment housekeeping pads, sumps, etc., will be provided under another Division or Sections of these Specifications.
- B. This Contractor shall furnish all required templates for anchor bolts, and dimension drawings for housekeeping pads and sumps. All concrete provided under the work of this Section shall be in accordance with that specified under another Division or Sections of these Specifications.

1.6 REPLACEMENT OF SURFACING

- A. Where required by operations under this Section, the Contractor shall remove and replace all street pavements, curbs, sidewalks, walkways, grassed areas and landscaped areas which are to remain, in a manner equal to their original condition when new, including sub-bases.
- B. In those cases where final surfaces cannot be placed immediately, a temporary surfacing of two inches of bituminous concrete shall be placed and maintained. This shall be removed before placement of final surfacing.
- C. Landscaping and grassed areas shall be preserved and/or replaced to the satisfaction of the Owners Representative.

1.7 COOPERATION WITH OTHERS

- A. The Contractor shall cooperate with other trades whose work is to be correlated with his work in order to avoid field interference, improper elevations, or inaccessibility to equipment. Any extra expense occasioned by lack of cooperation by this Contractor shall be borne by him.

END OF SECTION

SECTION 15110 - PIPE, TUBE AND FITTINGS FOR PLUMBING WORKPART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work of this Contract includes the providing of all labor, materials, accessories, services and tests necessary to install, complete and make ready for operation by the Owner, all work as shown on the Drawings and as specified herein.

1.2 SPECIFIC REQUIREMENTS

- A. Pipe and fittings shall conform to the latest USASI, ASTM, ANSI and/or F.S. Standards, and/or Cast Iron Soil Pipe Institute Standards No. 301 and 310.
- B. All pipes, fittings, traps, materials and/or other devices used in the plumbing system shall have cast, stamped, or indelibly marked on it the maker's name or mark, weight, and quality of the product when such marking is required by the approved standard.

PART 2 - PRODUCTS

2.1 EXTERIOR PIPING AND FITTINGS

- A. All exterior underground gravity sanitary sewer piping shall be standard weight cast iron soil pipe and fittings with grooved hub and male spigot compression type joints using a neoprene gasket and lubricant similar to TY-Seal gaskets or approved equal. Pipe and fittings shall conform to the latest ASTM A-74 and C-564 Standards.
- B. The exterior underground gravity Storm sewer piping and fittings twelve (12") inches and smaller shall be standard weight cast iron as specified herein for the exterior gravity sanitary sewer.
- C. The exterior underground domestic water services and main shall be ductile or cast iron pipe with mechanical joints, cast in revolving molds in full accord with the following American Standard Specifications, except for details of the joints and other modifications stated herein, "Cast Iron Pipe Centrifugally Cast in Metal Molds, for Water or Other Liquids A21.51 and A21.52 (AWWA/C151-65 60-42-10)", and shall be in accordance with the latest ASME and ASTM Standards, and shall be approved by the local Water Company. Each pipe shall have cast on it or stamped on it by means of a hand dye stamp, the maker's name or mark, and the year in which the pipe is cast, as required by the American Standard Specifications. The weight and thickness class shall be painted on each pipe, as required by the American Standard Specifications. All pipe shall be lined with cement mortar in accordance with the American Standards Specifications for Cement Mortar Lining for Cast Iron Pipe and Fittings A21.3-1964. All pipe shall be coated outside with an approved bituminous material neither sufficiently soft to flow when exposed to the summer sun, nor brittle enough to crack and scale off when exposed to temperatures below freezing. Coating may be applied by

either painting, dipping, or spraying, but in no case is the pipe or the coating material to be heated to a high enough temperature to be detrimental to the cement lining. In addition, the coating of the interior shall conform to the requirements of American Standard Specifications A21.4-1964. All fittings shall be cement-lined mechanical joint type, Class 250, short pattern ASA 21.10-1964 AWA C-110-64. All fittings shall be lined and coated as specified for cast iron pipe above. Assembly of the mechanical joint pipe and fittings shall be completed with a torque wrench. Torque to be applied to each bolt shall be between 60 pounds and 90 pounds. If effective sealing is not attained at the maximum torque indicated above, the joint shall be disassembled and reassembled after thorough cleaning. Overstressing of bolts to compensate for poor installation will not be permitted. Reinforce joints at hydrants, plugs, fittings and valves with heavy galvanized steel clamps and $\frac{3}{4}$ " galvanized steel rods; in accordance with standard details of National Fire Protection Association (Chapter 24). Give rods and clamps heavy coat of bitumen solution paint. Use torque limiting wrench for assembly.

- D. Connections to site hose bibbs and non-freeze box hydrants shall be made of seamless hard drawn Type "K" copper tubing and fittings, with silver brazed joints and fittings in accordance with latest ASTM Standards and shall be either coated or mill-wrapped.

2.2 INTERIOR PIPING MATERIAL

- A. Underground interior soil, waste, vent and storm piping shall be service weight cast iron soil pipe. Fittings for cast iron soil pipe below grade shall be service weight cast iron bell and spigot, and shall be as manufactured by Tyler or Central Foundry Company, or approved equal.
- B. Interior above ground soil and waste piping in stacks and 5" and over soil and waste piping in chases shall be service weight cast iron soil pipe.
- C. Interior, above ground, soil and waste piping, 4" and smaller in chases, storm vent and leader piping shall be no-hub, standard weight, cast iron soil pipe and fittings or galvanized steel screw pipe with galvanized cast iron recessed drainage fittings with galvanized malleable beaded fittings for vent piping.
- D. Underground (below slab) domestic water piping shall be Type "K" copper tubing, soft temper ASTM B-88 with wrought copper brazed fittings, minimum 125 psi WWP. Brazing joints shall be as specified for domestic water piping. All underground pipe and fittings shall be asphaltum coated.
- E. Above ground interior domestic water piping 6" and larger shall be galvanized steel pipe with threaded galvanized malleable iron or galvanized flanged cast iron fittings minimum 175 psi WWP.
- F. Interior above-ground domestic water piping 5" and smaller shall be seamless drawn or extruded hard temper Type "L" copper tubing, ASTM B-88, with solder joint fittings. Fittings shall be copper. Joints shall be made with a solder alloy (95/5) consisting of tin-antimony and shall conform to ASTM Specification B-32.

2.3 STERILIZATION

- A. The entire domestic water piping system shall be thoroughly sterilized with chlorine before acceptance for domestic operation.
- B. The amount of chlorine applied shall be such as to provide a dosage of not less than 50 parts per million. The chlorinating material shall be either liquid chlorine or sodium hypochlorite solution and shall be introduced into the system and drawn to all points of the system. All lines shall be thoroughly flushed before introduction of the chlorinating material. After a contact period of not less than eight (8) hours, the system shall be flushed with clean water until the residual content is not greater than 0.2 parts per million. All valves in the lines being sterilized shall be opened and closed several times during the contact period.
- C. Sterilization and tests for purity of water in the entire piping system shall be performed by the Contractor through an approved independent testing laboratory and a certificate shall be furnished to the Architect certifying the quality of purity.

PART 3 - EXECUTION

3.1 INSTALLATION NOTES FOR SITE PIPING SYSTEMS

- A. All piping and fittings shall be installed straight, and all joints shall be kept free from dirt and grit.
- B. After trench has been excavated in accordance with these Specifications, pipes may be rolled to the trench, but shall be carefully lowered by suitable rigging and put in place as provided herein. Pipe shall not be rolled into trench.
- C. All straight pipe and special castings shall be cleaned by brushing and by washing out all foreign matter prior to laying. If the Architect so directs, a proper mandrel shall be provided by the Contractor which shall be drawn forward as each pipe or special casting is laid. All branches and other openings shall be stopped up by wooden plugs or heads until either connected or capped. Pipe and special casting shall be laid to required line or grade. Where necessary, temporary wood blocking shall be used; such blocking to be removed as backfilling progresses. Whenever it is necessary to connect with or relay existing water mains, such connections or alterations shall be made by the Contractor as specified herein.
- D. The Contractor is advised that all taps and connections, etc., that he starts must be completed before the closing down of operations at the end of the work day.
- E. The Contractor shall plug or cap any remaining open ends which result from the removal of existing pipe which is to be abandoned. The open ends shall be plugged or capped with cast iron plugs or caps. Live ends of pipe shall be plugged or capped and backed with concrete to provide sufficient bearing equal to the pressure in the pipe times the area of the pipe as directed by the Architect.
- F. All water lines shall have at least 4'-0" cover at all points. These depths shall be increased where necessary for making connections or for avoiding subsurface

structures, drainage, sewer or other facilities.

- G. Piping shall be properly aligned, graded and supported. Piping shall be of correct lengths to permit the joints to be made up without springing or forcing. Change in direction shall be made by use of fittings. Piping shall not be deflected from a straight line at joints in either horizontal or vertical plane, except as authorized by the Architect, and not to exceed the recommendations of the manufacturer.
- H. During construction temporary plugs or caps shall be installed in completed portions of the piping as directed by the Architect. All portions of the Contractor's work shall be carried out so as to prevent the entrance of dirt or other foreign matter into the system.
- I. The Contractor shall make all crossing as required by conditions encountered during construction and at no additional expense to the Owner, including, but not limited to telephone conduits, cold water distribution, electric service, sanitary sewers, storm water drains and steam tunnels.
- J. The work includes providing material and labor for the installation of elbows, tees, short lengths of pipe, concrete thrust blocks, concrete encasement or supports and such other incidentals which will provide an adequate clearance from an existing utility line and/or sufficient cover.
- K. The Contractor shall be responsible for all damage and repairs to utilities. Any additional costs are at his own expense and repairs shall be completed to the satisfaction of the Architect.
- L. Provide vertical and horizontal separation between new sewers and water mains in accordance with Codes and Standards requirements.
- M. Reaction or thrust backing shall be applied at all bends, tees, reducers, plugs, caps, valves and dead ends for the water main. Size and shape of concrete backing shall be as approved by the Architect, but in any case shall be sufficient to provide bearing equal to applied pressure multiplied by the area of the pipe.
- N. Backing shall be of concrete and shall be placed between solid ground and the fitting to be anchored. Backing shall be placed so that the pipe and fitting joints will be accessible for repair, unless otherwise directed by the Architect. Provide tie rods set into concrete.
- O. After the piping has been installed, tested and approved, the trenches shall be backfilled with the excavated materials, free from large clots, stones, frozen or deleterious materials in the following manner: From the bottom of the pipe to the centerline of the pipe, the trenches shall be backfilled by hand with approved material placed in layers of 3 inches and each layer compacted by hand tamping. Backfilling materials shall be deposited in the trench for its full width on each side of the pipe.
- P. From the centerline of the pipe to a depth of one foot above the top of the pipe, the trenches shall be backfilled by hand with approved materials placed in 3 inch layers and hand tamped to compaction.

3.2 INSTALLATION NOTES FOR INTERIOR PIPING SYSTEMS

- A. It is the intent that each part of the plumbing systems shall be complete in all details and all lines provided with all control valves as indicated on Drawings, or as may be required for the proper control of the pipe lines under this Section so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the building.
- B. The size of storm, soil, waste, water, and vent piping shall be as determined by the local rules and regulations for plumbing and drainage, except where specifically noted to be larger by the specifications or plans; and all fixed rules of installation as set forth in the Rules and Regulations shall be followed as part of the Specifications.
- C. The Contractor shall examine carefully the architectural plans and details and familiarize himself with all conditions relative to the installation of piping, particularly where same is concealed behind furring or in hung ceilings.
- D. In no case shall the Contractor permit his pipes to be exposed beyond finished plaster lines unless specifically shown on Drawings. He shall consult with the other trades in the building and install his piping in such a way as to least interfere with the installation of other trades.
- E. Water piping shall be installed to drain, and branches shall not be trapped, but shall have continuous pitch. Where necessary to raise or lower mains, the same shall be provided with a drip and shall be properly valved and capped.
- F. Piping shall be installed, whether indicated or not, so as to rise and/or drop to clear any and all conduits larger than 1", lighting fixtures, ductwork and heating mains, to maintain the desired clear heights. The Contractor shall consult with the other trades and facilitate the erection of the equipment and piping.
- G. Run piping straight and as direct as possible. In general, form right angles with or parallel to walls or other piping. Risers shall be erected plumb and true.
- H. After cutting, all pipes shall be reamed out to full bore and before erection the inside of all pipes shall be thoroughly cleaned.
- I. No piping or work shall be concealed or insulated until all required tests have been satisfactorily completed and work has been approved by the Architect and all other authorities having jurisdiction.
- J. Branch connections of the drainage systems shall be made with "Wye" and long "Tee-Wye" fittings, short 1/4" bends, common offsets and double hubs will not be permitted. Short "Tee-Wye" fittings are to be used in vertical piping only.
- K. Cleanouts shall be provided at foot of all stacks, all changes of directions, at the ends of branch runs where shown, every 50'-0" and as required by Code, and shall be furnished as described under cleanouts.
- L. The house drains must be run at a minimum grade of c" per foot downward in the

direction of flow. Wherever possible, a $\frac{1}{4}$ " per foot pitch shall be maintained. Branch connections to stacks from fixtures shall pitch $\frac{1}{4}$ " per foot where possible. Attention is again called to the necessity of maintaining the ceiling heights established.

- M. Connection to roof drains shall be installed in conjunction with the roofing called for under another Division or Section of these Specifications and at such times as designated by this Contractor, so that the building is adequately protected during construction from damage by storm water. All piping shall be adequately and properly supported, and all joints shall be made up as hereinafter specified.
- N. Furnish and install complete systems of ventilating pipes from the various plumbing fixtures and other equipment to which drainage connections are made. Ventilating pipes shall be connected within 2'-0" of the discharge of each trap and shall be individually piped to point above the ultimate overflow level of the fixture before connecting with any other vent pipe (in general, this will be approximately 3'-6" above the finished floor). Branches shall be arranged to pitch back to fixtures.
- O. The individual vent pipes shall be collected together in branch vent lines and connected to vent stacks. Wherever possible, vent stack offsets shall be made with 45 degree fittings. The heels of vent stacks shall be connected to adjacent soil stacks for purpose of draining condensation where possible. The waste of one fixture shall be connected to the base of each vent stack for the purpose of washing out any scales or dirt which may accumulate, or the soil stack shall be used to wash out the heel of the vent.
- P. The tops of all soil and waste stacks shall be extended as additional ventilating pipes. The tops of all ventilating stacks shall run independently through the roof. Pipes smaller than 4" size shall be increased to 4" by means of approved increasers before passing through the roof slab.
- Q. Expansion loops and anchors shall be provided on all hot water and hot water circulation mains. Expansion loops shall be made with four elbows and three lengths of pipe, except as otherwise noted on the Drawings. All loops shall be prestressed.
- R. All piping installed in finished areas shall be completely concealed within hung ceilings, furrings, soffits, pipe spaces, etc.
- S. Where complete concealment is impossible because of obstructions such as beams, ducts, lights, piping, etc., the Contractor shall not install any work before first consulting with the Architect and his instructions (written or revised Drawings) shall be followed.

END OF SECTION

SECTION 15120 - VALVES FOR PLUMBING WORKPART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install complete and make ready for operation by the Owner, all work as shown on Drawings and as specified hereinafter.

1.2 SPECIAL REQUIREMENTS

- A. Furnish all valves as indicated on the plans, or as may be required for the proper control of the pipe lines installed under these Specifications, so that any fixture, line or piece of apparatus may be cut out for repair without interference or interruption of the service to the rest of the building. All water valves shall have a minimum working pressure of 125 psi, and shall be water rated unless otherwise noted on the Drawings or specified herein. All valves shall be of one manufacturer.
- B. All gate valves within the building shall be wedge gate valves with painted iron wheel handles. They shall have gland followers in stuffing boxes, and shall be constructed so that they may be repacked while open and under pressure. All valves shall have the name of the manufacturer and working pressure cast or stamped on them.
- C. All gate valves 3" and smaller shall be all bronze with brazed or screwed joint ends as required by the piping system in which they are installed.
- D. Globe valves shall be of all bronze with composition disc, threaded or brazed joint ends as required by piping system in which they are installed.
- E. Check valves up to and including 3" shall be all bronze swing check type with threaded or brazed joint ends. Check valves 4" and larger shall have bronze mounted iron bodies and shall be provided with screwed or flanged joint ends as required by piping system in which they are installed.
- F. Drain valves shall be ¾" heavy cast brass with composition washers with male thread for hose connections.
- G. At the high point of the hot water piping system provide a ½" automatic IBBM air relief valve,
1. 125 PSI, WOG Class. Pipe drain to spill over adjacent floor drain or service sink.
- H. All valves on the exterior domestic and fire protection water piping shall comply with local Water Company regulations.
- I. All valves shall have the trademark of the manufacturer and the guaranteed working pressure cast or stamped on the body of the valve. All gates or globes,

etc., shall be of one manufacturer.

- J. The exterior valves shall conform to all applicable requirements of American Water Works Association C500-61 Standard for Gate Valves for Fire Water Work Service.

PART 2 - PRODUCTS

2.1 EXTERIOR WATER SERVICE VALVES

- A. Furnish and install all underground control valves and valve boxes for water service and branches as indicated on the Drawings.
- B. All gate valves shall be similar and equal to Stockham G743-0 N.R.S. iron bodied, bronze mounted, double disc, parallel seat, mechanical joint, with operating nut. Valves shall be open left. Other manufacturers will be accepted when required by local authorities.
- C. All valves shall be installed complete with concrete supporting pads and valve boxes and valve covers. All of the foregoing shall be included in the price of valves. Valve boxes shall be set so the tops are flush with proposed finished grade. They shall be reset if required to meet finished paving or grade.
- D. All valve boxes shall have top and bottom sections and covers manufactured by "Kennedy" (Fig. 121) as specified for the fire service above. Coat with coal tar pitch varnish and the word "WATER" shall be cast on cover.
- E. The deep box type yard hydrants shall be cast brass non-freeze with 3/4 inch hose connection, vacuum breaker and a bleed-off connection on valve body to drain the casing, for 5'-0" bury, as manufactured by J.R. Smith Fig. No. 5810-VB or equal. At least six (6) cubic feet of crushed stone (French drain) shall be provided at the drip valve.

2.2 INTERIOR PIPING SYSTEM VALVES

- A. Domestic water valves tabulated herein have been selected from the catalog of the Stockham Valve Co. Other manufactures include Jenkins Co., Crane Co., Walworth Co. or approved equal.

Gate Valves	3" & smaller	brazed ends	B110-SB
		threaded	B110
		solder ends	B112
	4" & larger	flanged rising stem	G623
	3" & smaller	threaded non-rising	B110
	4" & larger	flanged non-rising	G612
Globe Valves	3" & larger	threaded	B22
	3" & smaller	brazed ends	B22SB
Angle Valves	3" & smaller	threaded	B222

Check Valves	3" & smaller	threaded	B319
		brazed ends	B319SB
	4" & larger	flanged	G931
Balancing valves	2" & smaller	threaded (ball valve)	S216BRRT
	2" & smaller	solder end (ball valve)	S216BRRS
Lockshield & Lockshield key	For gate valves Series B110 (stops)		

2.3 BACKFLOW PREVENTORS

- A. Provide pressure reducing type master backflow preventor on main water supply and to all fixtures and equipment requiring same as indicated on the Drawings and governed by the applicable codes.
- B. The pressure reducing backflow preventor shall consist of two separately spring loaded "Y" type check valves and one differential relief valve having two diaphragms separated by a spacer. This device shall automatically reduce the pressure in the "zone" between the check valves. Should the pressure differential, normally 8 psi, drop to 3.0 psi, the relief valve shall open, dumping the liquid to atmosphere and maintain the proper differential. A small hose in the spacer will bleed to atmosphere if either diaphragm is damaged, giving visual evidence of diaphragm failure. Provide funnel receptor and 1½" drain piping from same at relief valve drain opening and pipe to nearest floor drain or service sink. Both check valves and relief valves shall be constructed so they may be serviced without removing the device from the line. It shall be rated to 150 psi working pressure and 212°F water temperature. Backflow preventors 2" and smaller shall have bronze bodies and bronze trim. 2½" and larger shall have cast iron bodies with epoxy coating and bronze trim. Backflow preventors shall be similar to Wilkins 375 or approved equal.

2.4 BACKWATER VALVE

- A. Provide backwater valve where indicated on the Drawings.
- B. Backwater valves shall be similar to Zurn No. 1095-6, cast iron, hub inlet and offset spigot outlet, cast iron cleanout and plug for caulking into top hub of cleanout opening, automatic type bronze valve seat and flapper which hangs open during periods of non-operation.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. The entire plumbing system shall be supplied with valves so located, arranged and operated as to give a complete regulating control to all fixtures and apparatus.

- B. Shut-off valves shall be provided on all risers, branch lines and at each piece of equipment.
- C. Install check and globe valves on downstream side of the shut-off valve on hot water circulating riser and branch lines.
- D. Valves, where exposed and used in connection with finished piping, shall have the same finish as the pipe.
- E. Provide drain valves at the heel of each plumbing water riser and at low points of the horizontal mains.
- F. Provide chain operators on all valves 4" and larger located 7'-0" and higher above floor.
- G. Provide shut-off valves and check valves on each pump discharge line.
- H. All valves used on branch piping to bathroom and kitchens shall be all bronze type globe valves with discs suitable for service to which they are connected.
- I. Install valves where required for proper operation of piping and equipment, including valves in branch lines necessary to isolate sections of piping. Locate valves so as to be accessible.
- J. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
- K. Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.
- L. Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.
- M. Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
- N. Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.
- O. Except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1. Where throttling is indicated or recognized as principal reason for valve, install globe or butterfly valves.
- P. Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shut-off of metal seated valves.

- Q. Select and install valves with replaceable seats, except where otherwise indicated.
- R. Installation of Check Valves
 - 1. Swing Check Valves: Install in horizontal position with hinge pin located on the upside of the pipe and perpendicular to the pipe's centerline.
 - 2. Wafer Check Valves: Install between 2 flanges in horizontal or vertical position.
 - 3. Horizontal Lift Check Valve: Install in horizontal pipe section with stem vertically upward.
 - 4. Vertical Lift Check Valve: Install in vertical pipe section with upward flow.

END OF SECTION

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SECTION 15130 - HANGERS AND SUPPORTS FOR PLUMBING WORKPART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install complete and make ready for operation by the Owner, all Hangers and Supports for Plumbing and Fire Protection Systems as shown on the Drawings and as specified hereinafter.

1.2 SPECIFIC REQUIREMENTS

- A. Provide products which are Underwriters Laboratories listed and Factory Mutual approved.
- B. Provide pipe hangers and supports of which materials, design, and manufacture comply with ANSI/MSS SP-58.
- C. Select and apply pipe hangers and supports, complying with MSS SP-69.
- D. Fabricate and install pipe hangers and supports complying with MSS SP-89.
- E. Assume the responsibility for the proper transfer of the loads of the piping system to the structure. No additional cost to the Owner should be expected for any corrective work during construction.
- F. Supports and hangers shall be provided for all horizontal and vertical piping. The hanger design shall conform to the ASA Code for Pressure Piping. Hangers shall be kept outside of pipe insulation.
- G. All bracket clamps and rod sizes indicated in these Specifications are minimum size only. This Contractor shall be responsible for structural integrity of all supports. All structural hanging material shall have a safety factor of five (5) built in.
- H. All horizontal cast iron pipe shall be supported every five (5) feet and at each hub and/or "no-hub" clamping assembly. When a concentration of fittings occur, additional support shall be installed consistent with good trade practices. "No-hub" system must be supported in accordance with Standard CISPI-310-78.
- I. All hangers and supports for fire standpipe and sprinkler systems shall be Underwriters Laboratories approved. Fire standpipe and sprinkler piping shall be independently supported.

PART 2 - PRODUCTS

2.1 HANGERS AND SUPPORTS

- A. Pipe supports shall be of the following type and figure number, manufactured by C&P, F&M, Grinnell, or equal as approved:

B. Pipe Hanger Schedule	C&P	F&M	Grinnel
Beam Clamp	268	282	-
Clevis Hanger	100	239	260
180 Degree Shield	265P	80	-
Pipe Saddle	351	170 & 1700 Series	180 Series
Rigid Trapeze	371	Std. 45	
U-Bolt	283	176	137
Riser Clamp	89 or 126	241	261
Double Bolt Pipe Clamp	304	261	295
Welding Beam Attachment	113B	751	66
Insert	650	-	280
Continuous Slotted Insert	1480	190	-

C. Insulation Protection

1. For all insulated pipe furnish clevis hangers with welded shields and equal to C&P, Inc., Fig. 100-SH.

D. Pipe Supports in Pipe Chases

1. Supports shall securely hold piping, prevent vibration, etc. Provide pipe supports and channels as required. Use Grade KJA Cycolac DH self-extinguishing ABS as manufactured by the Sumner Corporation or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. Provide necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations. In all cases where hangers, brackets, etc., are supported from concrete construction, care shall be taken not to weaken concrete or penetrate waterproofing. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported

may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction. Hangers in contact with copper or brass pipe shall be copper plated steel.

- B. Pipe hangers shall be of the clevis and pipe roller types, except where otherwise noted.
- C. Where piping is run near the floor and not hung from the ceiling construction but is supported from the floor, such supports shall be of pipe standards with base flange and adjustable top yoke similar to C&P Fig. 101 or equal.
- D. Except where otherwise noted, piping shall be supported from structural steel only. Provide supplementary steel where required.
- E. Piping shall not be hung from other piping, ducts, conduits or from equipment of other trades.
- F. All water piping connected to rotating equipment within all mechanical spaces shall be isolated from the building structure by means of vibration hangers inserted in the hanger rods. The vibration hangers shall consist of a steel spring in combination with a double deflection neoprene element within a rectangular steel housing. Combined static deflection shall be 1.375" minimum. Hangers shall have capability of supporting the piping at a fixed elevation during installation and shall incorporate an adjusting device to transfer the load to the spring. Deflection shall be indicated by means of scale. Vibration hangers shall be Fig. No. 360 or type PCDNHS as made by Mason Industries, as specified under another Section of these Specifications.
- G. Where additional steel is required for the support of hangers, furnish and install same subject to the approval of the Architect. Piping shall not be supported from the metal deck slab construction.
- H. All piping running on walls shall be supported by means of hanger suspended from heavy angle iron wall brackets. No wall hooks will be permitted.
- I. Lateral bracing of horizontal pipe shall be provided where required to prevent side sway or vibration. The lateral bracing shall be of a type approved by the Architect and shall be installed where directed by the Architect.
- J. All anchors shall be separate and independent of all hangers, guides and supports. Anchors shall be of heavy blacksmith construction suitable in every way for the work approved by the Architect. Anchors shall be welded to the pipe and fastened to the structure with anchor type bolts.
- K. Anchors shall be fabricated and assembled in such a form as to secure the piping in a fixed position. They shall permit the line to take up its expansion and contraction freely in opposite directions away from the anchored points; and shall be so arranged as to be structurally suitable for particular location and line loading. Submit details for approval.
- L. All horizontal steel and copper pipe shall be supported at maximum intervals as

follows: Steel pipe - up to 1¼" - 8'-0"; 1½" to 2½" - 10'-0"; 3" and larger - 12'-0". Copper tube and Brass Pipe - up to 1¼" - 6'-0"; 1½" to 2½" - 8'-0"; 3" and larger - 10'-0". There shall be no metal-to-metal contact at supports for non-ferrous pipes. Provide 1/8" thick lead strips or Summer Inc. pipe clamps under uninsulated piping at supports. Hangers and supports shall be installed outside of insulation or insulated piping.

- M. Trapeze type hangers shall be made up of angles bolted back-to-back or channels for supporting parallel lines of piping. Trapeze type hangers shall be supported with suspension rods having double nuts, and securely attached to construction with inserts, beam clamps, steel fishplates, cantilever brackets, lag screws or other approved means.
 - 1. Use approved type brackets for supporting piping attached along walls. Non-insulated piping (compressed air, gas, etc.) supported by trapeze hangers shall be provided with hold down clamps at the trapeze hangers. If only non-ferrous piping (copper, etc.) is supported on the trapeze hangers, the trapeze and hold down clamps shall be copper clad.
- N. Maximum weights on hanger rods shall be such that stress in tension shall not exceed 9,000 psi, using root area of threaded portion. In no case shall hanger sizes be less than 3/8" for pipe up to 2", ½" for pipe 1½" to 3½", e" for pipe 4" to 5", ¾" for pipe 6", f" for pipe 8" to 12".
- O. Supports for vertical piping shall be double bolt riser clamps, with each end having equal bearing on the building structure located at alternate floors. Cast iron soil pipe shall be supported at every floor and at its base.
- P. All auxiliary steel for pipe supports shall be furnished and installed under this Section.
- Q. All hangers, rods, inserts, clamps, stanchions, brackets, etc., shall be dipped in zinc chromate primer before installation and provided with one (1) coat of approved type paint after installation. (Refer to Section 15000.)
- R. Chains, straps, perforated iron or wire hangers are not permitted.
- S. The Architect must approve method of supporting pipes from building structure before work is started. The Contractor shall bear all responsibility for materials and workmanship as described in this Section, and shall make sure that all hangers and supports are properly and permanently connected to building structure. No piping shall be hung from metal deck; auxiliary steel shall be provided.
- T. All pipe support shall be installed to avoid interference with other piping, hangers, electrical conduits and supports, building structures and equipment.

END OF SECTION

SECTION 15150 - INSULATION FOR PLUMBING WORKPART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install complete and make ready for operation by the Owner, all work as shown on Drawings and as specified hereinafter.
- B. The piping systems and equipment to be insulated shall include, but not be limited to the following:
 - 1. Domestic hot and cold water piping.
 - 2. Interior storm/water drainage piping as indicated.
 - 3. Non-potable cold water (rain water).

PART 2- PRODUCTS

2.1 INSULATING MATERIALS

- A. All insulation shall have a composite (insulation, jacket facing and adhesive used to adhere jacket or facing to the insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 73, not exceeding flame spread of 25, fuel contributed of 50, and smoke developed of 50. Accessories such as adhesives, mastics, cements, tapes and cloths for fittings shall have component ratings as listed above. Insulation shall be glass fiber with a maximum K factor 0.23 at 75°F mean temperature. Density shall not be not less than 3 lbs. per cu. ft.
- B. Provide materials specified from Owens-Corning Fiberglass Corp., or approved equal.
 - 1. Fiberglass Pipe Insulation: FS HH-I-558B, Form D, Type III, Class as indicated.
 - a. Provide Class 12 for hot and cold plumbing piping.
 - 2. Fiberglass Pipe Fitting Insulation: FS HH-I-558, Form E, Class as indicated.
 - a. Provide Class 16 for use with Class 12 pipe insulation, where temperature does not exceed 450oF.
 - 3. Vapor Barrier Materials: FS HH-B-100, Type I, paper-backed aluminum foil, except as otherwise indicated, strength and permeability rating equivalent to adjoining pipe insulation jacketing.
 - 4. Bends shall be 0.016 inch thick, ½" aluminum spaced 18" on center,

finish cement shall be J-M No. 375 or smooth coat by Insulation Industries, Inc.

5. Wires shall be 20 gage galvanized annealed steel, sealer shall be layer of J-M Duramesh 207 or equal.
6. Adhesives and Protection Finish shall be Benjamin Foster 30-36.
7. Jacketing Material for Equipment Insulation: Provide pre-sized glass cloth or canvas material, not less than 7.8 ounces per square yard.
8. Fitting and Valves: Zeston 25/50 rated -20 mil P.V.C. covers over fiberglass insulation.

2.2 RELATED MATERIALS AND REQUIREMENTS

- A. At pipe supports Insul-Shield pipe saddles and matching hanger shall be used. Joints of insulation abutting Insul-Shielding pipe saddles shall be butted with IC-405, and the joints firmly pressed together.
- B. All concealed and exposed piping shall be provided with factory ASJ (Owens/Corning Fiberglass) secured in place with vapor barrier adhesive IC-225. Provide ½" aluminum bands spaced 18" on centers.

2.3 INSULATION REQUIREMENTS

- A. Cold Water Piping
 1. Cold Water - all sizes - ½" insulation, A.S. jacket.
 2. Storm drainage piping and drain body - minimum ½" insulation, A.S. jacket.
 3. Frostproofed Piping - 3" insulation, dual temperature fire retardant jacket.
- B. Hot Water Piping
 1. Hot Water Supply - ½" to 2" I.D. - 1" insulation, A.S. jacket.
 2. Hot Water Circulating - all sizes - 1" insulation, A.S. jacket.
- C. Miscellaneous Equipment
 1. Insulate water meter with 4 pound density 1" thick vapor barrier glass insulation blanket, fitted and contoured to shape and secured in place with bends or wire. Apply two coats of mineral wool, cement and trowel to a smooth finish, and finish with two applications of Benjamin Foster 30-36 vapor barrier finish.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage. Staples shall not be used on vapor barrier.
- B. Cover valves, flanges, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory, precut or job fabricated units (at Installer's option) except where a specific form or type is indicated.
- C. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
- D. Install protective metal shields and insulated inserts at each hanger and support to prevent compression of insulation.
- E. Do not apply insulation to hot equipment.
- F. Apply insulation using the staggered joint method for both single and double layer construction, where feasible. Apply each layer of insulation separately.
- G. Coat insulated surfaces of equipment with layer of insulating cement, troweled in a workmanlike manner, leaving a smooth continuous surface. Fill in scored block, seams, chopped edges and depressions, and cover wire netting and joints with cement of sufficient thickness to remove surface irregularities.
- H. Cover insulated equipment surface with jacketing neatly fitted and firmly secured. Lap seams at least two inches. Apply over vapor barrier where applicable.
- I. All horizontal storm drainage piping (except in service/utility corridor) under roofs, exposed and above hung ceiling, and roof drain bodies shall be insulated (sweat-proofing) as specified for water piping, but nested larger diameter covering over hubs and drain bodies.
- J. Direct contact between pipe and hanger shall be avoided. Hanger shall pass outside of metal saddle which cover a section of high density insulation (such as calcium silicate) of sufficient length to support pipe without crushing insulation. Hangers or saddles shall not pierce insulation and vapor barriers.

3.2 INSTALLATION REQUIREMENTS

- A. Install insulation products in accordance with the manufacturer's written instructions, and in accordance with recognized industry practices to ensure that the insulation serves its intended purpose.
- B. Install insulation on pipe systems subsequent to testing and acceptance of tests.
- C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete the run. Do not use cut pieces of scraps abutting each other.

- D. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.
- E. The Contractor shall take every precaution necessary to ensure that the covering material is in satisfactory condition to receive painting.
- F. Penetration of walls and floors by piping connection to rotating equipment shall be provided with a fiberglass sleeve, the full depth of pipe penetration.
- G. In all cases where new piping connects to existing piping that is insulated, the existing insulation that is removed to make the new connection shall be replaced with new insulation as hereinafter specified.
- H. Do not insulate hand holes, cleanouts, ASME stamp, or the manufacturer's nameplate. Provide neatly beveled edge at interruptions of insulation.
- I. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- J. The installer of the piping insulation shall advise this Contractor of required protection for the insulation work during the remainder of the construction period, to avoid damage and deterioration.

END OF SECTION

SECTION 15160 - PLUMBING EQUIPMENT, SPECIALTIES AND ACCESSORIESPART 1 - GENERAL

(not used)

PART 2 - PRODUCTS

2.1 PIPE EXPANSION COMPENSATORS

- A. Any breaks or damage to the piping system or to the Work of other Sections within the period of the guarantee due to improper provision for expansion and contraction must be replaced at this Contractor's expense.
- B. This Contractor is to provide for expansion of pipes by providing expansion compensators and/or expansion loops and shall provide anchors at pump discharge and suction lines. All expansion loops shall be prestressed.
- C. Make adequate provisions for proper expansion and contraction of piping. At connections of branches to water mains, risers and at connections to heaters, coolers and other equipment, provide sufficient number of elbow swings to allow for proper expansion and contraction of piping. Provide adequate elbow swings, expansion compensators, expansion loops or approved type expansion joints, wherever noted, indicated, or required to allow for proper expansion and contraction of mains and risers.
- D. This Contractor shall provide, where necessary to absorb expansion and contraction, in hot water recirculation pipe lines (except at building expansion joints) 3 inches and smaller and for systems with pressures less than 51 psi, Flexonics Model HP expansion compensators having two-ply phosphor bronze elbows and brass shrouds and end fittings as manufactured by U.O.P. Flexonics Division, Bartlett, Illinois. All internal parts shall be of non-ferrous metals. Service pressure shall be external to the bellows. Compensators shall have integral guides extending the full length of the bellows travel. Compensators shall have external positive anti-torque devices to prevent twist.
- E. All lines in which expansion joints are installed must be securely anchored and guided in accordance with manufacturer's recommendations.

2.2 ESCUTCHEONS

- A. This Contractor shall provide escutcheons on all exposed pipe wherever they pass through floors, ceilings, walls or partitions.
- B. Escutcheons for pipes passing through outside walls and floors shall be Ritter Pattern and Casting Co., No. 1, solid, cast brass, flat type secured to pipe with set screws.
- C. Escutcheons for pipes passing through interior walls, partitions, and ceilings shall be Ritter Pattern and Casting Co., No. 1, solid, cast brass chromium plated type,

secured to pipe with set screws.

- D. Escutcheons for pipes in unfinished areas shall be cast iron, secured with set screws.

2.3 TRAPS

- A. Each fixture and piece of equipment requiring connection to the drainage system shall be separately trapped by means of a water seal trap placed as close to the fixture as possible.
- B. All running traps on drains, etc., shall have inlet handhole cleanouts and brass plug cleanouts in bottom. Cast iron traps below grade shall have bottom plug omitted. All exposed P traps shall have bottom cleanouts and shall be chromium plated brass.

2.4 DISSIMILAR METALS

- A. Connections between pipe, fittings, hangers and equipment of dissimilar metals shall be avoided.
- B. Dielectric unions or insulated couplings shall be installed between copper or brass piping material and steel piping material or steel tanks. Unions or insulated couplings shall be used for pipe sizes 2" and smaller, and use dielectric gaskets on flanges and sleeves for pipes 2½" and larger.
- C. Pipes, fittings, hangers, etc., of dissimilar metals shall be insulated against direct contact with each other by using a high quality or grade of dielectric insulating material.

2.5 PIPE SLEEVES

- A. Any pipe required in walls and floors shall be provided with a pipe sleeve.
- B. Provide watertight sleeves for all pipes penetrating exterior foundation walls and waterproof floor areas and where other waterproof areas are noted on the Architectural and Structural Drawings.
- C. Except where indicated or specified otherwise, provide and install Schedule 40 galvanized steel sleeves for all piping passing through concrete walls or floor slabs. Sleeves shall be securely set in the framework and where not specified otherwise shall be of such length as to extend flush with each face of the wall in which they are installed. Sleeves shall be securely set in floors 3" above unfinished floor and 2" above the finished floor or tile, as applicable. Sleeves in kitchen and laundry areas shall be chrome plated.
- D. Sleeves shall have an internal diameter of at least 1" larger than the outside pipe size diameter of the pipe passing through them. Sleeves in exterior foundation walls shall be James B. Clow and Sons, No. F-1430 or F-1435, or approved equal, extra-heavy cast iron wall sleeves with intermediate integral flange. Cast iron sleeves shall be set with ends flush with wall faces.

- E. Where sleeves penetrate waterproofing, install caulking between pipes and pipe sleeves as follows:
 - 1. Pack oakum to a depth of 1" between pipe and pipe sleeve at a location permitting 3" of sealant to be installed above the oakum.
 - 2. Fill space above oakum to a depth of 3" with sealant similar and equal to Igas Joint Sealer as manufactured by Silka Chemical Corporation.
- F. Sleeves for gas piping shall extend 4 inches beyond exterior face of wall and 1 inch beyond inner face.
- G. Sleeves in waterproof floors shall be as manufactured by Zurn Inc. or equal, cast iron sleeve with integrally cast flange and flashing device.

2.6 STACK SLEEVES

- A. Stack sleeves for pipes passing through roof shall be equal to Zurn Z-195-10, with cast iron body, adjustable flashing ring, rust resistant bolts, and under deck clamp. The adjustable flashing ring shall be caulked after it is in the proper position. The space between the flashing sleeve and the pipe passing through same shall be caulked watertight.

2.7 UNIONS

- A. Where Required
 - 1. On inlet and outlet of all apparatus and equipment having connections 2" and smaller. Where valves are adjacent to equipment, unions shall be on equipment side of valves.
- B. Type
 - 1. Steel piping: Malleable iron, WOG female pattern, brass seat, ground joint, 300 lb.
 - 2. Copper tubing: Ground joint, cast iron, 150 lb. WOG pattern.
 - 3. For piping over 2" flanged joints to be used.
 - a. Gaskets shall be 1/16" thick similar to Garlock or Cranite factory cut, one piece.

2.8 WATER HAMMER ARRESTORS

- A. Install permanently sealed water hammer arrestors on all hot and cold water branches and headers to plumbing fixtures whether indicated on the Plumbing Drawings or not.
- B. Shock absorbers are to be of size and location in accordance with the

manufacturer's recommendations and with DPI Standard WH 201, shock absorbers shall be PDI approved.

- C. Provide accessibility to all shock absorbers.
- D. Provide shock absorbers at the top of water risers.
- E. Provide shock absorbers at all quick closing valves, solenoid valves and at equipment such as sterilizers, washers, etc.
- F. The water hammer arrestors shall be Zurn Z-1700 and shall be installed as per manufacturer's recommendation.

2.9 HOSE BIBBS

- A. Hose bibbs shall be Chicago Faucets #952 or approved equal, with vacuum breaker and loose key except as specified herein. Combination hot and cold hose bibbs shall be Chicago #305-VBC.P. or approved equal; modify for piped mounting less loose flange.

2.10 WALL HYDRANTS

- A. Provide $\frac{3}{4}$ " non-freeze wall hydrants where indicated on Drawings. Wall hydrants shall be Zurn Z-1315 or approved equal, all bronze with bronze working parts throughout with a nickel bronze face, and renewable nylon seat.

2.11 THERMOMETERS

- A. Thermometers shall be adjustable angle type with red reading mercury, 7" black baked enamel case, black on white scale, a range from 30°F. to 240°F, and a separable brass socket. Thermometers shall be so installed and adjusted that they are easily readable from a normal standing position on the floor. Thermometers shall be similar or approved equal to U.S. Gauge "Multi-Angle".

2.12 PRESSURE GAUGES

- A. Pressure gauges shall have 3 $\frac{1}{2}$ " diameter black enamel cast aluminum case with threaded brass ring, heavy glass, phosphor bronze bushed, rotary precision movement and dial ranges of 0 to 200 psi for water service. Pressure gauges shall be similar or approved equal to Trerice Co. No. 500X, with brass tee handle cock.

2.13 VACUUM BREAKERS

- A. Provide vacuum breakers on water supply piping to each fixture and piece of equipment with submerged inlets, and on faucets and outlets within the building to which hoses can be or are attached. Set vacuum breakers in exposed readily accessible locations and at least 6'-6" above finished floor. Vacuum breakers shall be chrome plated brass, T&S Brass No. B-929-A or approved equal.

2.14 FIXED AIR GAPS

- A. Provide a fixed air gap where indicated on the Drawings and required by Code for indirect wastes to prevent contamination from possible backflows from a sanitary drain line. Air gap shall be Zurn No. Z-1025 to suit piping installation. Fixed air gap finishes shall match connecting pipe finishes.

2.15 PLASTER TRAPS

- A. Plaster traps shall be equal to Zurn Z-1180 and Z-1181 steel body, acid resisting epoxy finish inside and outside; Lumaloy cover and sediment basket with removable bronze screens; cover shall be gasketed with flush type lift and locking device. Plaster traps shall be located so that the removable sediment basket can be completely accessible without disrupting sinks.

2.16 FIXTURE STOPS

- A. Provide fixture stops as manufactured by the Dole Valve Company or approved equal. Fixture stops are to be installed in accordance with the manufacturer's recommendations and shall be provided for all sinks, lavatories and electric water coolers.
- B. All Lavatories: Dole Model #FMA 3/8" male pipe inlet and 3/8" female pipe outlet for rigid hot and cold supply risers. Flow rate 0.5 gpm.
- C. All sinks including equipment with sinks, mop receptors, service sinks and kitchen sinks, showers shall be Dole Model #FMC male pipe inlet and 1/2" female pipe outlet for hot and cold supply risers. Flow rate 4 gpm for service sinks and mop receptors, 3 gpm for kitchen and casework sinks, 2.5 gpm for showers.
- D. Electric Water Coolers: Dole Model #F3/4C male pipe inlet and d" female pipe outlet for cold supply riser. Flow rate 0.5 gpm.
- E. All exposed-to-view fixture stops and related piping shall be chrome plated nickel, or nickel plated.

2.17 DRAINS

- A. Drains shall have heavy cast iron, with double drainage flange and weep holes, with outlet connections as indicated and of sizes indicated on Drawings. Drains (except as noted) shall be furnished with high polished brass tops consisting of a one-piece rim secured to the body and vandal-proof spanner type screws, and a solid brass grate with reinforcing members on underside. Removable sediment basket shall be of heavy duty one-piece construction as specified hereinafter. All strainers or grates shall be secured with vandal-proof spanner type screws, unless otherwise specified.
- B. All drains in floors with a waterproof membrane shall be equipped with 6 lb. lead flashing or 20 oz. soft rolled sheet copper and secured to the flashing flange with brass bolts and cast iron clamping device. Flashings shall bond not less than 1'-0" on all sides into membrane waterproofing.
- C. On roofs furnish and set in conjunction with the roofer and when directed by the

General Construction Contractor, approved roof drains of cast iron unless otherwise indicated.

- D. Flashing of 6 lb. lead or 20 oz. soft rolled sheet copper, 34" x 34", shall be furnished and installed at each roof drain by means of non-puncturing type flashing clamping device.
- E. Set all drains in such a way that the floor finish and top of the drain will be plumb and flush with finish floor without requirements for future additional extension, modifications, etc.
- F. When Dex-O-Tex and/or vinyl waterproof floor is indicated on the Architectural Drawings, all drains must be provide with required flanges.
- G. All drains, except as noted, shall be similar to or equal to Zurn Mfg. Co. or Loro-Versal, and shall be as follows:
 - 1. Roof Drains R.D. - Similar and equal to Loro-Versal DN 70 siphonic drain for IRMA roofs, steel one piece consisting of base unit, galvanized, plastic-coated screen basket, securing clamping flange, discharge pipe. Drain and accessories must be compatible and applicable for each roof construction.
 - 2. Floor Drains F.D. Type A (Mechanical and Concealed Equipment Rooms) - Similar and equal to No. Z-505 cast iron body and flashing collar with cast iron tractor grate and flat bottom strainer. No. Z-414 cast iron funnel attached to grate, where indicated on the Drawings.
 - 3. Funnel Drains F.D. Type B (Kitchen Finished Area, Shower, etc.) - Similar and equal to No. ZN-415-B cast iron body, flashing collar, square nickel bronze top and ZN-414 funnel attached to grade where indicated on the Drawings.
 - 4. Floor Drains F.D. Type C (Kitchen) - Similar and equal to No. Z-525 cast iron body, flashing collar, adjustable square nickel bronze top, flat bottom strainer.
 - 5. Area Drains F.D. Type H - No. Z-550 cast iron, Duracoated, bottom outlet, non-puncturing flashing clamp device, extension, non-tilting grate with minimum free drainage area of 27 square inches. Drains in finished areas shall have polished nickel bronze top and grate.
 - 6. Drain in Trenches- See Section 02630.

2.18 CLEANOUTS

- A. Provide easily accessible cleanouts where indicated; at base of vertical stacks and leaders, at ends of horizontal drainage lines and at intervals not exceeding 50 ft., at each change of direction, on hand holes of running traps, and where indicated to make entire drainage system accessible for rodding. Provide at least 18 inch clearance to permit access to cleanout plugs.

- B. Cleanouts for cast iron pipe shall consist of tapped extra heavy cast iron ferrule caulked into cast iron fittings, and extra heavy brass screw plug with solid hexagonal nut.
- C. Cleanouts turning out through walls and up through floors shall be made by long sweep ells of "Y" and c bends with plugs and face or deck plates to conform to architectural finish in room. Where no definite finish is indicated on the Architectural and/or Mechanical Drawings, wall plates shall be chrome plated cast brass and floor plates shall be nickel bronze. Screws in cleanouts in finished areas shall be vandal-proof.
- D. Cleanouts shall be full size at the pipe up to and including 6 inch pipe. On larger size piping, 6 inch size plugs shall be used.
- E. The following schedule indicates the various types of cleanouts desired at various locations indicated on the Drawings. These cleanouts have been selected from the catalog of Zurn and are representative of quality design and finish desired. Cleanouts of Josam Mfg. Co., or J.R. Smith may be submitted provided they meet Specifications fully in every respect (such as material, weight, clamping features, finish, etc.). The characteristics and quality of the cleanout shall be as follows.
 - 1. Cleanout fitting in vertical stacks shall consist of tapped tees, capable of receiving a rough brass raised head cleanout plug; Zurn 1460-8 or approved equal.
 - 2. Cleanouts in Mechanical Equipment Rooms shall be Zurn 1420-25 or approved equal.
 - 3. Cleanouts in finished areas shall be Zurn Z-1420-3 or Z-1420-7 or approved with recess for tile floors, or approved equal.
 - 4. Cleanouts in Dex-O-Tex waterproof floors shall be Zurn No. Z-1405-18 or approved equal with extra heavy duty top.
 - 5. Cleanouts for 3 or more fixtures piped horizontally shall be extended to wall cleanouts, and shall be Zurn No. Z-1470 or approved equal.
 - 6. All cleanout plugs shall be brass and lubricated with graphite before installation.

2.19 THRUST BLOCKS

- A. This Work shall cover the installation of concrete thrust blocks as shown on the Plans or as required.
- B. Thrust blocks shall be composed of concrete aggregates meeting ASTM Specification C-33 and Portland Cement meeting ASTM Specification C-150 Portland Cement or C-175 for Air Entrained Portland Cement. Mix shall not be leaner than 1 cement, 2½ sand, 5 stone, having a compressive strength of not

less than 200 psi in 36 hours when using high early cement and 7 days when using standard cement.

- C. Thrust blocks shall be applied or ordered at bends, tees and hydrants where changes in pipe diameter occur at reducers or fittings.
- D. Thrust blocks shall be placed between solid ground and the fittings to be anchored. The area of bearing on fitting and on the ground in each instance shall be that approved by the Architect. The concrete shall be placed so that the pipe and fitting joints will be accessible for repair unless otherwise directed by the Architect.

2.20 MANHOLES, CATCH BASINS, FRAME, COVERS AND GRATES

- A. Lay brick and/or concrete blocks in manholes with upper joints completely filled with mortar. Horizontal joints shall not exceed $\frac{1}{2}$ " and vertical joints $\frac{1}{4}$ ", on the interior face. Plaster the exterior of manholes to a thickness of at least $\frac{1}{2}$ ". If concrete block is used, the bottom shall be as required for the concrete structure.
- B. Precast manholes and catch basins shall be installed on concrete bases and shall be set in accordance with the manufacturer's recommendations. Concrete block for drainage structures shall be precast solid segmental concrete blocks at least 5 inches thick and at least 8 inches long.
- C. All manhole flow channels shall be made of concrete, sewer pipe, brick, or semi-circular sections conforming to the inside diameter of the connecting sewers. Make gradual changes in grading and direction by the use of curves. Provide such channels for all connecting sewers and drain inlets to each manhole.
- D. Unless otherwise shown, set castings for manholes, catch basins and cleanouts at present finished grade and depress the grates of drainage openings to top elevations as indicated on the Drawings. Manhole covers and catch basins shall be raised to final grade as indicated.
- E. Cast iron frames, covers and gratings for all manholes and catch basins shall be tough, even grained, soft iron, free from burnt sand and other injurious defects. Before leaving the foundry, castings shall be thoroughly cleaned, subjected to hammer tests for soundness, and given two coats of coal tar pitched varnish.
- F. Frames and covers or gratings shall be Class 30 cast iron conforming to ASTM Specifications A-48. Castings shall be of best quality, soft grey iron, sound and true to pattern, coated with and heated to a temperature of 300oF. with coal tar pitched varnish. Bearing surfaces between frames and covers or gratings shall be machined, fitted together, and match marked to prevent rocking. Such frames and covers shall be manufactured by Campbell Foundry Co. or approved equal.
- G. Brick for manholes shall conform to applicable requirements of ASTM Specification C-62, Grade SW.
- H. Mortar for masonry in sewer structures shall be 1:3 cement sand mix, provided that hydrated lime may be substituted but not to exceed 10% by weight of the

cement.

- I. The Contractor shall seal inside and outside, all pipe penetrations through dry manhole walls to render these dry manholes waterproof.
- J. Steps shall be galvanized wrought iron $\frac{3}{4}$ " in diameter and of standard size and shape. They shall be firmly built into manholes at regular intervals of approximately 14 inches.

2.21 TIE-RODS

- A. Provide tie-rods for the site water main.
- B. Tie-rods shall comply with NFPA, Chapter 24, Appendix A Specification and pipe manufacturer's recommendations.
- C. Special consideration shall be given at the service entrance to the building. Provide auxiliary ties to the foundation wall to equalize building and pipe settling.

END OF SECTION

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SECTION 15300 - PLUMBING FIXTURES AND TRIMSPART 1 - GENERAL

1.1 (not used)

1.2 QUALITY ASSURANCE

- A. All fixture trimmings, including faucets, strainers, escutcheons, shower heads and arms, water closet supplies, stops, waste traps, escutcheons, visible hangers or chair carrier nuts shall be made of brass and shall be polished chromium plated. All material specified, such as chromium plating, shall be thoroughly and evenly applied and guaranteed not to strip or peel. All chromium plating on plumbing fixture trim shall be in accordance with Federal Specification WW-P-541b for grade "R" plating. Manufacturer shall submit certification that all chromium plating on finished trim meets the aforementioned Federal Specification. All plated work shall be highly buffed. Plastic, zinc or white metal will not be acceptable.
- B. All fixtures shall be free from imperfections, true as to line, angles, curves and color, smooth, watertight, nameplate in every respect and practically noiseless in operation. Fixtures as specified are given as a typical standard and they or other approved fixtures shall be furnished, set and connected in a good, substantial, neat and workmanlike manner.
- C. All fixtures specified to be vitreous ware shall be fixed vitreous china ware of the best quality, non-absorbent and burned so that the whole mass is thoroughly fused and vitrified, producing a material white in color which, when fractured, will show a homogenous mass, close grained and free from pores. The glazing and vitreous china fixtures shall be white, thoroughly fused and united to the body, without discoloration, chips, or flaws, and shall be free from craze. Warped or otherwise imperfect fixtures will not be acceptable.
- D. Each supply fixture, casework fixture and equipment, shall be separately controlled by its own stops. Locate as required on wall, above floor or as directed.
- E. All faucets shall have metal handles.
- F. All trim shall be permanently stamped with manufacturer's identification and visible after installation.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURE SCHEDULE

- A. The plumbing fixtures by American Standard or approved equal.

B. Water Closet

1. Zurn Z 5615.258.00 or approved equal 1.28 GPF elongated wall hung EcoVantage manual flush valve toilet system.
2. Zurn Z 5955SS- EL or approved equal solid plastic, sheltering arms, white, open front toilet seat less cover with stainless steel check hinges.
3. Zurn Z6000AV-HET or approved equal, high efficiency flushometer valve. The EcoVantage manual valve is an exposed. The valve has non-hold open and no leak handle feature, high back pressure vacuum breaker.
4. Combination water closet carriers and drainage fittings shall be Zurn or approved equal Z-1203 and Z-1204 Series or approved equal with feet bolted to construction.

C. Lavatories

1. Zurn Z 5344.291.1.07.28.0 or approved equal vitreous china lavatory, faucet holes 4" centers on battery panel sensor faucet with integral 4" cover plate centers.
2. (Pair) d" SPS wall supplies with loose key stops with cast brass set screw escutcheons.
3. 1¼" x 1½" chrome plated cast brass "P" trap with cleanout plug.
5. 1½" SPS chrome plated brass trap nipple and cast brass set screw escutcheon.
6. Zurn Z 6915 AquaSense Battery Powered, chrome plated sensor faucet.
7. Supported on Zurn ZX-1231 (250 lbs. load) or approved equal concealed chair carrier with concealed arms and block feet bolted into construction.

D. Service Sink

1. No. 7692.008 with 8379.018 rim guard, through back faucet, "Lakewell" enameled cast iron service sink or approved equal.
2. No. 7798.030 – cast iron "P" standard to wall and strainer for 3" iron pipe, or approved equal.
3. 8340.235 exposed yoke wall-mount utility faucet with vacuum breaker and stops in shank, or approved equal.

E. Pantry Sink

1. Model ECC2522 Elkay – single bowl sink.

E. Pantry Sink

1. Model ECC2522 Elkay – single bowl sink.
2. 20(1.0 mmm) Gauge – Type 304, self rim.
Faucet Holes: 1,2,3 or 4 holes as indicated, 4" (102 mm) center to center.
3. Elkay Comercial Faucet Model LK800AT08T4.

F. Shower

1. See Section 10300- Toilet Accessories.

G. Exterior Shower

1. Stainless steel shower from Famous Plumbing Supply Model WMHC – 445 - DELUXE.
2. Pool shower – Wall/Post model with ADA lever handles, 6" sunflower shower head, handy spray and 58" stainless steel hose.

H. Drinking Fountain

1. Wall mount water cooler, barrier – free access, Model EZS8 Elkay, with self-closing Easy-Touch Controls on the front, without cooling system. Comply with the requirements of A.D.A. and certified to be lead-free.

PART 3 - EXECUTION**3.1 SERVICES TO FIXTURES AND EQUIPMENT FURNISHED UNDER OTHER SECTIONS**

- A. Refer to Architectural and Plumbing Drawings for exact locations of equipment and fixtures. Provide all materials, equipment and appliances necessary and required to complete the installation of all plumbing and equipment, including but not limited to the following: plumbing, roughing and final connections, valves, stops, trim, escutcheons, fittings, traps, etc. Install faucets, trim, etc., furnished with the equipment provided by others.
- B. Unless otherwise detailed on Drawings, roughing of proper size and capacity for equipment indicated on Architectural, Heating and Ventilation, Plumbing or Electrical Drawings or provided under another Division or Section shall be provided and installed in such a manner and location that final connection can be made with a minimum of work and without cutting, patching permanent walls, partitions, ceilings or floors. Drawings are of necessity, schematic, for special equipment as exact roughing and requirements may vary with different manufacturers.

3.2 INSTALLATION REQUIREMENTS

- A. The Contractor shall make all plumbing connections to all equipment and fixtures requiring such connections as shown on Drawings whether the equipment and fixtures are furnished under this Section or another Division or Section. Investigate the equipment furnished under other Divisions or Sections to determine if combination fittings have a means of shut-off or require the installation of check valves, backflow preventors and/or pressure reducing valves. Make final connections to such, including installations of all special traps, supplies, control valves, etc. furnished with such equipment, and furnish all material necessary that is not supplied with the equipment.
- B. The Contractor shall leave valved water connection for equipment, spaces and other locations where shown for the use of other trades or other Sections. On each valved outlet for equipment with submerged inlets, provide a backflow preventor after the shut-off valve. Funnel drains and/or floor drains for the air conditioning, heating and refrigeration work shall be provided.
- C. Fixture supplies and traps as specified, shall be chrome plated brass where exposed to view. Where concealed from view in cabinets, etc., they may be rough brass. All fixture supplies shall have stops.
- D. As soon as installed, all metal fixture trimming shall be thoroughly covered by this Contractor with non-corrosive grease which shall be maintained until all construction work is completed.
- E. Upon the completion of the Work, all fixtures and trimmings shall be thoroughly cleaned and polished and free from all marks and left in first-class condition.
- F. Upon completion of the Work, test flush valves and faucets for leaks or drips and adjust same for quiet operation.
- G. All fixtures shall be left thoroughly clean. All plated or polished fittings, pipes and appliances shall be coated with Vaseline immediately after installation, and shall be finely polished and free from all marks and foreign substances.
- H. Equipment and all connections shall be in accordance with the rules relative to submerged inlets and shall be provided with all necessary vacuum breakers and check valves in accordance with the applicable codes.
- I. Connection between any fixture with a floor outlet and flange shall be made with an approved prepared gasket that shall be a germicide, absolutely gas and fume-proof, watertight, stain-proof, containing neither oil nor asphaltum, and which will not rot, harden or dry under any extreme climate change and must adhere on wet surfaces.
- J. Each fixture shall be separately trapped, using the type and size of trap called for specifically in the Specifications or the type required by the Plumbing Code. The traps shall be approved type.
- K. All fixtures requiring hot and cold water shall have the cold water faucet on the right hand side of the fixture and the hot water faucet on the left hand side of fixture.

- L. The Contractor shall be responsible for protecting all plumbing fixtures, equipment, etc., provided under Plumbing Work Sections against injury from building materials, acids, tools and equipment.
- M. No slip joints will be permitted on water piping.
- N. Flexible supplies will not be permitted in lieu of rigid supplies.
- O. Double compartment sinks or lavatories shall be provided with faucet, trap, supplies, etc. for each compartment.

END OF SECTION

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SECTION 15320 - DOMESTIC HOT WATER HEATERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install complete and make ready for operation by the Owner, all Work as shown on Drawings and as specified hereinafter.

1.2 ENERGY CONSERVATION

- A. Water heaters shall comply with New York State Energy Code requirements.

PART 2 - PRODUCTS

2.1 DOMESTIC HOT WATER HEATER – F/C/P ROOM

- A. Furnish and install where shown on the plans one (1) vertical water heater as manufactured by the Bradford White Corporation, or approved equal.
- B. The Light Duty Commercial Lowboy Energy Saver Electric Water Heater model No. LD-40L3-3 as manufactured by Bradford White Corporation or approved equal. Heater should be rated at 2 x 4.5KW, 240V, 3Ph and constructed in accordance with ASME Code, shall bear appropriate symbol and be listed with the National Board as required. Heater shall be listed with Underwriter's Laboratories and approved by National Sanitation Foundation. Bedford White tanks are lined with exclusively engineered enamel formula (Vitraglas Lining) that provides superior protection from the highly corrosive effects of hot water. This formula (Vitraglas) is fused to the steel surface by firing at the temperature of over 1600°F. 1" Non-CFC Foam Insulation covers the sides and top of tank, reducing the amount of heat loss. The fittings at the cold water inlet and hot water outlet are dielectric waterway fittings with 3/4" NPT tapered male threads. T&P relief valve included – side T&P is standard. Optional top T&P location is available. Heater include low restriction brass drain valve.

2.2 DOMESTIC HOT WATER HEATER – BOAT HOUSE AREA

- A. Furnish and install where shown on the plans one (1) vertical water heater as manufactured by the Rheem Corporation, or approved equal.
- B. The water heater shall be 20 Gallon, Point-of-Use Series, model No. 81VP20S as manufactured by Rheem Corporation or approved equal. Heater should be rated at 3/4" N.P.T. outlet, anode rod. T&P valve connections. Water heater furnished standard with 120 volt AC, 2000 watt single element. The unit is U.L. listed and comply with Underwriter's Laboratories Specifications 174. Patented

R-Foam insulation process for superior heat retention. Temperature and pressure relief valve included. Automatic thermostat keeps water at desired temperature. Over-temperature protector cuts off power in excess temperature situations. Heater is designed to meet exceed ANSI (American National Standards Institute) requirements and have been tested according to D.O.E. test procedures and meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy Efficiency performance criteria for energy consuming appliances.

3.1 CERTIFIED DRAWING

- A. A descriptive certified dimensional outline drawing shall be submitted for approval, showing all instrumentation, controls and design details.

3.2 FINAL ASSEMBLY

- A. The entire heater shall be factory assembled and tested, requiring only connection to services. Complete operating, adjustment and start-up instructions shall be provided in booklet form.

END OF SECTION

SECTION 15380 - TESTING AND ADJUSTMENTSPART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Work of this Contract includes providing all labor, materials, accessories, services and tests necessary to install, complete and make ready for operation by the Owner, all work as shown on the Drawings and as specified hereinafter.

1.2 REQUIREMENTS

- A. All tests shall be made in the presence of the Owners' Representative, and the local authorities having jurisdiction of the work to be tested, as may be directed; and at least 72 hours notice shall be given in advance of all tests.
- B. The Work of this Contractor shall include the furnishing of all testing instruments, gauges, pumps, smoke machines, and other equipment required or necessary for tests, required by laws, rules and regulations and as specified.
- C. Provide all other tests required by local inspectors and all other authorities having jurisdiction.
- D. All appurtenances shall be operated after installation to determine whether or not they meet the requirements of the Specifications.
- E. All defects disclosed in the work by tests and otherwise shall be made good or the Work replaced without additional cost to the Owner. No caulking on screwed joints, cracks or holes will be acceptable.
- F. Tests shall be repeated after any defects disclosed thereby have been made good or the work replaced if it is deemed necessary.
- G. All tests shall be made at the expense of the Contractor.
- H. Tests are not permitted to be made with air except as noted.
- I. Contractor to provide required test plug tee fittings during erection of pipe system.
- J. If the pipe installation fails to meet testing requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall repair or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of the tests after the leaks have been corrected.
- K. All piping which is to be enclosed in partitions or hung ceilings shall be tested and made tight when directed by the Construction Supervisor and in adequate time to permit the installation of partitions and ceilings. When necessary, the Contractor shall drain the piping and/or take over such precautions as required to

prevent damage by freezing.

- L. The Contractor shall also be responsible for the Work of other trades that may be damaged or disturbed by the tests, or the repair or replacement of his Work, and he shall, without extra charges, restore to its original condition any Work so damaged or disturbed.

PART 2 - PRODUCTS
(NOT USED)

PART 3- EXECUTION

3.1 SITE SANITARY AND STORM SEWERS

- A. Test completed sewer lines with light or reflected light. Test shall show clear unobstructed view between manholes. All of the Work will be subject to the final approval of the Architect.
- B. The construction of the sewer line shall be inspected by the Architect and Local Authorities.
- C. The completed sewer systems, including all mains, laterals, and manholes shall be limited to a maximum leakage limit of 100 gallons per inch of diameter, per day, per mile.
- D. Any completed collection system or partial system failing to meet the maximum allowable infiltration requirements shall be reconstructed or sealed in a manner acceptable to the Architect and the Local Authorities.
- E. The gravity sanitary sewer lines shall have all openings tightly closed with screw plugs, or equal device. The piping shall be filled with water and proven tight under a pressure equal to 10'-0" head of water for a minimum of two (2) hours. Water level must remain constant throughout test without addition of water.

3.2 SITE AND UNDERGROUND WATER PIPING

- A. The new water main shall be given pressure and leakage tests in section of approved length all as directed and approved by the Architect. Hydrostatic and leakage tests shall conform to AWWA C600-64 requirements. For these tests, this Contractor shall furnish a water meter and a pressure gauge. This Contractor shall furnish and install suitable temporary testing plugs, valves or caps for the pipeline, all necessary pressure pumps, pipe connections, other similar equipment, and all labor required. All expenses involved in making leakage and pressure tests shall be borne by this Contractor. The meter gauge shall be installed by this Contractor in such a manner that all water entering the section under test will be measured and the pressure in the section indicated, and shall be kept in use during both tests. The Sections of pipe to be tested shall be filled with water of approved quantity and all air shall be expelled from the pipe.

- B. The new water main shall be subject to a hydrostatic test of 200 psi gauge, after the pipe is laid and the trench partially backfilled (joints shall be left exposed). The test pressure shall be applied to each valved section and maintained for a period of two (2) hours with no more than 2 psi loss of pressure. If this Contractor cannot achieve the specified pressure and maintain it for a period of two (2) hours, the section under test shall be considered as having failed to pass the pressure test.
- C. If the section tested shall fail to pass the pressure test or the leakage test, or both, this Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, joint, etc., without extra cost to the Owner.
- D. If, in the judgment of the Owners' Representative, it is impractical to follow the foregoing procedures exactly for any reason, required modifications in procedure shall be made, but in any event, this Contractor shall be responsible for the ultimate tightness of the lines within the above leakage requirements.

3.3 INTERIOR DOMESTIC WATER SYSTEMS

- A. Domestic cold, hot and hot water circulation system: The entire water supply system shall be tested to a hydrostatic pressure of 150 pounds per square inch or 1½ times the system pressure, whichever is greater, at lowest point of the water system in the building, and proved tight at this pressure before fixtures are installed. Water supply piping, if in any way concealed by structural work, shall be tested to the aforesaid pressure and proved tight before pipes are concealed.
- B. The test pressure shall be held for a period of not less than two (2) hours. The piping system shall be considered tight if the drop in pressure does not exceed 2 pounds per square inch during the test period. If the pressure drop exceeds 2 pounds, all repairs and alterations in the piping system necessary to meet the test shall be made.

3.4 INTERIOR SANITARY WASTE AND STORM WATER SYSTEMS

- A. The entire piping of the sanitary system and of the storm water system shall be tested with water in accordance with the New York City Plumbing Code and the Local Plumbing Inspector's requirements and proved tight before the trenches are backfilled or fixtures connected.
- B. The water tests of the piping of the sanitary system and the piping of the storm water system shall comply with the requirements of the NYC Plumbing Code and all Local Authorities.
- C. All drainage and vent systems shall be filled with water and proven tight under a 10'-0" head over new building roof for a minimum of two (2) hours. Water level must remain constant throughout test without adding water.
- D. After all fixtures have been permanently connected to the sanitary system and the system is completed, a smoke test shall be applied to the sanitary system, and the entire system proved tight to the satisfaction of the Owners'

Representative, when filled with smoke under pressure equal to 1" column of water. The smoke shall be produced by a smoke generating machine and not be chemical mixtures.

END OF SECTION

SECTION 15390 - MANUFACTURERS FOR PLUMBING

PART 1 – GENERAL

(not used)

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor shall furnish one of the following products, or approved equal:

1. Plumbing Fixtures (China)
 - a. Zurn
 - b. Kohler
 - c. Eljer
 - d. American Standard
 - e. Or approved equal
2. Gauges and Thermometers
 - a. U.S. Gauge Co.
 - b. Ashton
 - c. Ashcroft
 - d. Philadelphia Thermometer Co.
 - e. Mueller
 - f. Taylor
 - g. Or approved equal
3. Shower Mixing Valves
 - a. Zurn
 - b. Symmons
 - c. American Standard
 - d. Powers
 - e. Speakman
 - f. Or approved equal
4. Trim for Plumbing Fixtures and Hose Bibbs
 - a. Eljer
 - b. Kohler
 - c. Chicago Faucet
 - d. T&S Brass
 - e. American Standard
 - f. Speakman
 - g. Zurn
 - h. Or approved equal
5. Hangers and Supports
 - a. Carpenter & Paterson, Inc.
 - b. Fee and Mason
 - c. Grinnell

- d. Or approved equal
- 6. Escutcheons
 - a. Fee and Mason Mfg. Co.
 - b. Ritter Pattern and Casting Co.
 - c. Or approved equal
- 7. Insulation
 - a. Owens-Corning Fiberglass Co.
 - b. Gustin-Bacon Mfg. Co.
 - c. Pittsburgh Plate Glass Co.
 - d. Or approved equal
- 8. Circulating Pump
 - a. Thrush
 - b. Bell and Gossett Co.
 - c. Taco Inc.
 - d. Or approved equal
- 9. Water Hammer Arrestors
 - a. J.R. Smith Co.
 - b. Josam Mfg. Co.
 - c. Zurn Mfg. Co.
 - d. Wade Mfg. Co.
 - e. Or approved equal
- 10. Valves
 - a. Walworth Co.
 - b. Jenkins Bros.
 - c. Crane Co.
 - d. Kennedy Valve Co.
 - e. Stockham
 - f. Or approved equal
- 11. Sprinkler Heads
 - a. Viking Corp.
 - b. Grinnell Corp.
 - c. Reliable Inc.
 - d. Star Sprinkler
 - e. Central Sprinkler, Inc.
 - f. Or approved equal
- 12. Alarm Actuating Devices
 - a. Acme Fire Alarm Co.
 - b. Edwards Co.
 - c. Potter Electric Signal, Inc.
 - d. Or approved equal

13. Flush Valves
 - a. Zurn
 - b. Delaney
 - c. Sloan Royal
 - d. Or approved equal

14. Drains, Carriers and Specialties
 - a. Wade
 - b. Zurn
 - c. J.R. Smith
 - d. Josam
 - e. Or approved equal

15. Toilet Seats
 - a. Zurn
 - b. Beneke
 - c. Church
 - d. Olsonite
 - e. Or approved equal

16. Piping and Fittings (Cast Iron)
 - a. American Cast Iron Pipe Co.
 - b. Alabama Pipe Co.
 - c. Central Foundry Co.
 - d. United States Pipe and Foundry
 - e. Or approved equal

17. Pipe (Steel)
 - a. Youngstown Sheet and Tube Co.
 - b. Republic Steel Co.
 - c. Or approved equal

18. Pipe and Fittings (Copper)
 - a. Bridgeport Brass
 - b. Mueller Brass Co.
 - c. Anaconda American Brass Co.
 - d. Chase Brass and Copper Co.
 - e. Or approved equal

PART 3 – EXECUTION

(not used)

END OF SECTION

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SECTION 15452 - DOMESTIC HOT WATER TEMPERATURE MAINTENANCE SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, material, equipment, accessories, services and tests necessary to complete and make ready for operation by the owner a complete self regulating domestic hot water temperature maintenance system in accordance with drawings and specifications.

1.2 QUALITY ASSURANCE

- A. "Manufactures" - Firms regularly engaged in the manufacture of this equipment with characteristics and capacities required, whose self-regulating heater products have been in satisfactory use in similar services for not less than 5 years.
- B. Heating cable, controls and accessory items shall be provided by a manufacturer listed as an approved manufacturer in this section.
- C. Heating cables shall be U.L. approved for the application and shall be installed in accordance with NEC requirements.

1.3 SUBMITTALS

- A. Manufacture shall provide catalog cuts and/or heater cable tabulating showing lengths, wattage, voltage and current values. Contractors shall provide installation drawings and where required, obtain local approvals as required by local codes.
- B. Manufacturer to provide a list of at least five self regulating domestic hot water temperature maintenance projects installed for a minimum of 5 years with a minimum of 200ft of cable each.

1.4 RELATED SECTIONS

- A. See Electrical Division 16 for associated work.

1.5 WARRANTY

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.
- B. Manufacturer shall warranty the heat tracing material for five (5) years from date of shipment.

PART 2 - PRODUCTS

2.1 HEATER CABLE

- A. The self-regulating heating cable shall be UL Listed and be approved by NYC or have

other required approvals as required by local codes. The cable shall consist of two(2) 16-AWG nickel-coated copper bus wires embedded in a radiation-cross-linked semi-conductive polymer core. It shall be covered by a radiation-cross-linked, polyolefin, dielectric jacket surrounded by a polymer-coated aluminum wrap, and enclosed in a tinned copper braid of 14 AWG equivalent wire size. This braid shall be covered with a (nominal) 40-milpolyolefin outer jacket, color coded for easy identification. Constant wattage heater cable, or cable which is not radiation cross-linked will not be accepted as an equivalent along the pipe length without external thermostatic controls.

2.2 COMPONENTS

- A. Shall be UL Listed as part of the system. Furnish all power connection kits, splices, tees, end seals, fiberglass tape and electric traced labels, as required. Splices and tees shall be re-enterable with connections made to screwed terminals.

2.3 PERFORMANCE

A. OPERATING TEMPERATURES

- 1. The system shall maintain a nominal temperature of 105 degrees F (40 degrees C) as noted on the drawings, at 208V.

B. MAINTENANCE TEMPERATURE

- 1. The specified system temperature shall be maintained only one product, regardless of pipe size. The insulation schedule shall be the same regardless of the design system temperature. Temperatures shall be maintained with straight runs of heating cable on the pipe.

C. POWER CONTROL(SELF-REGULATING INDEX)

- 1. The slope of power/temperature curve shall be such that the power of the heating cable shall increase with decreasing temperature at a rate of at least 0.028 W/ft. degree F (0.16 W/m degree C) from 50 degrees F (10 degrees C) to 100 degrees F (38 degrees C).

D. LONG-TERM THERMAL STABILITY (AS DETERMINED BY ACCELERATED TESTING)

- 1. The power retention of the heating cable shall be at least 90% after 300 cycles between 50 degree F (10 degrees C) and 212 degrees F (100 degrees C).

E. HIGH TEMPERATURE WITHSTAND

- 1. The heater shall not decrease in resistance, overheat, or burn when powered at 208V and exposed to 400 degrees F (205 degrees C) in an oven for 30 minutes.

2.4 INSULATION

- A. All hot water piping weather heat traced or not shall be covered with insulation. Staples shall not be used to secure the insulation. The insulation schedule shall be as follows:

PIPE SIZE	FIBERGLASS INSULATION THICKNESS
2" - 1"	1"
13" - 2"	12"
22" - 6"	2"

For pipe sizes 13" and smaller, use insulation jacket 3" larger in diameter than normal to allow space for heater cable.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed, determine space conditions and notify Commissioner in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with work until unsatisfactory conditions have been corrected.

END OF SECTION

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SECTION 15600 - GENERAL PROVISIONS FOR MECHANICAL WORK

PART 1 - GENERAL

2.1 RELATED DOCUMENTS

- A. This Section is coordinated with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

2.2 DESCRIPTION OF WORK INCLUDED

A. Work Included:

- 1. The work includes providing all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all Heating, Ventilating and Air Conditioning Work as shown on the Drawings and hereinafter specified, including, but not limited to the following:
 - 1. Provide a chilled/hot water refrigeration plant consisting of 4-10 ton heat pumps.
 - 2. Provide complete standing column wells to include but not limited to two (2) bore holes, casings, sanitary seals, submersible pump, pump wiring, exterior piping, screens, and pump controls.
 - 3. All motor starters and controllers for equipment furnished by this Contractor. Packaged type units shall be furnished completely pre-wired with panels mounted on the units as specified. All other motor starters and controllers will be turned over to the Electrical Contractor for installation and wiring.
 - 4. Packaged outdoor air-handling unit complete with supply and return fans, cooling/heating coil, economizer, pipe enclosure, controls and variable frequency drive.
 - 5. Complete radiant floor heating system to include radiant manifolds, valve actuators, piping, thermostats, and control package.
 - 6. Pumps.
 - 7. Fans.
 - 8. Cabinet and unit heaters, finned tube radiation and convectors.
 - 9. Hot water specialties such as expansion tanks, air vents, air separators, reducing and safety valves, etc.

10. Accessories such as V-belt drives, flow measuring devices, draft gauges, machinery guards, thermostats, pressure gauges.
11. Water treatment for chilled/hot water systems.
12. Vibration isolation equipment.
13. Piping, fittings, and valves.
14. Sheet metal ductwork and accessories such as dampers, access doors, etc.
15. Registers, grilles and diffusers.
16. Fire dampers.
17. Installation of smoke detectors in ductwork.
18. Acoustical duct lining.
19. Pipe, duct and equipment insulation.
20. Temperature Control: A complete electronic system of temperature control shall be installed in connection with the HVAC systems, including all thermostats, diaphragm valves, air piping, damper motors and dampers for the outdoor air intakes and fan discharges. All control wiring for automatic temperature controls, including interlocking wiring for fans, chillers, pumps, etc. by this Contractor.
21. Painting and pipe identification for all work by this Contractor is previously specified under "Special Requirements for Mechanical and Electrical Work".
22. Test and balancing.
23. Sleeves, pipe inserts and anchor bolts, escutcheons, prefabricated roof curbs, etc., as hereinafter specified.
24. Identification, name plates, tags and charts.
25. Cutting and rough patching.
26. Furnishing and setting of electric motors.
27. Furnishing of starters, motor control devices as specified under "Special Requirements for Mechanical and Electrical Work".
28. Templates and anchor bolts for equipment bases.
29. Cap flashing or pipe and duct passing through roof.

30. Energy management (building automation) system.
31. Concrete pads for all HVAC work.

2.3 WORK INCLUDED UNDER OTHER SECTIONS OF THE SPECIFICATIONS

A. The following work is included under other Sections of the Specifications:

1. Framed openings as shown on the Drawings.
2. Trenches and covers.
3. Valved water supply outlets within 5'-0" of the various pieces of the HVAC equipment will be left by the Plumbing Contractor. Final connections to HVAC equipment shall be made by this Contractor.
4. Floor and funnel drains adjacent to equipment requiring same will be furnished and installed by the Plumbing Contractor.
5. Domestic hot water generators including all domestic water piping thereto.
6. Outside air inlets, exhaust outlets, louvers and screens through walls, and elsewhere as noted on the Drawings. Motorized dampers furnished and installed under this Contract.
7. Base flashing of curbs and sleeves at roofs.
8. Power wiring for all motors except where otherwise noted.
9. Temporary heat.
10. Setting of access doors furnished by this Contractor.
11. Undercutting of doors or louvers in doors.
12. All motor disconnect switches, except where in combination starters and where otherwise noted.
13. Finish painting.
14. Access doors in ceiling and walls.
15. Finish patching.
16. Wiring of p-e switches, aquastats, pressure controls in power circuit of cabinet and unit heaters.

17. Fan shutdown system.
18. Mounting of all starters, motor control centers, starter panelboards, and motor control devices: Division 16.

2.4 QUALITY ASSURANCE

- A. Perform work in accordance with quality established in Section 15000 "Special Requirements for Mechanical and Electrical Work", and hereinafter specified. All work performed shall comply with local codes.

2.5 SUBMITTALS

- A. Submit shop drawings covering the following items:
 1. Coordination drawings.
 2. Internal cleaning and treating of piping.
 3. Sleeve and ductwork penetration drawings.
 4. Identification schedule and samples.
 5. Air handling units.
 6. Air filters and draft gauges.
 7. Coils.
 8. Expansion joints, anchors and guides, including details of installation.
 9. Air diffusers, registers and grilles.
 10. Schedule of ductwork, joints, gauges, supports, flexible connections, fire dampers, access doors, etc.
 11. Centrifugal fans.
 12. Sheet metal fabrication drawings.
 13. Machinery guards and V-belt drives.
 14. Roof vent fittings.
 15. Schedule of piping and fitting materials.
 16. Piping shop drawings.

17. Schedule of valves, strainers, vacuum breakers.
 18. Thermometers and pressure gauges.
 19. Schedule of pipe and ductwork supports, including inserts, escutcheons, etc.
 20. Heat pumps.
 21. Final well & screen design.
 22. Heating systems, including unit heaters, cabinet heaters, etc., as specified.
 23. Water pumps including pump curves.
 24. All motor starters, motor control devices and motor control centers.
 25. Water treatment equipment and systems.
 26. Schedule of insulation types and samples of each type.
 27. Vibration isolation schedule including inertia block details.
 28. Templates for equipment bases.
 29. Acoustic material.
 30. VAV boxes.
 31. Energy management system.
 32. Air vents, air separators, water strainers, reducing and safety valves for water systems.
 33. Automatic temperature controls.
 34. Radiant floor heating system.
 35. Concrete pad location and size.
- B. All shop drawings being submitted that include electrical work shall be submitted with all internal and external wiring diagrams.
- C. The previously listed items are major equipment and do not limit this Division's responsibility to submit shop drawings for all equipment and accessories which are to be provided under this Division of the Specifications.

PART 2 - PRODUCTS

2.1 SPARE PARTS

- A. Chilled water, and hot water pumps - For each pump listed, unless otherwise specified:
1. One set of wearing rings.
 2. One set of bearings.
 3. One set of packing glands complete with rings, nuts and bolts.
 4. Three gaskets for casing joint.
 5. Sufficient stuffing box packing for four packings.
- B. Where pump specifications do not require packing glands of stuffing boxes, spares listed may be omitted.
- C. Filters:
1. The Contractor shall furnish a minimum of two complete spare filter sets for the filters for all units.
- D. Miscellaneous Spare Parts:
1. Water column glasses shall be provided for each tank utilizing one.
 2. Furnish one complete set of V-belts for each belt driven unit installed.

2.2 LIST OF MANUFACTURERS

- A. The manufacturer's name appearing first on this list is the manufacturer the project design was based upon. However, the additional manufacturers listed herein are also acceptable with the provision that they meet the requirements of these Specifications, ratings, and/or space allocations listed in the Specifications or shown on the Drawings.
1. Automatic Stop Check Valves
 1. Crane Co.
 2. Edwards Valve Mfg. Co.
 3. or approved equal
 2. Water Pumps (In-line)
 1. Weiman
 2. Peerless

3. Bell & Gossett
 4. Taco
 5. or approved equal
3. Water Pumps (Submersible)
 1. Grunfos
 2. Gould
4. Air Filters
 1. American Air Filter Farr
 2. Cambridge
 3. or approved equal
5. Draft Gauges
 1. Dwyer
 2. or approved equal
6. Centrifugal Fans and Utility Sets
 1. Loren Cook
 2. Peerless
 3. Trane
 4. Buffalo
 5. ACME
 6. or approved equal
7. Cabinet & Unit Heaters
 1. Vulcan
 2. Trane
 3. Dunham-Bush
 4. or approved equal
8. Water Specialties
 1. Bell & Gossett
 2. Taco
 3. or approved equal
9. Expansion Joints
 1. Zallea
 2. Flexonics
 3. or approved equal

10. Thermometers & Pressure Gauges
 1. Ashcroft
 2. U.S. Gauge
 3. Trerice
 4. Weiss Instruments

11. Motors
 1. General Electric
 2. Westinghouse
 3. Allis Chalmers
 4. or approved equal

12. Starters, Switches
 1. General Electric
 2. Westinghouse
 3. Cutler-Hammer
 4. or approved equal

13. Diffusers, Registers & Grilles
 1. Titus
 2. Carnes
 3. Anemostat

14. Valves
 1. Jenkins
 2. Crane
 3. Walworth
 4. or as specified under paragraph on "Valves".

15. Insulation and Acoustic Lining
 1. Owens-Corning Fiberglas Corp.
 2. CSG Snap-on
 3. Johns Manville
 4. or approved equal

16. Vibration Isolation
 1. Vibration Eliminator Co.
 2. Mason Industries
 3. Korfund Corp
 4. or approved equal

17. Automatic Temperature Controls

1. Johnson Controls
2. Honeywell
3. Powers Regulator

18. Water Treatment

1. Heating Economy Services, Co., Inc.
2. Astro Pak Corp.
3. Okite Chemical Corp.
4. Drew Chemical Corp.

19. Heat Pumps

1. Climate Master
2. or approved equal

20. Internal Cleaning & Treating of Piping

1. Heating Economy Services Co., Inc.
2. Astro Pak Corp.
3. Okite Chemical Corp.
4. Drew Chemical Co.

END OF SECTION

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SECTION 15710 - HEAT EXCHANGERS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. This Section includes plate heat exchangers. This work includes providing of all labor, materials, equipment accessories, services and tests necessary to complete and make ready for operation by the Owner.

1.2 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Design Calculations: Calculate requirements for selecting seismic restraints and for designing bases.
 - 2. Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.
- C. Coordination Drawings: Equipment room, 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. Tube-removal space.
 - 2. Structural members to which heat exchangers will be attached.
- D. Operation and Maintenance Data: For heat exchangers to include in emergency, operation, and maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, performance, and dimensional requirements of heat exchangers and are based on the specific equipment indicated. Refer to Division 01 Section "Product Requirements."
- B. ASME Compliance: Fabricate and label heat exchangers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," Division 1.

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, or approved equal.

2.2 GASKETED PLATE HEAT EXCHANGERS

- A. Subject to compliance with requirements, provide the product indicated on drawings or approved equal. Provide Alfa Laval AQZ -FG or a compatible product by one of the following manufacturers:
 1. API Heat Transfer Inc.
 2. Armstrong Pumps, Inc.
 3. Invensys APV, Inc.
 4. ITT Industries; Bell & Gossett.
 5. Mueller, Paul Company.
 6. Polaris Plate Heat Exchangers.
 7. Tranter PHE, Inc.
 8. Or approved equal.
- B. Configuration: Freestanding assembly consisting of frame support, top and bottom carrying and guide bars, fixed and movable end plates, tie rods, individually removable plates, and one-piece gaskets.
- C. Frame:
 1. Capacity to accommodate 20 percent additional plates.
 2. Painted carbon steel with provisions for anchoring to support.
- D. Top and Bottom Carrying and Guide Bars: Painted carbon steel, aluminum, or stainless steel.
 1. Fabricate attachment of heat-exchanger carrying and guide bars with reinforcement strong enough to resist heat-exchanger movement during a seismic event when heat-exchanger carrying and guide bars are anchored to building structure.
- E. End-Plate Material: Painted carbon steel.
- F. Tie Rods and Nuts: Steel or stainless steel.
- G. Plate Material: Type 304 or 316 stainless steel of thickness suitable for intended use.
- H. Gasket Material: Nitrile rubber.
- I. Piping Connections:
 1. Threaded port for NPS 2 and smaller. For larger sizes, furnish end-plate port with threaded studs suitable for flanged connection.
 2. End plate with welded carbon-steel nozzles. Threaded pipe connection for NPS 2 and smaller; carbon-steel flanged pipe connection for larger sizes.
- J. Enclose plates in a solid aluminum removable shroud.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas for compliance with requirements for installation tolerances and for structural rigidity, strength, anchors, and other conditions affecting performance of heat exchangers.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 HEAT-EXCHANGER INSTALLATION

- A. Install plate heat exchanger on concrete base. Concrete base materials and installation are specified in Section 03300 - Cast In Place Concrete.
- B. Concrete Bases: Anchor heat exchanger to concrete base.
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of 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.
 - 5. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Maintain manufacturer's recommended clearances for service and maintenance. Install piping connections to allow service and maintenance of heat exchangers.
- C. Install shutoff valves at heat-exchanger inlet and outlet connections.
- D. Install relief valves on heat-exchanger heated-fluid connection and install pipe relief valves, full size of valve connection, to floor drain.
- E. Install vacuum breaker at heat-exchanger steam inlet connection.
- F. Install hose end valve to drain shell.

3.4 FIELD QUALITY CONTROL

- A. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 CLEANING

- A. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train City of New York maintenance personnel to adjust, operate, and maintain heat exchangers.

END OF SECTION

SECTION 15735 - PUMPS FOR MECHANICAL WORKPART 1- GENERAL

1.1 RELATED DOCUMENTS:

- A. This Section is coordinate with and complementary to the General Conditions and, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The Work includes providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all pumps as shown on the Drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Manufacturing firms regularly engaged in manufacture of this equipment with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. Provide product produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section, "Special Requirements for Mechanical and Electrical Work", and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section, "Special Requirements for Mechanical and Electrical Work".

1.6 GUARANTEE

- A. Refer to Section, "Special Requirements for Mechanical and Electrical Work".

PART 2 - PRODUCTS

2.1 IN LINE PUMPS

- A. The casing and suction head of the pump shall be of cast iron material. Casing

and suction head shall be equipped with 125# ANSI flanges. The impeller shall be of the enclosed type and shall be bronze. The impeller shall be statically and hydraulically balanced and keyed to the shaft. Efficiency and unit maximum BHP shall be quoted and guaranteed. Maximum head shall occur at and only at the no flow condition. The shaft shall be of steel material and removable shaft and shall be stainless steel. Bearings shall be single row, ball type and oil lubricated.

- B. Pumps shall have capacities as scheduled on the Drawings. Pumps shall be selected to operate at or near their point of peak efficiency thus allowing for operation at capacities of approximately 25% beyond design capacity. In addition, the design impeller diameter shall be selected so that the design capacity of each pump (GPM and TDH) shall not exceed 90% of the capacity obtainable with maximum impeller diameter at the design speed for that model or as approved.

2.2 SUBMERSIBLE PUMPS

- A. Discharge Bearing: Extra long top protected bronze bearing
- B. Intermediate Bowl: Closed grained class 30 cast iron. Water passage glassed for maximum efficiency and abrasion resistance.
- C. Impellers: Designed for maximum efficiency with wide range hydraulic coverage. Precision balanced for smooth operation.
- D. Upthrust Collar: Designed for extra margin of safety against possible momentary upthrust occurring at start up.
- E. Intermediate Bowl Bearings: Reliable long life bronze or rubber bearing.
- F. Lock Collets: Accurately machined to insure positive locking of impeller to pump shaft.
- G. Pump Shaft: 100,000 PSI high tensile stainless steel. Ground and polished for smooth bearing surface.
- H. Suction Inlet: Contoured for smooth flow entrance. Protected by an oversized stainless steel strainer to prevent entrance of damaging solids.
- I. Pump/Motor Coupling: Large stainless steel coupling accurately machined for perfect alignment, balance and power transmission.
- J. Integral Motor Lead: Vulcanized internal splice to main motor windings provide positive seal against internal motor water or external well fluid.
- K. Stator Winding: Wet stator windings covered and sealed with water-proof, non-aging insulation of high di-electric strength.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where pumps are to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interfere installation of equipment with other components of systems.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment and after motor has been energized with normal power source, test equipment to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactory corrected. Refer to Section Test and Adjustments.
- B. All pump casings shall be hydrostatically tested at 1½" times design working pressure.

END OF SECTION

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SECTION 15745 – OUTDOOR AIR HANDLING UNITSPART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever Supplemental applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all air handling units as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Manufacturing firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.
- B. Include in the submittal specific information regarding grounding for electric motors, VFD motor control and motor grounding equipment, and testing to assure proper motor assembly ground and shaft isolation / grounding protection.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.7 RATINGS AND CERTIFICATIONS

- A. Unit shall conform to AMCA 210 for fan performance ratings.

- B. Unit shall conform to E.T.L. standards.
- C. Unit sound ratings shall be in accordance with ARI 260 for inlet and discharge sound power levels.
- D. Unit casing radiated sound ratings shall be in accordance with ISO 9614 parts 1&2 and ANSI S12.12.
- E. Unit shall conform to ARI 410 for capacities, pressure drops, and selection procedures of air coils.
- F. Unit shall conform to ARI 430 for all fabrication procedures of air handling units.
- G. Motors covered by the Federal Energy Policy Act (EPACT) shall meet EPACT requirements.
- H. Damper performance shall comply with AMCA 500.
- I. Air handling units must comply with ASHRAE 90.1-2004 & ASHRAE 62.1-2004
- I. Airflow Monitoring Stations will be rated in accordance with AMCA 611-95 and bear a Certified Ratings Seal for Airflow Measurement Performance.
- J. Air-handling units shall be ISO9001 certified.

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

- A. Furnish and install outdoor air-handling unit(s) as scheduled on the drawings. Unit(s) shall be arranged as shown on the drawings, and are to perform as set forth in the equipment schedule.
- B. Unit shall be complete with fans, motors, motor controls, coils, dampers, controls, access doors and other components/options, as shown on product drawings, wiring diagrams, and as described in performance specifications.
- C. Unit casing and frame shall be factory insulated.
- D. Units shall be ETL labeled.

2.2 UNIT CASING

- A. Air- Handling unit shall be specifically designed for outdoor applications.
- B. Casing leakage shall not exceed 1% of design CFM at ± 8 " static pressure differential across casing.
- C. Panel deflection shall not exceed $L/240$ at ± 8 " static pressure differential across casing.

- D. Unit casing shall consist of a structural frame with insulated roof, wall, and floor panels.
- E. Removal of wall panels shall not affect structural integrity of units.
- F. Unit shall have double wall, 2" insulated panels for walls, roof, and floor. Exterior skin shall be galvanized and painted sheet steel. Individual segments shall have galvanized sheet steel, stainless sheet steel or perforated aluminum interior liner, as described in performance specifications.
 - 1. Panels with optional perforated liner shall have 1" of 3 lb/ft.³ fiberglass board insulation, faced to prevent fiber erosion, and 1" of foam insulation. Exterior skin shall be galvanized and painted sheet steel. Interior liner shall be perforated aluminum. Minimum perforated panel thermal resistance shall be R10 hr-ft²-°F/BTU.
- G. Unit roof shall be double-sloped with a longitudinal peak and a minimum pitch of 1/4" per foot.
 - 1. Roof snow-loads capacity shall be at least 50 lb/ft².
 - 2. Roof overhangs unit perimeter by 1-1/2".
- H. Floor panels shall be double wall construction, designed to provide at most L/240 deflection when subjected to a 300 lb. load at mid-span.
- I. Unit casing shall be insulated with spray injected foam to achieve thermal resistance of R12 hr-ft²-°F/BTU.
 - 1. Insulation application meets the requirements of NFPA 90A.
 - 2. Drain pans shall be insulated with spray injected foam.
- J. Double wall access doors shall be provided on sections as shown on product drawings.
 - 1. Stainless steel hinges permit a 180° door swing.
 - 2. Access door shall be of the same material type as exterior/interior casing.
 - 3. Access door latches shall use a roller cam latching mechanism.
- K. View ports shall be double-pane tempered glass.
- L. Primary drain pans shall comply with the guidelines of ASHRAE 62.
 - 1. Drain pans shall be double sloped at least 1/8" per foot, and have no horizontal surfaces.
 - 2. Drain connection material shall be the same as drain pan.
 - 3. Drain pans shall drain to one point.
 - 4. Drain connections shall be welded to drain pans
 - 5. Drain pans shall have at least 1" clearance between pan and coil supports.
- M. Auxiliary drain pans shall comply with the guidelines of ASHRAE 62, and will be supplies in segments as shown in performance specifications.
 - 1. Drain pans shall be double sloped at least 1/8" per foot, and have no horizontal surfaces.

2. Drain connection material shall be the same as drain pan.
3. Drain pans shall drain to one point.
4. Drain connections shall be welded to drain pans.
5. Drain pans shall have at least 1" clearance between pan and coil supports.

- N. Optional pipe chases shall be furnished, as shown on drawings.
1. Pipe chases shall be constructed in the same manner as units.
 2. Pipe chase doors shall be provided, as shown on drawings.
 3. Pipe chases shall have the same base rail options as units.

2.3 FANS

- A. Fans shall provide CFM and static pressure, as shown in performance specifications.
- B. Fans shall be Class I, II, or III, as required to meet selected RPM and horsepower shown in performance specifications.
- C. Fans shall be DWDI (housed or SWSI (plenum) as shown on product drawings.
- D. Fans shall have forward curved or airfoil blades, as shown in performance specifications.
- E. Airfoil fans shall bear the AMCA Seal. Airfoil fan performance will be based on tests in accordance with AMCA standard 210 and will comply with the requirements of AMCA certified ratings programs for air and sound. Airfoil wheels shall comply with AMCA standards 99-2408-69 and 99-2401-82.
- F. Fans shafts shall be polished steel and sized such that the first critical speed will be at least 125% of the maximum operating speed for the fan pressure class. Shaft shall be coated with an anti-corrosion coating.
- G. Fan and motor assembly shall be internally mounted on a common base. Fan and motor base shall be spring isolated on a full width isolator support channel.
1. Fan motor shall be on an adjustable base.
 2. Fan discharge shall be connected to cabinet via a flexible connection.
 3. Access doors shall be provided as shown on product drawing.

2.4 BEARINGS AND DRIVES

- A. Fan bearings shall have average life (L50) of at least 200,000 hours. Bearing fatigue life ratings shall comply with ANSI/AFBMA 9.
- B. DWDI fans shall be belt-driven. SWSI fans shall be belt driven or direct driven, as shown on product drawings.
- C. Forward curved fans smaller than 18" shall have permanently lubricated bearings. Re-greaseable fan bearings shall be factory lubricated and equipped with standard hydraulic grease fittings.

- D. Fan drives shall be selected for a 1.5 service factor and shall be furnished with anti-static belts.
 - 1. Drives 15 hp or smaller on constant volume fans shall be adjustable pitch.
 - 2. Drives 20 hp or larger or drives on fans with VFDs shall be fixed pitch.
 - 3. Sheaves shall be machined from close grain cast iron and statically balanced.
 - 4. Drive belts shall be V type, precision molded, raw edge construction, anti-static, oil and heat resistant.

2.5 ELECTRICAL MOTORS

- A. Fan motors shall be built in accordance with the latest NEMA and IEEE standards.
- B. Fan motors comply with ASHRAE Standard 90.1.
- C. Fan motors shall be furnished in sizes, electrical power and starting characteristics as shown in performance specifications.
 - 1. Fan motors shall be rated for continuous, full load duty at 104°F (40°C) ambient temperature and 1.15 service factor.
 - a. Exception: 1.5 hp and 3 hp, dual voltage (230/460V), 900 RPM, TEFC motors shall have a 1.0 service factor.
 - 2. Fan motors shall be NEMA design ball bearing type.
 - a. Direct drive plenum fans shall be coupled with motors that closely match required fan RPM.
 - 3. Fan motors shall meet, at a minimum, NEMA high efficiency standards.
 - 4. Motors shall be suitable for use with variable frequency drives, per NEMA MG-1 Part 30.

2.6 FAN MOTOR DISCONNECTS

- A. Fan motor disconnects shall be provided with unit, as shown in performance specifications.
- B. Disconnect shall be housed in a NEMA 3R enclosure, and will be mounted on the primary access side of segment.
- C. Disconnect shall be suitable for use as an OSHA lockout/tagout disconnect when applied in accordance with part IV, Department of Labor OSHA 29 CFR Part 1910, Control of Hazardous Energy Source (lockout/tagout): final rule.
- D. Disconnect handles can be padlocked in the "off" position with up to three padlocks. Switch mechanism can be directly padlocked in the "off" position when door is open.

- E. Disconnects shall be provided with an integral ground lug.
 - 1. 16A to 100A disconnects shall have two (2) #14 ground wires.
 - 2. 200A to 400A disconnects shall have one (1) #6-250 ground wire.

2.7 FAN MOTOR STARTERS

- A. Constant speed motor starters will be furnished (shipped loose) or provided (factory mounted and wired to motor) with units, as shown in submittal documents.
- B. Motor starters shall be housed in a dedicated, weather resistant compartment.
 - 1. Shipped loose starters and starters provided on units without single point power shall be housed in a NEMA 3R enclosure.
 - 2. Weatherproof compartments shall be provided on units with single point power.
- C. Motor starter panels shall include:
 - 1. Main power block
 - 2. Motor contactor(s)
 - 3. Individual short circuit and overload protection
 - 4. 120 volt control power transformer with primary and secondary protection
 - 5. 5 point terminal strip for field connections
 - 6. Main power disconnect
 - 7. Hand-Off-Auto switch

2.8 FAN VARIABLE FREQUENCY DRIVES

- A. Variable frequency drives shall be furnished (shipped loose) or provided (factory mounted and wired to motor) with units, as shown in submittal documents.
- B. VFDs shall be UL or ETL listed and comply with applicable provisions of the National Electric Code.
- C. VFDs shall be housed in a dedicated, weather resistant compartment.
 - 1. Shipped loose VFDs and VFDs provided on units without single point power will be housed in a NEMA 3R enclosure.
 - 2. Weatherproof compartments will be provided on units with single point power.
- D. VFDs furnished or provided with units will be programmed and started by manufacturer's trained and employed technician.
- E. VFD shall include harmonic distortion feedback protection:
 - 1. Swinging DC Line Choke (equivalent to 5% input line reactor)
 - 2. Integral RFI/EMI filtering to meet EMC EN61800-3 for First Environment.

- F. User interface shall include:
1. 30 Character multi-lingual alphanumeric display
 2. Parameter set-up and operating data
 3. Display data includes:
 - a. output frequency (Hz)
 - b. speed (RPM)
 - c. motor current
 - d. calculated % motor torque
 - e. calculated motor power (kW)
 - f. DC bus voltage
 - g. output voltage
 - h. heat sink temperature
 - i. elapsed time meter (re-settable)
 - j. kWh (re-settable)
 - k. input / output terminal monitor
 - l. PID actual value (feedback) & error
 - m. fault text
 - n. warning text
 - o. scalable process variable display
- G. VFD protection circuits shall include:
1. over current
 2. ground fault
 3. over voltage
 4. under voltage
 5. over temperature
 6. input power loss of phase
 7. loss of reference/feedback
 8. adjustable current limit regulator
- H. VFD shall be UL 508C approved for electronic motor overload (12t).
- I. VFD shall include high input transient protection and surge suppression:
- 1.4 MOVs ahead of diode bridge
 - 2.120 Joule rated 1600V diode module
 3. Compliant with UL 1449 / ANSI 61.4
- J. VFD communication features include:
1. Two programmable analog inputs
 2. Six programmable digital inputs
 3. Two programmable analog outputs
 4. Three programmable digital relay outputs
 5. Modbus RTU Communications protocol
 6. Adjustable filters on analog inputs and outputs
 7. Input speed signals, including 4-20 mA and 0-10 VDC
 8. Acceleration/Deceleration contacts (floating point control)
 9. Auto restart (customer selectable and adjustable)
 10. Start/Stop options will include 2 wire (dry contact closure), 3 wire (momentary contacts), application of input power, and application of reference signal (PID sleep/wake-up)

11. Integrated control interface for Siemens FLN, Johnson N2, Modbus RTU, and BACnet MS/TP
 - a. Optional LONworks over RS-485.

- K. VFD shall have the following functions:
 1. Premagnetization on start
 2. DC braking/hold at stop
 3. Ramp or coast to stop
 4. Seven preset speeds
 5. Three critical frequency lockout bands
 6. Start function will include ramp, flying start, automatic torque boost, and automatic torque boost with flying start

2.9 HEATING/COOLING COILS

- A. Water coil capacity and pressure drop performance shall be certified in accordance with ARI Standard 410, when selected within fluid velocity, inlet fluid temperature, and entering air temperature ranges specified by ARI 410.
- B. Heating/Cooling coil segments shall have a full-width IAQ drain pan that extends at least 6" downstream of the last coil in the section.
- C. Coils shall be removable from the side of unit, via removable AHU panels. No more than one panel must be removed to remove a coil.
- D. Coils with 6 or fewer rows shall have frames constructed of 16-gauge steel. Coils with 8 or more rows will have frames constructed of 14-gauge steel. Casing channels shall be free-draining and do not block fin area.
- E. Cooling coils with finned height greater than 48" will have an intermediate drain pan with downspout to drain condensate to main drain pan. Intermediate drain pan material will match coil frame material.
- F. Coil segment door clearances shall allow for at least 2-inches of field installed piping insulation.
- G. Coil bulkheads and blank-offs shall prevent air from bypassing coils.
- H. Coil connections shall be extended through unit casing.
- I. Water coils shall have a 1/4" FPT plugged vent or drain tap on each connection that is accessible from outside the unit. Coils circuited for 3/4 serpentine or greater shall allow for complete draining and venting when unit is installed on a level surface.
- J. Spool shaped coil grommets shall be provided to insulate and seal coil penetrations.
- K. Water coils shall be designed to operate at 250 psig and up to 300° F and shall be factory tested with 325 psig compressed air under water.

- L. Coil fins shall be die-formed, continuous, and have fully drawn collars to accurately space fins, and form a protective sheath for tubes.

2.10 FILTERS

- A. Filter segments shall be provided, as shown on product drawings. Filter tracks/frames shall be an integral part of the unit.
- B. Filter types, nominal sizes, efficiencies, and performance characteristics shall be as shown in performance specifications.
- C. Filter access shall be provided via access doors on filter segments or adjacent segments as required by filter loading scheme. See product drawings for details.
- D. Performance of installed HEPA filtration systems is certified via a DOP test and classified as UL Class 1 when tested in accordance with UL Standard 586.

2.11 DAMPERS

- A. Dampers shall be factory installed.
- B. Dampers shall have airfoil blades with extruded vinyl edge seals and flexible metal compressible jamb seals.
- C. Dampers shall have a maximum leakage rate of 4 CFM/square foot at 1" w.g. and comply with ASHRAE 90.1.
- D. Maximum damper torque requirement shall be 7 in. lbs./ft².
- E. Damper blades shall be parallel acting unless submitted otherwise.

2.12 AIR FLOW MONITORING STATIONS

- A. Optional airflow monitoring stations shall be provided on air inlets, as shown in performance specifications.
- B. Airflow monitoring stations shall bear the AMCA Certified Ratings Seal for Airflow Measurement Performance.
- C. Airflow monitoring station dampers shall comply with leakage rates per ASHRAE 90.1.
- D. Airflow monitoring stations shall be accurate within 5% of actual airflow between 350 FPM and 4000 FPM free area velocity.
- E. Outdoor air intake openings with air flow monitoring stations shall have rain louver.
 - 1. Louver shall be a wind-driven rain penetration class A louver.
 - 2. Louver effectiveness ratio shall be 100% at the following conditions:

- a. Wind velocity, 29 mph into louver.
- b. Rain fall rate, 3 in./hr.
- c. Free area air velocity, 1500 FPM.

2.13 DIFFUSERS

- A. Diffuser segments shall be provided, as shown on product drawings.
- B. Perforated steel diffuser plates shall be installed between fans and downstream components when required to ensure proper velocity profiles across downstream components.

2.14 ROOF CURBS

- A. Roof curbs shall be furnished, as shown on product drawings.
- B. Roof curbs shall be galvanized steel and support the perimeter of units, including pipe chases.
- C. Roof curbs shall have a wood nailing strip.
- D. Roof curbs shall be shipped loose for installation prior to unit installation.

2.15 APPURTENANCES

- A. Safety grates capable of supporting a 300 lb. load shall be provided over bottom openings, as shown in performance specifications.
- B. Base rails suitable for rigging and lifting shall be provided, as shown on product drawings.
- C. Lifting lugs shall be provided at each shipping split, corner, and intermediate location, where required for proper lifting.

2.16 FINISHES

- A. External unit surfaces shall be factory cleaned prior to finishing or shipping.
- B. Unit shall be painted, as shown in performance specifications.
 1. Painted units shall be prime-coated prior to painting.
 2. Paint shall be acrylic polyurethane.
 3. Painted unit shall exceed 500-hour salt spray test, with (5%) solution, without any sign of red rust when tested in accordance with ASTM B-117.
- C. Unpainted air-handling units constructed of G90 galvanized steel shall pass the ASTM B-117 test for 220-hour salt spray solution (5%) without any sign of red rust.

2.17 TESTS AND INSPECTIONS.

- A. Fan skid shall be run-balanced at specified speed to insure smooth operation.
 - 1. Variable volume fan assemblies will be balanced from 10% to 100% of design RPM.
 - 2. Filter-in measurements shall be taken in horizontal and vertical axes on drive and opposite-drive sides of fan shafts.
 - 3. Filter-out measurements shall be taken in horizontal, vertical, and axial axes on drive and opposite-drive sides of fan shafts.
 - 4. Variable speed fan vibration limits: filter -in measurements will not exceed 7 mils. Filter-out measurements will not exceed 9.5 mils.
- B. Unit wiring with voltage greater than 30Vac shall be hipot tested prior to shipping.

PART 3- EXECUTION**3.1 INSPECTION**

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify Commissioner in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.
- C. Check alignment and, where necessary (and possible), realign shafts of motors and equipment within tolerances recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, energized with normal power source, test equipment to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected. Refer to Section - Testing and Adjustments.

END OF SECTION

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SECTION 15748 - COILSPART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all coils as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Manufacturing firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 WATER COILS

- A. All water coils shall be of the continuous flat plate fin type for minimum resistance to air flow. Fins shall be fabricated with drawn collars and shall be bonded to the tubes by a hydraulic expansion process. Openings in unit casing for coil

connections to be sealed against leakage. Coil casings shall be not less than 16 gauge galvanized steel.

- B. Water coils shall be of the continuous tube type and circuited so as to be completely drainable by gravity through the supply header. Headers and tubes are to be fabricated of a seamless .024 inch thick wall copper tubing. Fins are to be .005 inch thick copper. Supply and return headers shall be complete enclosed within the unit casing or external where called for on the drawing, and shall be equipped with steel nipples of extra length equipped with drain and vent plugs outside unit casing. Coils shall have capacities as called for and shall have the minimum number of rows as shown on the schedule.
- C. Coils shall have ARI Certification.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install coils where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that coils comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of coils with other components of systems.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of coils, test coils to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected. Refer to Section - Testing and Adjustments.

END OF SECTION

SECTION 15750 - AIR FILTERSPART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all air filters as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Manufacturing firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Furnish and install the air filters shown on the Drawings. The filters shall be component sections of air handling units.
- B. Filters shall be as manufactured by American Air Filter Co., Farr Filters, Inc.,

Cambridge Filter Corp. or equal as approved by the Architect.

- C. The filter arrangements shall be as indicated in the schedule on the Drawings.
- D. Fans and systems shall not be operated until protective filters have been installed. Filters which are required for operation before the Owner's acceptance of the systems shall be provided by this Contractor.
- E. At the time of acceptance by the Owner, the Contractor shall install new filtering media.

2.2 FILTERS

- A. Filters shall be of size and capacity as scheduled on the Drawings and shall be of the high efficiency, dry, replaceable type. The components shall include particle board cell sides (fire retardant), glass mat media, aluminum separators, neoprene (fire retardant) base adhesive. The cartridge shall contain not less than 120 square feet of self-supporting glass media. The cell shall not have back up wire grids. The cell shall be housed in a 16 gauge galvanized steel frame, Class I, and held in position with galvanized latch arm assemblies. The frames shall be prepunched for convenient assembly with rivets into banks. The frame shall not require any type of media support. Filter shall be listed by U.L.
- B. Each unit shall have a nominal rating of 2000 cfm with face areas of 24" x 24". The depth of cell shall be not more than 11½".
- C. The initial resistance of filters at rated air flow shall not exceed 0.64" W.G. The efficiency of the filter shall average not less than 80-85% (MERV13) of atmospheric dust by spot efficiency by the ASHRAE Standard 52-76 Dust Spot Test Method.
- D. 2" deep Perfectpleat prefilter as made by American Air Filter Co., or approved equal, shall be provided as an integral part of the overall assembly and be fitted directly against the face of high efficiency filters and held in position by the frame latches.

2.3 DRAFT GAUGES

- A. Provide draft gauge for measuring the resistance of the air through the filter.
- B. Gauges shall be Dwyer Magnahelic Series 2000 or approved equal

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install filters and housings where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.

END OF SECTION

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SECTION 15754 - DUCT TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Sections is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all Duct Terminal Units as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 VARIABLE (V.A.V.) VOLUME AIR TERMINAL UNITS

- A. Furnish and install pressure independent variable air volume terminal units of size and capacities as shown on Drawings. Units shall be Anemostat FA or approved equal.

- B. Unit casings shall be 22 gauge galvanized steel and be fully lined with 1 inch, 1-1/2 lb. density, neoprene coated fiberglass. The fiberglass shall comply with U.L.-181 for erosion, and NFPA 90A for fire resistivity. There shall be no cut edges of fiberglass exposed to the moving air stream. Terminals shall have a vortex shedder to convert generated sounds to higher frequencies for more effective attenuation.
- C. Unit inlets shall be round or rectangular. Rectangular inlets shall have S and Drive connections. Attenuation section where called for in the Schedule shall be integral to the basic unit casing to minimize casing leakage and eliminate all field assembly.
- D. Damper to be heavy gauge metal with Delrin self-lubricating bearings. Tight close-off. Damper leakage is less than 2% of nominal cfm at 3 inches sp, as rated by ADC Test Code 1062 R4.
 - 1. For optimum control, the inlet duct must be of the same size as the assembly inlet.
- E. Units shall be tested in accordance with ADC test code 1062 R4 in an ADC certified laboratory. Unit sound power levels (second thru seventh octave band) and minimize pressure drop ratings shall not exceed those in the schedules.
- F. Pressure independent air terminal units shall operate over an inlet velocity range of 0 to 3000 fpm. Sensor/collector ring combination shall take a representative sample of air velocities at inlet. Cfm delivery shall be in accordance with (maximum-minimum) settings and/or as required by thermostat to satisfy space-served conditions. Adjustable minimum and maximum cfm limits gauge tee for flow measurement and balancing.
- G. All actuators, controls, and circuitry shall be factory furnished and installed. Control and CFM settings must be easily accessible. Access shall also be provided to inspect, clean, and remove the velocity sensing device.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.

- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.
- C. Check alignment and, where necessary (and possible), realign shafts or motors and equipment within tolerances recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, test equipment to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected. Refer to Section - Testing and Adjustments.

END OF SECTION

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SECTION 15760 – FANSPART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions and Supplementary General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all fans and ventilators as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2- PRODUCTS

2.1 ROOF FANS

- A. Furnish and install the roof fans where indicated on the Drawings.

- B. The fans shall have spun aluminum housings, or sectionalized aluminum housing, non-overloading spark proof blades, air cooled motor out of the air stream, sheaves and V-belt drives, electrically operated aluminum draft dampers, and motor disconnect switch, and aluminum bird screen. Damper motors shall have inherent overload protection.
- C. For 208 volt fan motors, provide a 208/120 volt transformer with primary protection under the hood to wire damper motor.
- D. The fans shall have the capacities indicated on the drawings.
- E. Each roof fan shall be furnished with a prefabricated roof curb as hereinafter specified.
- F. Fiber-Aire as manufactured by Swartwout, Inc. or approved equal.

2.2 PREFABRICATED ROOF CURBS

- A. Furnish and install a roof curb for each roof exhaust fan, as indicated on the Drawings. The curbs shall be all aluminum curbs. Insta-Curb as manufactured by Swartwout Fabricators, Inc. or approved equal.
- B. All roof curbs for roof exhaust fans shall have fiberglass linings.
- C. All roof curbs shall be 12" high.
- D. Roof curbs shall be of same manufacturer as roof fans.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.
- C. Check alignment and, where necessary (and possible), realign shafts or motors

and equipment within tolerances recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, test equipment to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected. Refer to Section - Testing and Adjustments.

END OF SECTION

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SECTION 15770- UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions and Supplementary General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all unit heaters as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Manufacturing firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section 15390 "Approved Manufacturer's List" and 15600 "General Provisions for HVAC Work.
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - 15600 General Provisions For HVAC Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 UNIT HEATERS

- A. Furnish and install, where shown on the plans, propeller type unit heaters of size and type as indicated on the plans. All ratings shall be based on tests in accordance with the Standard Test code adopted jointly by the Industrial Unit Heater

Association and the American Society of Heating and Ventilating Engineers.

- B. The casing shall be made of die formed steel parts, phosphatized for rust resistance, and finish with baked enamel. All hardware, both internal and external, shall be cadmium plated for rust resistance.
- C. The fan blades shall be specially designed for unit heater application, and quiet operation, and shall operate in a die formed steamlined inlet. Wheels shall consist of die formed aluminum blades riveted to die formed steel spiders. Small sizes may be one piece aluminum construction. Unit heater shall have adjustable discharge louvers.
- D. Unit heaters shall be properly supported from building construction with 2" diameter hanger rods and braced as required to prevent sidesway.
- E. Motors used on shall not exceed 1750 RPM, and shall be designed for continuous operation at a temperature rise of not more than 55 deg. C. above the ambient temperature. Motor bearings where difficult to reach, shall be provided with extended oil or grease tubing.
- F. Provide on-off switch with thermal overload for single phase motors.

2.2 HOT WATER UNIT HEATER COILS

- A. Coil shall be constructed of nonferrous fins mechanically bonded to copper tubes. Suitable means for tube expansion shall be provided by tube bends or by provision for entire coil to move inside casing. All coils shall be given 500 pound hydrostatic and 100 pound air tests by the manufacturer before assembly.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, energized with normal power source,

test equipment to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactory corrected. Refer to Section Test and Adjustments.

END OF SECTION

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SECTION 15771 - CABINET HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions and Supplementary General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all cabinet heaters as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Manufacturing firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section 15390 "Approved Manufacturer's List" and 15600 "General Provisions for HVAC Work".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2- PRODUCTS

2.1 CABINET HEATERS

- A. Furnish and install cabinet heaters of size, type and capacities as shown on the Drawing.

- B. Basic unit shall include chassis, coil, fanboard, fanwheel(s), housing(s), motor and insulation. Chassis is galvanized steel wrap-around structural frame with all edges flanged. Insulation is faced, heavy density glass fiber.
- C. Vertical Cabinet Models:
1. 16 gauge steel front panels and 18 gauge steel end and top panels have channel-formed edges around entire panel perimeters. Front panel insulated over entire coil section. Integral, stamped outlet grilles have 15° deflection from vertical. Stamped lattice discharge grilles on inverted airflow models. Access door on coil connection side of unit. Front panel removable without tools.
- D. Vertical Recessed Models:
1. 16 gauge steel, four-side overlap front panels, with "M"-shaped stiffener running entire panel length as standard. Integral, stamped inlet and outlet grilles have 15° downward deflection. Front panel insulated over entire coil section. Front camlocked access doors on right-hand side of unit. Front panel removed with two screws.
- E. Cabinet Finish:
1. All cabinet parts cleaned, bonderized, phosphatized, and flow-coated with baked-on primer. Final finish of spray applied baked-on enamel in colors selected by Architect.
- F. Water Coils:
1. e" OD seamless copper tubes mechanically bonded to configured aluminum fins with continuous fins collars and sleeved coil and supports. Maximum working pressure 300 psig., factory burst test 450 psig (air), and leak test 300 psig (air under water). Maximum entering water temperature 275EF. Supply and return connections on same side of units on all models and sizes.
- G. Fans:
1. Fan wheels centrifugal, forward-curved, double of non-corrosive, molded, fiberglass-reinforced thermo-plastic material on all units except electric heat and inverted airflow models which use aluminum. Fan housings of formed sheet metal on 200-600 cfm units. 800-1800 cfm units have end caps made of non-corrosive, molded, fiberglass-reinforced thermo-plastic material, and fan scrolls of galvanized steel.
- H. Motors:
1. All motors have integral thermal overload protection and start to 78% of rated voltage. Motors operate satisfactorily at 90% of rated voltage on all speed settings and at 10% over voltage without undue magnetic noise.

All motors factory run tested assembled in unit prior to shipping.

I. Filters:

1. Removable from vertical cabinet models without removing from panel; from vertical recessed units by removing front panel; from horizontal units by pivoting hinged bottom panel. 1" woven glass filters.

J. Electrical Performance:

1. All cataloged models wired in accordance with National Electric Code. Underwriters Laboratories, Inc. listed. Provide on-off switch with thermal overload.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, energized with normal power source, test equipment to demonstrate compliance with requirements. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected. Refer to Section - Test and Balancing.

END OF SECTION

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SECTION 15774 - RADIANT-HEATING HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes radiant heating piping, including pipes, fittings, and piping specialties.

1.3 DEFINITIONS

- A. PEX: Crosslinked polyethylene.

1.4 SUBMITTALS

- A. Product Data: For each type of radiant heating pipe, fitting, manifold, specialty, and control.
 - 1. For radiant heating piping and manifolds, include pressure and temperature rating, oxygen-barrier performance, fire-performance characteristics, and water flow and pressure drop characteristics.
- B. Shop Drawings: Show piping layout and details drawn to scale, including valves, manifolds, controls, and support assemblies, and their attachments to building structure.
 - 1. Shop Drawing Scale: 1/4 inch = 1 foot

PART 2 - PRODUCTS

2.1 PEX PIPE AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. FlorHeat Company (The).
 - 2. HeatLink USA Inc.
 - 3. Infloor Radiant Heating Inc.

4. IPEX Inc.
5. REHAU.
6. Slant/Fin Corp.
7. Stadler-Viega.
8. Uponor Wirsbo Co.
9. Vanguard Piping Systems, Inc.
10. Warmboard, Inc.
11. Watts Radiant, Inc.; a division of Watts Water Technologies, Inc.
12. Zurn Plumbing Products Group.

- B. Pipe Material: PEX plastic according to ASTM F 876.
- C. Oxygen Barrier: Limit oxygen diffusion through the tube to maximum 0.10 mg per cu. m/day at 104 deg F according to DIN 4726.
- D. Fittings: ASTM F 1807, metal insert and copper crimp rings.
- E. Pressure/Temperature Rating: Minimum 100 psig.

2.2 DISTRIBUTION MANIFOLDS

- A. Manifold: Minimum NPS 1 modular plastic.
- B. Main Shutoff Valves:
1. Factory installed on supply and return connections.
 2. Two piece body.
 3. Body: Brass or bronze.
 4. Ball: Chrome-plated bronze.
 5. Seals: PTFE.
 6. CWP Rating: 150 psig.
 7. Maximum Operating Temperature: 225 deg F.
- C. Manual Air Vents:
1. Body: Bronze.
 2. Internal Parts: Nonferrous.
 3. Operator: Key furnished with valve, or screwdriver bit.
 4. Inlet Connection: NPS ½.
 5. Discharge Connection: NPS 1/8.
 6. CWP Rating: 150 psig.
 7. Maximum Operating Temperature: 225 deg F.
- D. Balancing Valves:
1. Body: Plastic or bronze, ball or plug, or globe cartridge type.
 2. Ball or Plug: Brass or stainless steel.
 3. Globe Cartridge and Washer: Brass with EPDM composition washer.
 4. Seat: PTFE.

5. Differential Pressure Gage Connections: Integral seals for portable meter to measure loss across calibrated orifice.
6. Handle Style: Lever or knob, with memory stop to retain set position if used for shutoff.
7. CWP Rating: Minimum 125 psig.
8. Maximum Operating Temperature: 250 deg F.

E. Zone Control Valves:

1. Body: Plastic or bronze, ball or plug, or globe cartridge type.
2. Ball or Plug: Brass or stainless steel.
3. Globe Cartridge and Washer: Brass with EPDM composition washer.
4. Seat: PTFE.
5. Actuator: Replaceable electric motor.
6. CWP Rating: Minimum 125 psig.
7. Maximum Operating Temperature: 250 deg F.

F. Thermometers:

1. Mount on supply and return connections.
2. Case: Dry type, metal or plastic, 2-inch diameter.
3. Element: Bourdon tube or other type of pressure element.
4. Movement: Mechanical, connecting element and pointer.
5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
6. Pointer: Black metal.
7. Window: Plastic.
8. Connector: Rigid, back type.
9. Thermal System: Liquid- or mercury-filled bulb in copper-plated steel, aluminum, or brass stem.
10. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

- G. Mounting Brackets: Copper, or plastic or copper-clad steel, where in contact with manifold.

2.3 PIPING SPECIALTIES

A. Floor Mounting Tracks:

1. Aluminum or plastic channel track with smooth finish, no sharp edges.
2. Minimum Thickness: 1/16 inch.
3. Slot Width: Snap fit to hold tubing.
4. Slot Spacing: 12 inch intervals.

2.4 CONTROLS

- A. Temperature-control devices and sequence of operations are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Danfoss Inc.
 2. HeatLink USA Inc.
 3. Honeywell.
 4. Infloor Radiant Heating Inc.
 5. IPEX Inc.
 6. REHAU.
 7. Slant/Fin Corp.
 8. Stadler-Viega.
 9. tekmar Control Systems, Ltd.
 10. Uponor Wirsbo Co.
 11. Vanguard Piping Systems, Inc.
 12. Watts Radiant, Inc.; a division of Watts Water Technologies, Inc.
 13. Zurn Plumbing Products Group.
- C. Wall-Mounting Thermostat:
1. Minimum temperature range from 50 to 90 deg F.
 2. Manually operated with on-off switch.
 3. Day and night setback and clock program with minimum four periods per day.
 4. Operate pumps or open zone control valves if room temperature falls below the thermostat setting, and stop pumps or close zone control valves when room temperature rises above the thermostat setting.
- D. Heated-Panel Thermostat:
1. Remote bulb unit with adjustable temperature range from 50 to 90 deg F.
 2. Snap action; open-on-rise, single-pole switch with minimum current rating adequate for connected pump or zone control valve.
 3. Remote bulb on capillary tube, resistance temperature device, or thermistor for directly sensing radiant panel temperature.
 4. Stop pump or close zone control valves if heated-panel thermostat setting is exceeded.
 5. Corrosion-resistant, waterproof control enclosure.
- E. Heated-Panel Thermostat with Outdoor Temperature Reset:
1. Remote bulb unit with adjustable temperature range from 50 to 90 deg F.
 2. Snap action; open-on-rise, single-pole switch with minimum current rating adequate for connected pump and zone control valve.

3. Remote bulb on capillary tube, resistance temperature device, or thermistor for directly sensing radiant panel temperature.
4. Remote bulb on capillary tube, resistance temperature device, or thermistor for directly sensing outdoor-air temperature.
5. Operate zone control valves to reset supply-water temperature inversely with outdoor-air temperature as follows:
 - a. Low outdoor-air temperature, zero deg F with high supply-water temperature 110 deg F.
 - b. High outdoor-air temperature, 60 deg F with low supply-water temperature 70 deg F.
6. Corrosion-resistant, waterproof control enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and substrates to receive radiant heating piping for compliance with requirements for installation tolerances and other conditions affecting performance.
 1. Ensure that surfaces and pipes in contact with radiant heating piping are free of burrs and sharp protrusions.
 2. Ensure that surfaces and substrates are level and plumb.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Install the following types of radiant heating piping for the applications described:
 1. Piping in Level Fill Concrete Floors PEX.

3.3 INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such 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 or Coordination Drawings.
- B. Install radiant heating piping continuous from the manifold through the heated panel and back to the manifold without piping joints in heated panels.
- C. Connect radiant piping to manifold in a reverse-return arrangement.
- D. Do not bend pipes in radii smaller than manufacturer's minimum bend radius dimensions.

- E. Install manifolds in accessible locations, or install access panels to provide maintenance access as required.
- F. Fire- and Smoke-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials according to Division 07 Section "Penetration Firestopping."
- G. Piping in Level Fill Concrete Floors
 - 1. Secure piping in concrete floors by attaching pipes to subfloor using tracks, clamps, or staples.
 - 2. Space tracks, clamps, or staples a maximum of 18 inches o.c., and at center of turns or bends.
 - 3. Maintain 3/4-inch minimum cover.
 - 4. Install a sleeve of 3/8-inch- (9.5-mm-) thick, foam-type insulation or PE pipe around tubing and extending for a minimum of 10 inches on each side of slab joints to protect the tubing passing through expansion or control joints. Anchor sleeve to slab form at control joints to provide maximum clearance for saw cut.
 - 5. Maintain minimum 40-psig pressure in piping during the concrete pour and continue for 24 hours during curing.
- H. Revise locations and elevations from those indicated as required to suit field conditions and ensure integrity of piping and as approved by Architect.
- I. After system balancing has been completed, mark balancing valves to permanently indicate final position.
- J. Perform the following adjustments before operating the system:
 - 1. Open valves to fully open position.
 - 2. Check operation of automatic valves.
 - 3. Set temperature controls so all zones call for full flow.
 - 4. Purge air from piping.

3.4 FIELD QUALITY CONTROL

- A. Prepare radiant heating piping for testing as follows:
 - 1. Open all isolation valves and close bypass valves.
 - 2. Open and verify operation of zone control valves.
 - 3. Flush with clean water, and clean strainers.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Subject piping to hydrostatic test pressure that is not less than 1.5 times the design pressure but not more than 100 psig. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- C. Remove and replace malfunctioning radiant heating piping components that do not pass tests, and retest as specified above.
- D. Prepare a written report of testing.

END OF SECTION

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SECTION 15801 - MECHANICAL SPECIALITIES**PART 1- GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all HVAC Specialties as shown on the Drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacturer of this equipment with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. Provide equipment whose performance under specified conditions is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section entitled "Special Requirements" for mechanical and electrical work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section "Special Requirements" for mechanical and electrical work.

1.6 GUARANTEE

- A. Refer to Section "Special Requirements" for mechanical and electrical work.

PART 2 - PRODUCTS**2.1 THERMOMETERS**

- A. Furnish and install, where indicated on the Drawings and where specified herein, separable well-type dial or 9" mercury adjustable angle type in glass stem, thermometers as manufactured by American, Trerice, Weksler, Weiss or approved equal.

- B. All thermometers shall be installed in such a manner as to cause a minimum of restriction to flow in the pipes and so that they can easily be read from the floor.
- C. Dial thermometers shall be 5 inch hermetically sealed, bimetal with stainless steel cases, antiparallax dials with raised jet black figures, stainless steel stems, and brass separable sockets unless otherwise specified. Thermometers for duct mounting shall have union connections in lieu of separable sockets. Separable wells shall be stainless steel for steel pipe and brass for copper pipe. Separable wells shall be standard type for uninsulated pipe and logging extension type of proper length for insulated pipe. Stem shall extend a minimum of 2½" into the fluid.
- D. The accuracy of all thermometers shall be within 1% of the scale range.
- E. All instrument wells for controls and indicators furnished by the temperature control manufacturer shall be installed under this Section.
- F. Where conditions are such that thermometers would not be readable from the floor, remote bulb dial thermometers shall be mounted on panelboards. The thermometers shall be 5 inch dials and shall be vapor actuated. The thermometers shall have separable wells. Panel mounted thermometers shall be provided with an engraved nameplate mounted below each thermometer to identify its service. The nameplates shall be chrome plated with black filled letters.
- G. The scale range for the thermometers shall be as follows:

<u>Service</u>	<u>Temperature Range</u>	<u>Remarks</u>
Hot Water	30° to 250° F	
Chilled Water	0° to 120° F	
Dual Temperature Water	30° to 250°F	

2.2 PRESSURE GAUGES

- A. Furnish and install where indicated on the Drawings and where specified herein, Bourdon spring type pressure gauges as manufactured by U.S. Gauge, Weksler, Trerice, Marsh, Ashcroft, or approved equal.
- B. All gauges shall be installed so as to be easily readable from the floor. Where conditions are such that gauges on piping would not be readable from the floor, the gauges shall be installed on panelboards.
- C. The gauges shall have dull, black enamel cast aluminum casings with chrome plated bezels or rims. The gauges shall have white faces with black filled engraved numerals and adjustable pointer. The diameter of the dial shall be not less than 4½ inches. Gauges shall have brass bronzed brushed rotary type movement.
- D. Panel mounted gauges shall be designed for flush mounting with back connections and shall be provided with an engraved nameplate mounted below

each gauge to identify its service. The nameplates shall be chrome plated with black filled letters.

- E. Differential pressure switches, pressure sensing pipe taps, furnished by temperature control manufacturers shall be installed under this Section.
- F. The accuracy of all gauges shall be within 1% of the scale range.
- G. All gauges on water lines shall be fitted with filter type pressure snubbers consisting of d" dia. x c" thick, micro metallic stainless steel filter, as manufactured by Operating and Maintenance Specialties or approved equal. All gauges on steam lines shall be fitted with pigtailed.
- H. Pressure gauges shall be installed where indicated on the Drawings.
- I. The scale range of pressure gauges shall be 0 to 100 psig.
- J. Pressure gauges shall have a range at least twice the working pressure, but in no case less than 0 to 30 lbs. A ball valve shall be installed on the water side of each gauge.

2.3 MACHINERY GUARDS

- A. Moving parts of machinery exposed to contact by personnel shall be guarded by barrier to a type which complies with OSHA Code.
- B. Exposed moving parts such as belts and couplings shall have not less than 3/4" No. 16 gauge metal guards with all edges rounded and gauge, material and construction shall be in accordance with OSHA standards - paragraphs 7173.3, 7173.5 and 7174.1. Guards shall have 1 1/4" x 1 1/4" x c" angle iron frame properly supported.
- C. All machinery guards covering the ends of motor or equipment shafts shall have openings for the insertion of a tachometer. Machinery guards shall be painted with two coats of machinery gray enamel.

2.4 EXPANSION JOINTS, LOOPS, ANCHORS AND GUIDES

- A. Provisions for expansion in piping mains, branches, and risers shall be made by the installation of offsets, expansion loops, or compensators as indicated on the Drawings and as required. Every 100'-0" horizontal water piping shall have expansion loop and anchors. Minimum loop shall be 8'-0" by 6'-0" if not indicated on the Drawings.
- B. All piping with loops or compensators shall be anchored so as to throw all expansion toward the loops or compensators.
- C. Guides shall be installed on both sides of each expansion loop and compensator. Guides shall be Flexonics pipe alignment guides or approved equal. Anchors and guides shall be secured to beams, columns or concrete slabs.

- D. Pipe hangers and rollers are not considered guides.
- E. Provide 12" long guides for each expansion joint. Guides shall be located 3'-0" on each side of the expansion joints.
- F. Furnish and install as shown on plans, or where necessary to absorb max. 1¼" expansion and max. ¼" contraction between two anchor points in iron and steel pipe lines up to and including 2½", Flexonics Model II Expansion Compensators having two-ply stainless steel bellows and carbon steel shrouds and end fittings, as manufactured by Flexonics Division of Calumet & Hecla, Inc., Bartlett, Illinois. Service pressure shall be external to the bellows. Compensators shall have properly located positioning clip to insure installation at correct end-to-end dimension to allow full rated traverse. Compensator shall be for Max. 150 psig. working pressure. Test pressure shall not exceed 200 psig.
- G. Expansion joints in 3" and above piping shall be hydraulically formed bellows type with internal sleeves and external covers for insulation. Expansion joints, except where otherwise noted, shall be of the self-equalizing type having fully-contoured, cast iron equalizing rings.

2.5 DRAFT GAUGES

- A. Furnish and install at each filter, draft gauges for measuring the resistance of the air through the filters.
- B. Draft gauge for rooftop units and outdoor units shall be 2000 Series Magnehelic as made by Dwyer or approved equal. Gauges shall be provided complete with two static pressure taps, case, fittings and means of mounting. Scale shall be as required. Set gauges to be easily readable from floor level. Gauges shall be of Dwyer make or approved equal.

2.6 AUTOMATIC FLOW-CONTROL VALVES

- A. The Contractor shall provide and install for each heat pump, one "Autoflow" model FVT or Griswold compact pressure compensating flow control valves in one piece configuration consisting of ground joint union and flow control valve and Petes plugs.
- B. All valves are to be factory set to control the flow rate within 4% of the selected rating over an operating pressure differential of at least ten times the minimum required for full flow conditions.
- C. The valves shall be all metal with threaded or sweat connections. Metallurgy shall be all brass and stainless steel.
- D. Performance certification of valves by an independent laboratory shall be furnished.
- E. All valves shall have unions to allow field-exchange of internal components without removing the valve body from the pipeline.

- F. All valves shall be permanently marked to show direction of flow and flow rates.

2.7 AIR VENTS

- A. In installing water piping systems and all equipment, carefully plan the actual installation in such a manner that high pints and air pockets are kept to a minimum and are properly vented where they are unavoidable. All air elimination devices called for on the Drawings and in these Specifications shall be provided and properly installed. In addition, furnish and install all other air elimination devices which may be required due to job conditions. Assume responsibility for a proper, continuous and automatic air elimination to assure even and balanced distribution of water to all equipment.
- B. Furnish and install an Armstrong No. 1 AV or Sarco 13W automatic air vent with test petcock at each high point in the water piping mains and where indicated on the Drawings. Furnish and install a 125 psig rated valve on the system side of each automatic air vent. Vents on hot water, dual temperature water and chilled water lines shall have Hoke Fig. No. PY-271 valves or approved equal. Vents on all other waterlines shall have Hoke Fig. No. RB-271 valves or approved equal.
- C. Furnish and install manual air vents Hoffman No. 500 or approved equal, for all upfed radiation. Furnish and install a 125 psig rated ball valve on the system side of each manual air vent. Provide access to all air vents.

2.8 AIR SEPARATORS

- A. Furnish and install the air separators for water system where indicated on the Drawings. The separators shall be Rolairtrol, as manufactured by Bell and Gossett or equal as approved by the Architect.
- B. The units shall be of ASME construction and shall be stamped 125 psig W.P.
- C. The units shall be furnished without integral strainers.
- D. The units shall be installed in strict accordance with the manufacturer's recommendations.
- E. The units shall be supported on 2" pipe legs and shall be provided with a 3/4" drain gate or ball valve with hose end and cap.

2.9 V-BELT DRIVES

- A. All V-belt drives furnished under this Section shall be Gates Rubber Co., Woods, or approved equal. Drives shall be designed with an overload factor of twice the fan brake horsepower but in no case less than 125% of motor horsepower rating. Machined cast iron pulleys shall be used. Manufacturer's shop drawings shall state actual transmission capacity of each drive. Provide companion sheaves for adjustable sheave drives. Companion sheaves shall be selected such that the individual belts shall not exceed a two degree misalignment of the groove centerlines between the driving and driven sheaves. Sheaves shall be complete with flanges and locking devices. All sheaves shall be selected with a 1.5

- minimum service factor.
- B. Provide matching belts.
 - C. All motors up to 3 HP shall have variable speed drives.
 - D. All motors 10 HP to 25 HP for speeds below 1000 RPM shall have variable speed drives.
 - E. Provide fixed drives above 1000 RPM for 10 to 25 HP and for all units above 25 HP.

2.10 STRAINERS FOR WATER SYSTEM

- A. Furnish and install a full size Y-pattern strainer on the inlet of each control valve and each water pump, where indicated on the Drawings.
- B. The strainers shall be as manufactured by Spence, Sarco, Barnes and Jones, Elliott, Crane or Mueller.
- C. All strainers, except where otherwise noted, shall have bronze body up to 2½", semi-steel above 2½", rated at 125 psig for all systems with 50 psig max. pressure and 250 psig for all others. Strainers 2 inch diameter and smaller shall have screwed ends. Strainers 2½ inch diameter and larger shall have flanged ends.
- D. All strainers shall have removable cylindrical or conical screens of brass construction. They shall be designed to allow blowing out of accumulated sediment and to facilitate removal and replacement of the screen without disconnecting the main piping.
- E. Screens for water 1/16" for 3" inclusive, c" for 4" and above.
- F. An approved blow-out connection with gate valve shall be made to each strainer. The valves shall be located not higher than 8 feet above the floor. All drain connections shall be piped to floor drains.

2.11 REDUCING AND SAFETY VALVES FOR WATER SYSTEM

- A. Furnish and install pressure reducing and safety valves for makeup water systems and where indicated on the drawings.
- B. The reducing valve shall be Model 7 pressure reducing valve with field adjustable setting as manufactured by Bell & Gossett or equal as approved by the Architect.
- C. The safety valves shall be of size and capacity as indicated on the Drawings. The valves shall be made by Bell and Gossett or approved equal and shall have 150 pound raised face flange on the inlet and discharge for all sizes 2½" and above 2" and below shall be screwed.
- D. The safety valves shall be steel valves with stainless steel trim. The bonnet shall

be enclosed and equipped with a packed lifting lever. The spring shall be carbon steel rated for 450° F.

- E. The vertical discharge line from the safety valves shall be installed as close to the safety valves as possible and piped to drain.

2.12 MECHANICAL PIPE COUPLINGS

- A. Mechanical pipe couplings similar to Victaulic may not be used.

2.13 PRESSURE AND TEMPERATURE TEST STATIONS

- A. Furnish and install where indicated on the Drawings, a ¼" MPT fitting to receive either a temperature or pressure probe c" OD. Fitting shall be solid brass with valve core of Nordel (Max. 275°F.), fitted with a color coded and marked cap with gasket, and shall be rated at 1000 psig.
- B. In addition, the installing contractor shall supply the Owner with six pressure gauge adapters with c" OD probe and 6 five inch stem pocket testing thermometers; 25-125°F for chilled water and six 50-500°F for hot water.
- C. Provide one pressure and temperature test kit consisting of one 0-60 PSI, water pressure gauge and one 0-30 psi water pressure gauge each with No. 500 gauge adapter attached, a 25-125°F. Pocket testing thermometer, a 0.220 F. pocket test thermometer, a No. 500 gauge adapter, and a protective carrying case. Provide one additional 0-60 psi pressure gauge and one additional 0 to 30 psi pressure gauge.
- D. Test kit shall be used by the Balancing Contractor to balance the systems and then it shall be turned over to the Owner.
- E. Test stations and test kit shall be manufactured by Paterson Engineering Company, Inc. or approved equal.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where these specialties are to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install HVAC Specialties where shown, in accordance with manufacturer's written instructions and with recognized industry practices, to ensure that HVAC Specialties comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of HVAC

Specialties with other components of systems.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of HVAC Specialties, test HVAC Specialties to demonstrate compliance with requirements. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

END OF SECTION

SECTION 15810 - VIBRATION ISOLATION**PART 1- GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 15050 - Seismic Restraint for Isolated and Unisolated Equipment, Piping Ductwork, Tanks and Stacks shall apply.

1.2 DESCRIPTION OF WORK

- A. The Work includes providing all labor, materials, equipment, accessories, services and tests to complete and make ready for operation by the Owner, all vibration isolations as shown on the Drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacture of this equipment with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. Provide products produced by the manufacturers which are listed in Section "Approved Manufacturer's List".
- C. Provide equipment whose performance under specified conditions is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section "Special Requirements for Mechanical and Electrical Work" and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section "Special Requirements for Mechanical and Electrical Work".

1.6 GUARANTEE

- A. Refer to Section "Special Requirements for Mechanical and Electrical Work".

1.7 TECHNICAL REQUIREMENTS

- A. All mechanical equipment shall be mounted in accordance with the specifications below and for the specific requirements shown in the equipment schedule.

- B. The isolation manufacturer shall supply all unit isolators, complete rails, fan and motor bases and structural steel forms for concrete inertia blocks, where called for and shall be responsible for the selection of all vibration eliminators and shall guarantee to meet the requirements of these Specifications.
- C. Wherever rotational speed is mentioned as the disturbing frequency, the lowest such speed in the system shall be used. All isolation devices shall be selected for uniform static deflections according to distribution of weight. Lateral motion of all isolators shall be $\frac{1}{4}$ " maximum during start-up and shut-down.
- D. "Outdoor" isolators, steel parts other than galvanized springs and cadmium plated springs shall be suitably coated to resist corrosion. Isolators shall be equipped with limit stops to resist wind velocity.
- E. All fan units and air handling units (except fans with wheels under 27") shall be isolated as follows:
- | | |
|------------------------|-----------------------------------------|
| 1. Up to 450 RPM: | 75% efficiency (3½" maximum deflection) |
| 2. 450 RPM to 850 RPM: | 90% |
| 3. 850 RPM and over: | 95% |
- F. Submittals shall show disturbing frequency, required efficiency, designed deflection and outside diameter of springs, when pertinent.
- G. All horizontal pipe runs within the mechanical equipment room area, but not less than 50 feet from connected equipment shall be isolated from building structure by means of units designed for insertion in rods.
- H. For seismic restraint requirements, see Section 15050.

PART 2- PRODUCTS

2.1 VIBRATION ISOLATION

- A. Type D:
1. Vibration hangers shall contain a steel spring and a double deflection neoprene element in series. Neoprene elements shall have a minimum deflection 0.35". The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection and be seated in a neoprene cup with an integral molded bushing that passes through the lower hanger box.
 2. Manufacturer/Type:

Mason Industries, Inc. DNHS
Vibration Eliminator Co. SNRC
- B. Bases:

1. Type G:

- 1. Vibration isolator manufacturer shall furnish integral structural steel bases for both driver and driven machines.
- 2. Bases shall be rectangular in shape for all equipment.
- 3. Bases shall be WF bases as manufactured by Mason Industries, Inc. or approved equal.

2. Type Y:

- 1. Rooftop packaged air handling units shall be installed on a spring supported isolation curb which shall combine the manufacturer's curb and the isolation base into one assembly. The system shall be designed with 1", 2" or 3" static deflection steel springs which are both adjustable, removable and interchangeable after the rooftop unit has been installed. The system shall maintain the same operating and installed height both with and without the equipment load and shall be fully restrained during wind load conditions allowing no more than ¼" motion in any direction. The isolation curb shall be designed to accept and utilize outer placement of standard 2" roof insulation to act as a sound attenuation system for the inside of the curb. The entire unit shall become an integral part of the membrane waterproofing. The entire assembly shall be dry galvanized or PVC coated. The isolation curb shall be model P-6000 as manufactured by Mason Berger East. Options for the system include an elevation kit model EK-1 and a sound barrier pack framing kit complete with offset plenum for lightweight roof deck areas model SBC-3. Note: Where this option is utilized, General Contractor is to furnish and install sound barrier material.
- 2. Manufacturer/Type:

Mason Industries, Inc.: Model P-6000
 Vibration Eliminator Co.:

C. ISOLATION SCHEDULE:

Vibration Eliminator Specification
Type for Equipment Location:

Type of Equipment	With No Occupied or Unoccupied Spaces Below	Above Occupied or Unoccupied Spaces

Rooftop Package AHU

Type Y
(3.0" deflection)Piping in Mechanical
Equipment Rms.

See Spec. Text

See Spec. Text

2.2 FLEXIBLE CONNECTIONS

- A. Where shown on the drawings, provide a flexible pipe connector at pumps, and other vibrating equipment.
- B. Flexible connector shall be:
 - 1. Manufacturer of nylon tire cord and EPDM, both molded and cured with hydraulic presses.
 - 2. Straight connectors to have two spheres reinforced with a mold-in external ductile iron ring between spheres.
 - 3. Elbow shall be long radius reducing type.
 - 4. Rated 250 psi at 170°F. Dropping in straight line to 170 psi at 250°F. for sizes 1½" to 12". Elbows shall be rated no less than 90% of straight connections.
 - 5. Sizes 10" and 12" to employ control cables with neoprene end fittings isolated from anchor plates by means of ½" bridge bearing neoprene bushings.
 - 6. Minimum safety factor, 4 to 1 at maximum pressure ratings.
 - 7. Submittals to include test reports.
 - 8. Mason Type MFTNC Superflex, or approved equal.

PART 3- EXECUTION

3.1 INSPECTION AND COORDINATION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the Work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.
- C. Coordinate work with other trades to avoid rigid contact with the building. Inform other trades following work, such as plastering or electrical, to avoid any contact which would reduce the vibration isolation.
- D. Bring to the Architect's attention, prior to installation, any conflicts with other

trades which may result in unavoidable rigid contact with equipment or piping as described herein, due to inadequate space or other unforeseen conditions. Corrective work necessitated by conflicts after installation shall be at the responsible Contractor's expense.

- E. Bring to the Architect's attention, any discrepancies between the Specifications and field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the Contractor's expense.

3.2 INSTALLATION

- A. Mount floor-mounted equipment on 4" concrete housekeeping pads over complete floor area of equipment. Mount vibration isolating devices on concrete pad.
- B. The machine to be isolated shall be supported by a structural steel frame.
- C. Brackets shall be provided to accommodate the isolator. The vertical position and size of the bracket shall be specified by the isolator manufacturer.
- D. The minimum operating clearance between the equipment frame or rigid steel base frame and the housekeeping pad or floor shall be 1". Minimum operating clearance between concrete inertia base and housekeeping pad or floor shall be 2".
- E. The equipment structural steel shall be placed in position and supported temporarily by blocks or shims, as appropriate, prior to the installation of the machine or isolators.
- F. The isolators shall be installed without raising the machine and frame assembly.
- G. After the entire installation is complete and under full operational load, the isolators shall be adjusted so that the load is transferred from the blocks to the isolators. When all isolators are properly adjusted, the blocks or shims shall be barely free and shall be removed.
- H. Isolation mounting deflection shall be (minimum) as specified or scheduled.
- I. Install equipment with flexibility in wiring connection.
- J. Verify that all installed isolator and mounting systems permit equipment motion in all directions. Adjust or provide additional resilient restraints to flexibly limit start-up equipment lateral motion to ¼".
- K. Prior to start-up, clean out all foreign matter between bases and equipment. Verify that there are no isolation short circuits in the base isolators or seismic restraints.
- L. All piping and ductwork to be isolated shall freely pass through walls and floors without rigid connections. Penetration points shall be sleeved or otherwise

formed to allow passage of piping or ductwork and maintain $\frac{3}{4}$ " to $1\frac{1}{4}$ " clearance around the outside surfaces. This clearance space shall be tightly packed with firestopping or fiberglass and caulked airtight after installation of piping or duct ductwork.

- M. No rigid connections between equipment and building structure shall be made that degrades the noise and vibration isolation system herein specified.
- N. The contractor shall not install any equipment, piping or conduit which makes rigid contact with the "building" unless permitted in this Specification. Building includes, but is not limited to, slabs, beams, columns, studs and walls.
- O. Obtain inspection and approval of any installation to be covered or enclosed, prior to such closure.
- P. Diagonal thrust restraint shall be as described for Type D hanger with the same deflection as specified for the spring mountings. The spring element shall be designed so it can be pre-set for thrust and adjusted to allow for maximum of $\frac{1}{4}$ " movement at start and stop. Diagonal restraints shall be attached at the centerline of thrust. Restraint shall be Mason Type WB or approved equal.

3.3 PIPING ISOLATOR INSTALLATION

- A. The isolators shall be installed with the isolator hanger box attached to, or hung as close as possible to, the structure.
- B. The isolators shall be suspended from substantial structural members, not from slab diaphragm unless specifically permitted.
- C. Hanger rods shall be aligned to clear the hanger box.
- D. Horizontal suspended pipe 2" and smaller shall be suspended by Type DE isolator with a minimum $\frac{3}{8}$ " deflection. water pipe larger than 2" shall be supported by Type F isolator with minimum 1" or same static deflection as isolated equipment to which pipe connects, whichever is greater.
- E. Horizontal pipe floor supported at slab shall be supported via Type B, with a minimum static deflection of 1" or same deflection as isolated equipment to which pipe connects, whichever is greater.
- F. Vertical riser pipe supports shall utilize neoprene elements.
- G. Vertical riser guides, if required, shall avoid direct contact of piping with building.
- H. Pipe sway braces, where required shall utilize two (2) neoprene elements.

3.4 FIELD QUALITY CONTROL

- A. Obtain inspection and approval of any installation to be covered or enclosed, prior to such closure.

- B. Upon completion of installation of all vibration isolation devices herein specified, the local representative of the isolation materials manufacturer shall inspect the completed system and report, in writing, any installation error, improperly selected isolation devices, or other faults in the system that could affect the performance of the system. Contractor shall submit a report to the Architect, including the manufacturer's representatives final report, indicating all isolation reported as improperly installed or requiring correction, and include a report by the Contractor on steps taken to properly complete the isolation work.

END OF SECTION

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SECTION 15815 - WATER TREATMENT AND CLEANING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all water treatment and cleaning as shown on the drawings and hereinafter specified.
- B. The Contractor shall engage the services of a water treatment contractor who shall provide a complete water treatment service. The service shall include furnishing and application of all chemicals, at least one visit a month to collect samples for chemical analysis at the water treatment company's laboratory, and all necessary inspection, adjustment, and maintenance of the chemical treating devices. Complete chemical control of the treatment shall be included. Reports shall be furnished to Architect after each visit.
- C. Water treatment shall be applied concurrently with the operation of each circulating water system for a period of one year. An initial dose of treatment chemical shall also be applied immediately after each system is initially filled with water if operation is to be delayed after filling.
- D. In addition to the chemicals indicated, slimicides and algaecides shall be provided as necessary. Chromate and phosphate will not be acceptable. All chemicals shall be approved by local and state agencies having jurisdiction.
- E. The firm's water treatment laboratory shall be equipped to analyze water in accordance with the statement methods of the American Public Health Association.
- F. Water treatment contractor shall provide chemical feeding devices during the period of this contract. At the termination of the contract, the treatment equipment shall belong to the Owner.
- G. Provide a water treatment program for the heat pump load & building circulating systems.
- H. The new boiler water treatment system shall be connected to existing boilers water treatment system. Provide piping and valves as required.

1.3 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section 15390 "Approved Manufacturer's List" and 15600 "General Provisions for HVAC Work".
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 CHEMICAL TREATMENT CLOSED CHILLED AND HOT WATER SYSTEMS

- A. Provide a Nitrite based material to maintain the following conditions in each closed water system.
 - 1. pH7.5 - 9.07.5 - 9.07.5 - 9.0
 - 2. Nitrite1500 - 2000300 - 400 ppm300 - 400 ppm
as NO₂

2.2 CHEMICAL TREATMENT - CLEANING - DEGREASING

- A. Provide a supervised program of cleaning and degreasing chemicals used in the specified systems prior to start-up. Sufficient chemicals shall be added to each system to establish a concentration of 120 ppm degreasing chemicals containing 20% dioctylsulfocuccinate and a concentration of 240 ppm of cleaning chemical containing 15% polyacrilate and 25% diphosphonate in the water. Systems shall then be circulated for a minimum of 8 hours, dumped, flushed, and refilled, with the correct corrosion inhibitors added for operation. Strainers are to be hand cleaned after flushing.

2.3 CHEMICAL FEED EQUIPMENT - CHILLED AND HOT WATER SYSTEMS

- A. Provide a 5 gallon shot feeder including funnel, relief valve and air vent for

intermittent feed of corrosion inhibitor across a suitable pressure drop in each closed system.

2.4 WATER TREATMENT CONTROL TESTING EQUIPMENT

- A. Provide a test set complete with apparatus and chemical reagents for the determination of phosphonate (ortho), ph (7.6 - 9.2), nitrite and any additional test as required by water treatment company.

2.5 CLEANING OF PIPING SYSTEMS

A. Preliminary Cleaning:

1. Clean new piping internally by flushing prior to the application of pressure tests and before the chemical cleanout procedures specified herein. Provide temporary strainers at the inlet to the water pumps before the start of cleaning procedures.
2. Block off and isolate circulating pumps, cooling coils, and heating coils during the preliminary flushing and draining process.
3. Thoroughly flush piping clear of foreign matter with City water under pressure, and then drain before proceeding with pressure testing. Blow down accumulations of grit, dirt and sediment at each strainer and each low point in the piping systems.
4. Provide bypass flush valves and required piping to permit full circulation of water during the washout of the piping systems. Close shutoff and balancing valves on branch piping to the terminal equipment units during the washout operation to prevent water circulation through the automatic control valves.

B. Chemical Cleanout:

1. After completion of pressure testing, chemically clean internally each recirculating water system.
2. Provide temporary connections with valves to fill the piping and remaining equipment with water for the purpose of draining piping and equipment after completion of the chemical cleanout procedure. Provide temporary blind flanges and/or caps to isolate the piping and equipment noted herein.
3. Provide temporary piping connections, valves, strainers, bypasses, and blank connections where required to clean out systems. Line each strainer basket with a fine mesh nylon screen and replace the screens at the end of each day's circulation until each system is thoroughly cleaned.

- C. Fill each system with City water; start circulation pump and vent high points manually until all air is released from the system.

1. Fill and Flush with a solution of a non-foaming chemical detergent, to remove all foreign matter. Circulate the solution for a minimum of 8 hours and drain as rapidly as possible to remove suspended matter. Flush the system with fresh water, drain a second time and refill. After final filling, the pH of the water must not exceed the pH of the fresh incoming water by more than 0.5 pH.
2. Introduce the chemical solution into the system gradually by injecting into the suction side of the circulating pump, or by means of a bypass chemical feeder located on the discharge side of the permanent hot water secondary system circulating pump. Slowly raise and then maintain the temperature of the circulating water at 150°F by circulating through the hot water converter.
3. While the water is being circulated, open each drain connection for a short flow. Repeat at hourly intervals. Replace any water drained during blowdown with chemical solution as required until air is eliminated from the system. The chemical cleanout procedure to be continuous in this manner for 2 full 8-hour periods.
4. At the conclusion of the chemical cleanout period, completely drain the entire system and allow to cool. Flush out with fresh City water prior to final activation of the system. Remove temporary equipment and strainers, reconnect permanent pump and replace items previously removed.

D. Filling of Water Systems:

1. After completion of the chemical cleanout, fill each water system with fresh water, air vent, and add chemical treatment.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Install water treatment equipment where shown or specified, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that water treatment systems comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of water treatment equipment with other components of systems.

- C. Check alignment and, where necessary (and possible), realign shafts of motors and equipment within tolerances recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, and after motors have been energized with normal power source, test equipment to demonstrate compliance with requirements. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

END OF SECTION

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SECTION 15820 - PIPING FOR MECHANICAL**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The Work includes providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all piping as shown on the Drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. "Manufacturers"-Firms regularly engaged in manufacture of pipe whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. Provide pipe whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section 15000, "Special Requirements for Mechanical and Electrical Work", and submit shop drawings.

1.5 COORDINATION

- A. Refer to Section 15000, "Special Requirements for Mechanical and Electrical Work".

1.6 WARRANTY

- A. Refer to Section 15000, "Special Requirements for Mechanical and Electrical Work".

PART 2- PRODUCTS**2.1 PIPE**

- A. All pipe shall be new, free from scale or rust, of the material and weight specified under the various services. Each length of pipe shall be properly marked at the mill for proper identification with name or symbol of manufacturer.
- B. All steel piping, except where otherwise rated, shall be standard or extra strong

weight, in conformance with the ASTM A-53 Grade A seamless, for piping 2" and larger, as manufactured by National Tube Division, Republic Steel Corp., or approved equal. Piping shall be ASTM A-120 continuous butt weld, for piping less than 2".

- C. All brass piping shall be standard or extra heavy weight 85% red brass semi-annealed seamless-drawn, in conformance with the ASTM B-43, as manufactured by Anaconda, American Brass Co., Chase Brass and Copper Co., or Revere Copper and Brass, Inc.
- D. All copper tubing shall be of weight as required for service specified, with conformance with ASTM B-88 for Types "L" and "K" tubing, as manufactured by Chase, Anaconda, Revere, or approved equal. Tubing and fittings shall be thoroughly cleaned with sand cloth and treated with an approved non-corrosive flux before solder is applied.
- E. All galvanized steel piping shall be standard or extra strong weight, as specified, in conformance with the ASTM A-53 Grade B. Pipe shall be hot-dripped zinc-coated with Prime Western smelter and not wiped.
- F. Generally, unless otherwise specified, joints in steel piping of sizes 2 inches and under shall be screwed, and all sized 2½ inches and over shall be welded or flanged. Brass pipe shall be screwed 2 inches and smaller and flanged 2½ inches and over. Copper tubing shall be silver-soldered or 95-5 solder as herein specified.
- G. Welding Piping
 - 1. All fittings for welded piping shall be as manufactured by Tube Turn, Grinnell, Bonney Forge or equal as approved by the Architect. The fittings shall be of the same weight and material as the piping to which they are attached.
 - 2. For piping 2½" or 4" and larger, full size branch connection shall be made with manufactured welding tees, branch connections for less than full size, shall be made with welding tees or with Weldolet forged branch outlet fittings. Fishmounting, shaped nipples, and stubbing not permitted.
- H. Welding outlet fittings shall be Weldolets as manufactured by Bonney Forge, Inc., or approved equal 2 or 3 and smaller branches shall be made with thredolets as made by Bonney Forge or approved equal.
- I. Weld ells shall have a center line radius not less than diameter of the pipes.
- J. All flanges shall be welding neck flanges ANSI B16.5 ASTM 181 Grade I. all systems, except where otherwise noted - 150 lbs. Class, forged steel.
- K. Instrumentation connections ¾" and smaller on all systems shall be provided by welding threaded 2000# forged steel half couplings to the pipe.
- L. All pipe to be welded shall be cut off clean and beveled. All welding shot shall be

removed.

- M. Composition of welding electrodes shall be in accordance with manufacturer's recommendations.
- N. Pipe welding shall comply with the provisions of the latest revision of the applicable code, whether ASME Boiler and Pressure Vessel Code, ANSI Code for Pressure Piping B31, or such state or local requirements as may supersede codes mentioned above.
- O. Before any pipe welding is performed, submit a copy of the welding procedure specifications together with proof of its qualification as outlined and required by the most recent issue of the code having jurisdiction.
- P. Before any operator shall perform any pipe welding, also submit the operator's qualification record in conformance with provisions of the code having jurisdiction, showing that the operator was tested and certified under the Procedure Specification as before mentioned.
- Q. Assume responsibility for the quality of welding done and repair or replace any work not in accordance with these specifications.
- R. In addition, all pipe welding procedures and procedures for qualification of pipe welding operators shall comply with the requirements of the American Welding Society.
- S. Pipe Schedule: Pipe for the various services shall be as follows:

<u>Service</u>	<u>Material</u>	<u>Schedule</u>
Overflow and Drain	Galv. Steel	40
Hot Water	Steel	40 or standard
Branch runouts to radiation	Copper	Type L
Chilled Water and Dual Temperature Water	Steel	40 or standard
Condenser Water	Steel	40 or standard

- T. The Contractor shall have the option to use Type K copper for hot water piping up to and including 2"

2.2 MECHANICAL PIPE COUPLINGS

- A. Rigid Mechanical pipe couplings similar to Victaulic may not be used.

2.3 FITTINGS

- A. Fittings shall be specified under "Fitting Schedule" for various services.
- B. Welding fittings shall be of the same material and schedule as the pipe to which they are welded. Welding elbows shall be long radius pattern unless clearance conditions necessitate the use of standard radius pattern. Welding fittings shall be as made by Tube-Turn.
- C. Fittings shall be of material conforming to the following schedule:
 - Steel Welding Fittings ASTM A-106
 - Malleable Iron Fittings ASTM A-197
 - Cast-Iron Fittings ASTM A-126
 - Brass Fittings ASTM B-62
 - Solder Fittings ASTM B-88
- D. All fittings used at expansion loops or bends shall be extra heavy.
- E. Cast-iron, malleable-iron and bronze fittings shall be of Crane manufacturer or approved equal.
- F. Flanges shall be raised face, of the same weight as the fittings in each service category. All flanges shall be drilled to "US Standard" hex nuts and washers. Bolting shall conform to ASTM 193 Grade B-7, threads Class 7 fit. Nuts shall be semi-finished hexagonal, ANSI B18.2 ASTM A194 Grade 2H.
- G. Unions - Unions 2 inches and smaller shall be screwed. Unions 2-1/2 inches and larger shall be flanged. Screwed unions on steel pipe, unless otherwise specified, shall be of malleable iron with bronze ground seats suitable for 300 pounds W.S.P. Screwed unions on copper or brass pipe shall be brass, ground joint suitable for 300 pounds W.S.P. Flanged unions shall be malleable iron for steel pipe, and brass for copper or brass pipe, gasket type suitable for 150 pounds W.S.P. Unions shall be as manufactured by Crane or approved equal.
- H. Brass pipe threads shall be cut with special brass threading dies, and the joints shall be made up with lubricant. Strap wrenches, or equivalent, shall be used in making up brass pipe. Wrenches which gouge or scar the pipe will not be used.
- I. Solder for each solder-type fitting shall be of 95% tin and 5% antimony or silver solder, as specified herein.
- J. Unless otherwise specified, all flanged joints shall be fitted with Manville or equal ring gaskets designed for the intended service.
- K. Fitting Schedule: Fittings for the various services shall be as follows:

<u>Service</u>	<u>Size</u>	<u>Material</u>	<u>Weight</u>	<u>Type</u>
Hot Water	1½" & below	Forged Carbon Steel	3000#	Socket Welded ASA B16.11

Hot Water	2" & above	Grade II Seamless ASTM A234 Grade B	Sch.40	Butt Welding
Overflow and Drain	ALL	Galv. M.I. Wrought Copper	150# 125#	Screwed Solder
Cold Water	ALL	Bronze Wrought Copper	125# 125#	Brazed Solder

2.4 PIPE HANGERS AND SUPPORTS

- A. Provide necessary structural members, hangers and supports of approved design to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations. In all cases where hangers, brackets, etc., are supported from metal decking and/or concrete construction, care shall be taken not to weaken decking and/or concrete or penetrate waterproofing. All hangers and supports shall be capable of screw adjustment after piping is erected. Hangers supporting piping expanding into loops, bends and offsets shall be secured to the building structure in such a manner that horizontal adjustment perpendicular to the run of piping supported may be made to accommodate displacement due to expansion. All such hangers shall be finally adjusted, both in the vertical and horizontal direction, when the supported piping is hot, or chilled, as required. Hangers in contact with copper or brass pipe shall be copper plated steel.
- B. Pipe hangers shall be the clevis and pipe roll types, except where otherwise noted.

PIPE HANGER SCHEDULE

		<u>MAKE AND MODEL</u>		
<u>Pipe</u>	<u>Type of Hanger</u>	<u>Grinnell Fig. No.</u>	<u>F & M Fig. No.</u>	<u>Carpenter & Paterson Fig. No.</u>
2" & smaller (steel)	Clevis Hanger	260	239	100
2" & smaller (copper)	Adjustable Wrought Iron	CT-65	364	100 CT
2½" to 4" (steel)	Adjustable Swivel Pipe Roll	174 2729	16	
<u>Pipe</u>	<u>Type of Hanger</u>	<u>Grinnell Fig. No.</u>	<u>F & M Fig. No.</u>	<u>Carpenter & Paterson Fig. No.</u>
2½" to 4" (copper)	Adjustable Wrought Ring	CT-269		
5" & above	Two Rod Roller			

Hanger 171 170 142

- C. Beam clamps - Hangers supported from floor steel shall be approved I beam clamps. I beam clamps for hangers supporting piping 2 inches and smaller shall be C & P Fig. No. 148 adjustable beam clamps. For piping 2½ inches and larger, I beam clamps shall be wrought steel. C & P Fig. No. 268 or equal.
- D. Where piping is run near the floor and not hung from the ceiling construction but is supported from the floor, such supports shall be of pipe standards with base flange and adjustable top yoke similar to C & P Fig. 247 or equal.
- E. All vertical piping shall be anchored by means of heavy steel clamps securely bolted or welded to the piping, and with end extension bearing on the building.
- F. All vertical piping shall be guided at each floor by use of clamps fastened to building structure. Provide 360° protective saddle at guides. Saddles shall be fastened to pipe or insulation.
- G. Vertical runs of pipe not over 15 feet long shall be supported by hangers placed not over one foot from the elbows on the connecting horizontal runs.
- H. Vertical runs of pipe over 15 feet long but not over 60 feet long and not over 6 inches in size, or not over 30 feet long and not over 12 inches in size, shall be supported on heavy steel clamps. Clamps shall be bolted tightly around the pipes and shall reset securely on the building structure without blocking. Clamps shall be welded to the pipes or placed below couplings. Clamps shall be type 8, Federal Specification WW-H-171C, unless other types are approved.
- I. For all chilled water dual temperature water and makeup water, provide "Insulshield" as made by Insulcoustic Corp. or pipe covering protection shield C & P Fig. 265P with steel shield min. 9 inches long, with vapor barrier jacket. For hot-water heating piping 2 inches and smaller, same as above. For hot-water heating piping 2½ inches and larger, provide steel pipe covering protection saddles C & P Fig. 353 series.
- J. Hanger rods shall be of the following diameters:

<u>Pipe Size</u>	<u>Rod Diameter</u>	<u>Max. Spacing</u>
1¼ inch & below	d inch	6'-0"
1½ and 2 inch	d inch	10'-0" (copper 8'-0")
2½ inch 3 inch	½ inch	10'-0" (copper 8'-0")
4 inch 5 inch	e inch	12'-0"
6 inch	¾ inch	14'-0"

8 inch & above f inch 16'-0"

- K. Hanger rods shall be attached to preset concrete inserts with steel reinforcing rod through the insert and both ends hooked over the reinforcing mesh. For pipes 4 inches and larger, rods shall extend through concrete slab above where they shall be attached to steel bearing plates 6" x 6" x ¼".
- L. Piping shall not be hung from other piping ducts, conduits or from equipment of other trades and no vertical expansion shields will be permitted. Hanger rods shall not pierce ducts.
- M. All water piping connected to rotating equipment within all mechanical spaces shall be isolated from the building structure by means of vibration hangers inserted in the hanger rods. The vibration hangers shall consist of a steel spring in combination with a double deflection neoprene element within a rectangular steel housing. Combined static deflection shall be 1.375" minimum. Hangers shall have capability of supporting the piping at a fixed elevation during installation and shall incorporate an adjusting device to transfer the load to the spring. Deflection shall be indicated by means of scale. Vibration hangers shall be type PCDNHS made by Mason Industries.
- N. Where additional steel is required for the support of hangers, furnish and install same subject to the approval of the Architect. Piping and ductwork shall not be supported from concrete slab construction at ceiling.
- O. All piping running on walls shall be supported by means of hanger suspended from heavy angle iron wall brackets. No wall hooks will be permitted.
- P. Lateral bracing of horizontal pipe shall be provided where required to prevent side sway or vibration. The lateral bracing shall be of a type approved by the Architect and shall be installed where directed by the Architect.

2.5 ANCHORS

- A. All anchors shall be separate and independent of all hangers, guides, and supports. Anchors shall be of heavy blacksmith construction suitable in every way for the work approved by the Architect. Anchors shall be welded to the pipe and fastened to the structure with bolts.
- B. Anchors shall be fabricated and assembled in such a form as to secure the piping in a fixed position. They shall permit the line to take up its expansion and contraction freely in opposite directions away from the anchored points; and shall be so arranged as to be structurally suitable for particular location, and line loading. Submit details for approval.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where the piping is to be installed and

determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate with other work as necessary to interface installation of piping with other components of systems.
- B. Provide and erect in a workmanlike manner, according to the best practices of the trade, all piping shown on the Drawings or required to complete the installation intended by these Specifications.
- C. The Drawings indicate schematically the size and location of piping. Piping shall be set up and down and offset to meet field conditions and to provide adequate maintenance room and headroom in the Mechanical Rooms.
- D. Study the General Construction Specifications and Plans, of the exact dimension of finished work and of the height of finished ceilings in all rooms where radiation, units, equipment or pipes are to be placed and arrange the work in accordance with the Schedule of Interior Finishes, as indicated on the Architectural Drawings.
- E. All exposed piping shall be run perpendicular and/or parallel to floors, interior walls, etc. Piping and valves shall be grouped neatly and shall be run so as to avoid reducing headroom or passage clearance. Provide min. 7'-6" headroom under passageway in mech. equip. room. All valves, controls and accessories concealed in furred spaces and requiring access for operation and maintenance shall be arranged to assure the use of a minimum number of access doors.
- F. All pipe lines made with screwed fittings must be provided with sufficient number of flanges or unions to make possible any taking down of the pipes without breakage of fittings.
- G. All piping shall be erected as to insure a perfect and noiseless circulation throughout the system. No bull head tees will be permitted.
- H. All valves and specialties shall be so placed as to permit easy operation and access.
- I. Provide proper provision for expansion and contraction in all portions of pipework, to prevent undue strains on piping or apparatus connected therewith. Provide double swings at riser transfers and other offsets wherever possible, to take up expansion. Arrange riser branches to take up motion of riser.
- J. Approved bolted, gasketed, flanges (screwed or welded) shall be installed at all apparatus and appurtenances, and wherever else required to permit easy connection and disconnection. Screwed unions shall be used on piping 2" or less.
- K. All piping connections to coils and equipment shall be made with offsets provided with screwed or welded bolted flanges so arranged that the equipment can be

serviced or removed without dismantling the piping.

- L. If, after plant is in operation, any coils or other apparatus are stratified or air bound (by vacuum or pressure), they shall be repiped with new approved and necessary fittings, air vents, or vacuum breakers at no extra cost. If connections are concealed in furring, floors, or ceilings, bear all expenses of tearing up and refinishing construction and finish, leaving same in as good condition as before it was disturbed.
- M. Fittings shall be of the eccentric reducing type, where changes of size occur in horizontal piping to provide for proper drainage or venting. Steel pipe bends shall be made of the very best grade open hearth, low carbon steel, leaving a smooth uniform exterior and interior surface. Pipe bends shall be made with seamless steel pipe, having a minimum radius of not less than five (5) pipe diameters.
- N. Tubing shall be erected neatly in a workmanlike manner. Bends in soft copper tubing benders to prevent deformation of the tubing in the bends. Approved seat-to-pipe threaded adapters shall be provided for junctions with valves and other equipment having threaded connections.
- O. Vertical sections of main risers shall be constructed of pipe lengths welded together. No couplings shall be used.
- P. The ends of all pipe and nipples shall be thoroughly reamed to the full inside diameter of the pipe and all burrs formed in the cutting of the pipes shall be removed.
- Q. Piping shall be installed in accordance with the latest edition of the ASME Code for Pressure Piping.
- R. All piping shall be concealed above furred ceilings in rooms where such ceilings are provided (except where specifically indicated otherwise on the drawings, or in walls or partitions, except as otherwise indicated).
- S. Dissimilar piping shall be connected with dielectric connector as made by Ebco Company or approved equal.
- T. Piping at all equipment and control valves shall be supported to prevent strains or distortions in the connected equipment and control valves. Piping shall be supported to allow for removal of equipment, valves and accessories with a minimum of dismantling and without requiring additional supports after these items are removed.
- U. Pipe nipples - Any piece of pipe 3" in length and less shall be considered a nipple. All nipples with unthreaded portion 1½" and less shall be extra heavy. Only shoulder nipples shall be used. No close nipples will be permitted.
- V. Screw threads shall be cut clean and true; screw joints made tight without caulking. No caulking will be permitted. A non-hardening lubricant shall be used. No bushings shall be used. Reductions, otherwise causing objectionable water

or air pockets, to be made with eccentric reducers or eccentric fittings.

- W. Pitch water piping upward one inch per 100 feet in direction of flow to ensure adequate flow without air binding, and to prevent noise and water hammer. Pitch drain piping c inch per foot in the direction of flow. Branch connections to mains are to be made in such a manner as to prevent air trapping and permit free passage of air. To meet job conditions, mains shall set up to maintain headroom, and clear other trades. Provide oversized float operated automatic air vent (with valve). Avoid 90 deg. lift set-ups in supply lines by using 45 degree ells. Where 90 deg. lifts exceed 12" install automatic air vent in supply lines. All lifts in return lines shall be installed with automatic air vents. Pipe outlet of all automatic air vents to an open sight drain if the vent is concealed, or to within two feet of the floor within machine rooms. All water piping shall pitch back to low points for drainage. Low points shall be provided with 3/4 inch hose cocks.
- X. Provide drain valves at the heel of all interior main water risers. Provide drain valves at the heel of all perimeter water risers.
- Y. Miscellaneous drains, vents, reliefs, and overflows from tanks, equipment, piping, relief valves, pumps, etc., shall be run to the nearest open sight drain or roof drain. Provide drain valves whenever required for complete drainage of piping, including the system side of all pumps.
- Z. Provide domestic water connections from valved outlets to any equipment requiring same.
- AA. All drain piping from condensate drain pans shall be properly trapped in accordance with the static pressures involved. Condensate drain piping sizes shall be not less than 1½".

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of piping (partial or complete) test piping to demonstrate compliance with requirements. Where possible, field correct malfunctioning piping, then retest to demonstrate compliance. Replace piping which cannot be satisfactorily corrected. Refer to Section - Testing and Adjustments.

END OF SECTION

SECTION 15830 - VALVES FOR MECHANICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all Valves as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of valves, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide valves produced by the manufacturers, which are listed in Section "Approved Manufacturer's List".
- C. Provide valves whose performance under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.5 GUARANTEE

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS

2.1 VALVES

- A. Valves- General: All valves shall be of a design which the manufacturer lists for the service and shall be of materials allowed by the latest edition of the ASME Code for pressure piping for the pressure and temperature contemplated, unless a higher grade or quality is herein specified. All valves shall be of the same manufacturer, except for special applications.
- B. The system shall be supplied with valves in all branch mains and risers, at all pumps, tanks, reducing and control valves, heating and cooling surfaces and at all apparatus; so located, arranged and operated as to give complete shut-off. Except

where flanged valves are used, each connection to equipment shall be made with screwed or flanged unions on the equipment or discharge side of the valve.

- C. All valves shall be installed with the best workmanship and are to have neat appearance and be arranged so that they are easily accessible.
- D. Each valve shall have the maker's name or brand, the figure or list number and the guaranteed working pressure cast on the body or stamped on the bonnet, or shall be provided with other means of easy identification.
- E. Check valves installed in the horizontal position shall be swing checks; valves installed in the vertical position shall be silent checks for 22" and above, and lift check for 2" and smaller, except that all check valves in pump discharges shall be silent checks.
- F. Provide blow-off valves at all strainers, and where shown on the Drawings.
- G. Provide valve operating chain on all gate, globe, butterfly and plug valves in Mechanical Equipment Rooms - 4" and larger, which are more than 7'-0" above the operating floor. Unit shall be complete with adjustable sprocket, chain and guide (Crane "Babbit" type). Provide hook to keep chain out of the way.
- H. Generally, all valves are to be of the gate type, except that globe valves shall be used for throttling services and on traps, and pressure reducing and control valve bypasses. Globe valves used on bypasses shall have monel metal mountings. Pumps shall have lubricating plug valves on discharge piping.
- I. All valves 2 inches in diameter and smaller shall be all bronze with bronze bodies. Valves 22 inches in diameter and larger shall have iron bodies with bronze mountings (except where otherwise noted).
- J. All flanged-end valves shall have renewable metal seat rings and discs. On gate valves these parts shall be of bronze, on all globe valves they shall be of bronze and suitable for throttling service.
- K. All screwed-end globe valves shall be of the union bonnet type with renewable teflon discs.
- L. All valves shall have their bonnets back-seated to provide for packing under pressure. All gate valves shall be of the solid tapered wedge type.
- M. Drain valves shall be provided on tanks, receivers, risers and where they may be required or necessary, for draining the lines and equipment. Drain valves or plug cocks shall be provided at the low points for proper drainage. Cocks and valves shall be provided with threaded ends for those connections.
- N. All valves up to 2 inches in diameter shall have screw ends, 22 inches in diameter and over shall have flanged ends. Valves 22" and larger which are non-rising stem, shall have position indicators.

- O. All bronze and iron valves shall be furnished with Teflon impregnated packing or approved equal.
- P. All handwheels shall be of malleable iron.
- Q. No Asbestos shall be used in construction of valves including the gaskets.
- R. All valves shall be of type and number as specified below: For all services, except as otherwise noted.

<u>TYPE</u>	<u>SIZE</u>	<u>CRANE NO.</u>	<u>JENKINS NO.</u>	<u>WALWORTH NO.</u>	<u>REMARKS</u>
Gate Valve	2" & Smaller	428UB	47U	2	150 lb. WSP, Bronze, Rising Stem
	2 1/2" & Larger	465-1/2	651C	726F	125 lb. WSP, Bronze Trimmed, Iron Body, OS&Y
Globe Valve	2" & Smaller	14-1/2P	546P	237P	300 lb. WSP, Bronze.
	22" & Larger	351	613C	906F	125 lb. WSP, Bronze Trimmed, Iron Body OS&Y
Angle Valve	2" & Smaller	16-1/2	558P	238P	300 lb. WSP, Bronze
	22" & Larger	353	907F		125 lb. WSP, Bronze Trimmed, Iron Body, OS&Y
Swing Check	2" & Smaller	137	409Z	406	150 lb. WSP, Bronze
	2 1/2" & Larger	373	624	M928F	125 lb. WSP, Bronze Trimmed, Iron Body.
Silent Check	All Sizes	---	---	---	Williams-Hager, Fig. 636, 125 WSP, Semi-steel.
Drain Valves	2" & Smaller	451 (2/4" size only)	372N	24	200 lb. OWG, non-rising stem, Hose end, Bronze with Bronze Cap & Chain

2.2 VALVES IN COPPER TUBING

- A. Except where otherwise noted, all valves for use with copper tubing shall be as follows:

<u>TYPE</u>	<u>SIZE</u>	<u>CRANE NO.</u>	<u>JENKINS NO.</u>	<u>WALWORTH NO.</u>	<u>REMARKS</u>
Gate Valve	2" & Smaller	1320			125 lb. WSP, Bronze
	3" & Larger	----	1240	4-SJ	300 lb. Nonshock CW Bronze with solder joint adapter
	22" & Larger	428	----	55	
Globe Valve	2" & Smaller	1310	----		125 lb. WSP, bronze
	2 1/2" & Larger	----	1200	95-SJ	300 lb. Nonshock CW Bronze with solder joint adapter
Angle Valve	2" & Smaller	1311	----		125 lb. WSP, Bronze
	2 1/2" & Larger	----	1202	----	300 lb. Nonshock CW Bronze with solder joint adapter
Swing Check	2" & Smaller	1303	----	406SJ	125 lb. WSP, Bronze
	2 1/2" & Larger	----	1222	406	300 lb. Nonshock CW Bronze with solder joint adapter
Balancing Valves	All sizes				See Balancing Cocks

2.3 LUBRICATED PLUG VALVES

- A. Full port opening tapered plug suitable for lubrication under service pressure with plug in any position.
- B. Lubricating Guns:
1. One for every 10 valves.

2. Extra heavy, lever type, hydraulic hand gun.
3. 15,000 psi gauge and 12" long connection hose.
4. Similar to Walworth #1699 or approved equal.

C. Lubricant:

1. Manufacturer's recommendations.
2. One year supply, each valve.

D. Operators:

1. 4" to 6", wrench, except as noted.
2. Wrench set for each size valve.
3. Wrench for every 10 valves, each size
4. 8" and larger: gear operated.
5. Permanently installed handwheel.

2.4 VALVE CONSTRUCTION

- A. Piping less than 100 psi: 200# WOG Class, cast iron body.
- B. Piping 100 psi to 250 psi: 500# WOG Class, cast iron body.
 1. 4" and larger: flanged, USAS 250#.
- C. Piping over 250 psi: 720# WOG Class, carbon steel body.
 1. Up to 2": screwed
 2. 22" and larger: flanged, USAS 300#.
 3. Similar to following: Walworth figure numbers:

<u>Class</u>	<u>4"</u>	<u>5" & 6"</u>	<u>8" & 12"</u>	<u>14" up</u>
200#	1700F	1705F	1727F	1703F
500#	2720F	2721F	2721F	2723F
720#	1760F	1761F	1764F	1764F

2.5 BALANCING COCKS

A. Square head, similar to Walworth Co.

1. Up to 2"
 - a. Bronze
 - b. Screwed
 - c. 125 psi WSP Class; similar to Fig. 554.
 - d. 250 psi WSP Class; similar to Fig. 576.
2. 2 1/2" and 3"
 - a. Iron body similar to Walworth Co.
 - b. Screwed
 - c. 125 psi WSP Class; similar to Fig. 651.
 - d. 250 psi WSP Class; similar to Fig. 671.
3. 4" and above: provide flanged lubricated plug valves.

2.6 BALL VALVES

- A. Ball Valves up to 2" may be used for all water services as an alternate to gate valves, globe valves and balancing cocks.
- B. Ball valves shall be bronze body, bronze ball and stem, Teflon seats and seals threaded ends, 400 psig cold W.O.G. Worchester No. 411T-SE or equal. "APOLLO" 70 - 100 Series.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where valves are to be installed and determine space conditions and notify architect in writing of conditions determined to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install valves where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that valves comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interfere installation of valves other components of systems.

END OF SECTION

SECTION 15840 - SHEET METAL DUCTWORK**PART 1- GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all exposed and concealed Sheet Metal Ductwork as shown on the drawings and hereinafter specified.
- B. All exposed ductwork to be neat, clean with internal acoustic/thermal liner as specified herein.

1.3 QUALITY ASSURANCE

- A. Fabrication and installation shall be by a single firm specializing and experience in metal ductwork for not less than 3 years.
- B. Comply with SMACNA (Sheet Metal and Air Conditioning Contractors National Association) recommendations for fabrication, construction and details and installation procedures, except as otherwise indicated.
- C. Comply with ASHRAE (American Society of Heating Refrigeration and Air Conditioning Engineers) recommendations, except as otherwise indicated.
- D. Compliance to SMACNA and ASHRAE is a minimum requirement. In case of disagreement between sheet metal work described in this Section and SMACNA or ASHRAE, the specification shall govern.
- E. Comply with all relevant provisions of AHRAE 90.1-2004.
- F. Ducts and plenums shall be sealed in accordance with ASHRAE 90.1-2004 Table 6.4.4.2 A, as required to meet the requirements of 6.4.4.2.2 and with standard industry practice.

1.4 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical work and submit shop drawings and coordinate drawings.
- B. Provide description of duct sealing.
- C. Show fabrication, assembly and installation details, including duct liners, duct accessories, hangers and supports.
- D. Upon completion, submit all testing results required per section 3.4.

1.5 COORDINATION

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

1.7 PRODUCT HANDLING

- A. Protect shop fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Protect ends of ductwork and prevent dirt and moisture from entering ducts and fittings.
- B. Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclosed with waterproof wrapping.

1.8 MOCKUP

- A. Before installing duct systems, build mockups of ductwork representing pressure classes higher than 1-inch wg. Build mockups to comply with the following requirements, using materials indicated for the completed work, and include each of the following features and fittings:
 1. Five transverse joints.
 2. Three longitudinal seams
 3. One access door.
 4. Two typical branch connections, each with at least one elbow.
 5. Two typical flexible duct or flexible connector connection for each duct and apparatus.
 6. One section of acoustically lined ductwork.
 7. One ten-foot section of rectangular and circular ductwork, with acoustical liner or insulation, supports and hangers.
 8. One sound trap connected to lined ductwork at each end.
 9. Approved mockups may become part of completed work, if undisturbed at time of substantial completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR DUCTWORK

- A. Furnish and install the size, connections and run of ducts as indicated on the drawings.
- B. While the Drawings shall be adhered to as closely as possible, the Commissioner's right is reserved to vary the run and size of ducts during the progress of the work if required to meet structural conditions.

- C. Install all ductwork in strict adherence to the ceiling height schedule indicated on the Architect's Drawings. Consult with the Electric and Plumbing Contractors, and in conjunction with the above Contractors, establish the necessary space requirements for each trade.
- D. The sheet metal ductwork shall, whether indicated or not, rise and/or drop and/or change in shape to clear any and all conduits, lighting fixtures, plumbing and heating mains to maintain the desired ceiling heights. And to provide adequate maintenance room and headroom in mechanical equipment rooms.
- E. The ductwork shall be continuous, with airtight joints and seams presenting a smooth surface on the inside and neatly finished on the outside. Ducts shall be constructed with curves and bends so as to effect an easy flow of air. Unless otherwise shown on the Drawings, the inside radius of all curves and bends shall be not less than width of ducts in plane of bend.
- F. All rectangular ductwork, unless otherwise noted, shall be built from galvanized sheet steel and thoroughly braced and stiffened.

2.2 INSTALLATION OF HVAC DEVICES

- A. Installation of Smoke Detectors: Smoke detectors shall be furnished by the Electrical Sub-Contractor and shall be installed in ductwork under this Section. Provide access door to each smoke detector.
- B. Installation of Dampers: Refer to Drawings and temperature control specification for smoke dampers and other automatic dampers and install them in ductwork.
- C. Installation of variable air volume system control devices: Install in sheet metal ductwork all control devices furnished by the manufacturer of the variable air volume system controls. Provide an access door at each such location.

2.3 DUCT FABRICATION

- A. Ducts shall be neatly finished on the outside with all sharp edges removed.
- B. Inside surfaces shall be smooth with no projections into the air stream except where otherwise indicated.
- C. Longitudinal joints shall be Pittsburgh lock at corners or Acme lock on flat surfaces double seams hammered tight and shall be located above the horizontal axis of the duct. A snap lock seam shall not be permitted as a substitute for the Pittsburgh lock at corners of ducts.
- D. Transverse joints shall be made airtight with all laps in the directions of air flow.
- E. All fasteners and attachments shall be made of the same material as the ducts.
- F. Furnish test wells 12" on the center horizontally and vertically in the suction and discharge duct of each fan. Test wells shall consist of a 1" x 3/4", 125 lb., bronze,

screwed hex bushing, secured to the duct with a bronze hex locknut on the inside of the duct. A ¾" x 2" long standard weight bronze, screwed nipple and cap shall be fitted to the housing on the outside of the duct. Test wells shall be No. 699 as made by Ventlok or approved equal.

- G. All radius elbows shall have a minimum centerline radius of 1½ times the width of the duct.
- H. All square elbows shall have factory-designed and built single thick turning vanes. Shop fabrication vanes will not be approved. Where turning vanes are in conflict with the access doors to fire dampers. They shall be made movable, so that fire dampers, shall be accessible.
- I. Dissimilar metals shall be connected with flanged joints made up with fiber or neoprene gaskets to prevent contact between dissimilar metals. Flanges shall be fastened with bolts protected by ferrules and washers made of the same materials as the gaskets. Where an aluminum duct is to be connected to a galvanized steel duct, the end of the galvanized steel duct shall be coated with heavy black asphaltum paint before connecting it to the aluminum duct, except in exposed locations.
- J. Changes in shape and dimension shall conform to the following: Except where otherwise noted, for increases in cross-sectional area, the shape of the transformation shall not exceed 1" in 7". Except where otherwise noted, for reductions in area, the slope shall not be less than 1" in 4" but 1" in 7" preferred.
- K. Wherever it may be necessary to make provisions for vertical hangers of the ceiling construction passing through ducts, provide streamlined shaped sleeves around such ceiling construction hangers as to fully protect the duct from being punched with holes for the passage of such hangers. Any such streamlined sleeves shall be made air tight at top and bottom of ducts. In no case shall there be more than two rods in any 9 sq. ft. area. No rods shall pierce ducts smaller than 12" in horizontal area. All such penetrations must be approved in advance by the Commissioner.
- L. The construction of sheet metal ducts as per SMACNA Manual "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.
- M. Galvanizes Steel Sheets: Lock forming quality; complying with ASTM A 653/A 653M and having G60 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

2.4 PREFABRICATED ROUND DUCT AND FITTINGS

A. Round, Longitudinal and Spiral Lock-Seam Ducts: Prefabricated supply ducts and fittings of galvanized steel, according to SMACNA's HVAC Duct Construction Standards-Metal and Flexible." Prefabricated connection system consisting of double-lipped, EPDM rubber gaskets. Manufacture ducts according to connection systems manufacturers' tolerances.

B. Basis of Design Product: Subject to compliance with requirements, provide McGill Uni-Seal or a comparable product by Ductmate Industries, Inc., Lindab Inc., or McGill AirFlow Corporation.

C. Prefabricated Duct Joints:

1. Ducts up to 20 inches in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.
2. Ducts 21 to 72 inches in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges in sealant and one external closure band with gasket.

D. Ducts shall be provided in continuous, unjoined lengths whenever possible. Except when interrupted by fittings, round spiral duct sections shall not be less than 12 feet long.

E. Prefabricated 90-degree Tees, Laterals and Conical Tees: Comply with SMACNA's HVAC Duct Construction Standards-Metal and Flexible," with metal thicknesses specified for longitudinally-seam straight ducts.

F. Prefabricated Diverging-Flow Fittings: Provide with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.

G. Prefabricate elbows using die-formed, gored, pleated or mitered construction. Bend radius of die-formed, gored or pleated elbows shall be 1-1/2 times duct diameter.

2.5 DAMPERS

A. At each main branch take-off and in such other locations where required to properly balance the low pressure system, furnish and install volume dampers of the opposed blade, multi-louvered type, which shall be operated by indicating quadrants and set screws, for adjusting the system.

B. Volume dampers shall be constructed as follows: Damper blades shall not be wider than 12", shall be complete with heavy angle iron frames, connecting and operating links, brass trunnions, and bronze bearings. Dampers, unless otherwise noted, shall be fabricated with not less than No. 16 gauge sheet steel. Blades shall overlap and shall be provided with continuous stops on all four sides of dampers to prevent leakage. Blades shall be galvanized. Blades of dampers shall be set into a flat steel frame with frame securely bolted to the duct. All dampers shall be fitted with a hexagonal brass spindle which shall extend through the exterior of duct and be fitted with an indicating self-locking regulator. Regulator shall be similar to Ventlok 641 or approved equal. All hardware shall

be Ventlock or approved equal For insulated ductwork provide No. 644 self-locking regulator as made by Ventlok or approved equal.

- C. All automatic dampers shall be furnished as a part of the automatic temperature control system by the automatic temperature control manufacturer. Install dampers and provide safing in ductwork for automatic dampers smaller than duct size.
- D. For stainless steel, copper and aluminum ductwork provide dampers of same material as ductwork.
- E. All dampers shall be made accessible from building construction. Access doors in building structure shall be furnished or provided as herein before specified.

2.6 FIRE DAMPERS

- A. Fire dampers and sleeve installation shall be in accordance with NFPA-90A recommendations and shall bear U.L. Label in compliance with U.L. 555.
- B. Clearly indicate fire damper location on shop drawings. Provide access doors in the ducts and furnish access doors or panels at building construction at each damper of sufficient size and type to permit inspection and replacement of linkage. Assume responsibility to coordinate all locations of duct access doors with the General Contractor to conform with whatever architectural access openings may be necessary and furnish access doors or panels in building construction. Provide shop drawings indicating location of access panels or doors for Architect's approval.
- C. It is the intention of these plans and specifications to be complete. However, it is the responsibility of this Section, as being completely cognizant of local regulations, to determine where fire dampers are required and to advise the Architect prior to construction as to any discrepancies or questions in the plans or specifications.
- D. Fire dampers shall be enclosed in sleeve of twelve gage metal set and grouted into fire partitions. Sleeve shall be secured at both sides of fire partitions with 1½ x 1½ x ¼ ga. mounting angles secured to sleeves only. Provide duct breakaway connections, see detail on drawings.
 - 1. Fire dampers shall be "Fire Seal" as made by Air Balance, Inc. or approved equal, U.L. labeled.

Used For

Rectangular or Square
Ductwork

Fire Damper

Type C
Model 119-CL
or as detailed on the drawings

Type C

Round Duct

Model 119-CL
or as detailed on the drawings.

In stainless steel ductwork, provide stainless steel construction fire dampers similar to Fire Seal Model 119D.

2.7 ACCESS DOORS IN SHEET METAL WORK

- A. Wherever necessary in ductwork, casings or sheet metal partitions, provide suitable access doors and frames to permit inspections, operation and maintenance of all valves, coils, humidifiers, controls, smoke dampers, smoke detectors, fire dampers, filters, bearings, traps, or other apparatus concealed behind the sheet metal work. All such doors shall be of double construction of not less than No. 20 gauge sheet metal and shall have sponge rubbergaskets around their entire perimeter. Doors in insulated ducts of insulated casings shall have rigid fiberglass insulation between the metal panels.
- B. All access doors in sheet metal ducts shall be hung on heavy flat hinges and shall be secured in the closed position by means of cast zinc clinching type latches. Where space conditions preclude hinges, use four heavy window type latches. Doors into ducts shall in general not be smaller than 18" x 18" except for access door to fire dampers which will depend on size of fire damper.
- C. In no case shall access to any items of equipment requiring inspection, adjustment, or servicing require the removal of nuts, bolts, screws, wing nuts, wedges, or any other screwed or loose device.
- D. Each sheet metal chamber shall have access doors for access to all parts of the system. Doors shall be fitted with cast zinc door latches, two per door. Latches shall be operable from both sides of casing. Hinges shall be extra heavy, zinc plated hinges, minimum of two per door. The doors shall be felted or provided with rubber gaskets so as to make them airtight. The doors shall be made with inner and outer shells 2 inches apart so that they may be properly insulated and properly operated. Doors shall be a minimum size of 20" x 48".
- E. Hinges shall be Ventlok No. 150 or 260 with or without screw holes or approved equal. Latch for walk-in access doors shall be No. 260 as made by Ventolk Co. or approved equal. Latch for access door in ductwork shall be Ventlok No. 100 or approved equal.

2.8 FLEXIBLE CONNECTIONS

- A. All fan and air supply unit connections, both at inlet and discharge shall be made with material as hereinafter specified, so as to prohibit the transfer of vibration from fans to ductwork connecting thereto.
- B. The flexible connections shall be a minimum of 12" long including bands using extra wide fabric as specified and held in place with heavy metal bands, securely attached, to prevent any leakage at the connection points.
- C. Flexible connections shall be fabricated from the following materials unless

otherwise required by Local Authorities.

1. Neoprene coated glass fabric
- 30 ounce/sq. yd.

D. Flexible connections shall not be painted.

2.9 AIR INTAKE AND DISCHARGES

A. Air intake and discharge louvers and screens in the facade of the building shall be furnished and installed under another contract.

2.10 GRILLES, REGISTERS AND DIFFUSERS

A. Furnish and install where shown on the drawings all metal diffusers, grilles and registers of the sizes and capacities indicated.

B. Ceiling diffusers shall be selected to diffuse the air uniformly throughout the occupied space. The air shall be introduced at a temperature differential of 20EF and shall be diffused at the five (5) foot level to a velocity of not greater than 50 FPM and a temperature differential of not greater than 2EF when compared with mean room temperature. The sound power level of air distribution equipment devices shall not exceed ratings as shown by Anemostat Corp. data.

C. Equipment manufacturer shall submit engineering data in a manner to facilitate convenient review of the following factors:

1. Aspiration ability, including temperature and velocity traverses, throw and drop of each unit, noise criteria ratings for each unit, sizes, free area and quality of construction.

D. All air distribution equipment shall be as manufactured by Anemostat Corp., or approved, as scheduled on plans.

E. All ceiling diffusers shall be furnished with a device or devices equalize the air flow and control the volume.

F. Location of ceiling diffusers and registers shown on the drawings are approximate. Coordinate with the acoustic tile ceiling Sub-Contractor for exact locations of ceiling diffusers and registers. They shall be in accordance with approved ceiling layout shop drawings.

G. Return grilles shall match return registers with the damper omitted. Anemostat Corp. Type SS-3HD or approved equal.

H. All registers, grilles and diffusers shall be coated with baked aluminum enamel, baked flat white (W-1), or baked gloss white (W-4) as supplied by Anemostat Corp. unless otherwise indicated. All supply registers and grilles shall have a ¼" sponge rubber gasket around the grille frame.

I. Exceptions to foregoing types of grilles, registers and diffusers shall be as

indicated on the plans.

- J. Each air supply outlet shall have the required capacity and shall be guaranteed to give the required draft with draftless diffusion. Where manufacturer's recommendations require duct sizes differing from those on the drawings, the same shall be provided at no additional cost to the Owner.
- K. All grilles, registers and diffusers must be tested under ADC standards and carry and ADC seal of approval.
- L. All registers and grilles located at face of partitions or plaster line of ceilings or soffits, etc. shall have plaster frames, Anemostat R C or approved equal.
- M. Relocations of ceiling diffusers or registers in order to match the ceiling tile layout shall be made at no additional cost to Owner.

2.11 SOUND TRAPS

- A. Furnish and install sound traps of the types and sizes shown on plans.
- B. Outer casings of rectangular sound traps shall be made of 22 gauge steel in accordance with ASHRAE Guide recommended construction for high pressure rectangular ductwork. Seams shall be lock formed and mastic filled.
- C. Interior partitions for rectangular sound traps shall be made of 24 gauge galvanized perforated steel.
- D. Filler material shall be of inorganic mineral or glass fiber of a density sufficient to obtain the specified acoustic performance and packed under not less than 5% compression to eliminate voids due to vibration and settling. Material shall be inert, vermin and moisture proof.
- E. Combustion rating for the sound trap acoustic fill shall be not less than the following, when tested in accordance with ASTM E84, NFPA Standard 255 or UL NO. 723:

Flamespread Classification	20
Smoke Development Rating	20
Fuel Contributed	15 - 30
- F. Airtight construction shall be used, and sound traps shall be leakproof when subjected to a differential air pressure of 8" w.g. inside to outside of the sound trap casing.
- G. Sound trap ratings shall be determined in a duct-to-reverberant room test facility which provides for air flow through the sound trap during rating. The test setup and procedure shall be such that all effects due to end reflection, directivity, flanking transmission, standing waves, and test chamber sound absorption are eliminated. Acoustic ratings shall include dynamic insertion loss and self-noise power levels both at 2,000 fpm face velocity as per schedule on the Drawings.

- H. Static pressure loss of sound traps shall not exceed those listed in the schedule at the air flow indicated. Air flow measurements shall be made in accordance with applicable portions of ASME, AMCA and ADC air flow test codes.
- I. The manufacturer shall supply with submittals certified test data on dynamic insertion loss, self-noise power levels, and aerodynamic performance. Test data shall be for a standard product having not less than 24" x 24" cross section. All rating tests shall be conducted in the same facility, shall utilize the same sound traps and shall be conducted sequentially. The certifying laboratory shall be open to inspection upon request from the architect. Provide flanges at both ends of sound traps 1½" x 1½" x c thick.
- J. Sound traps lining shall meet with erosion test method described in U.L. No. 181 and shall be suitable for Hospital use.

2.12 ACOUSTICAL PERFORMANCE SPECIFICATIONS - GENERAL

- A. It is the intent of this Specification that noise levels due to air conditioning and/or ventilating equipment, ducts, grilles and registers, diffusers and air light fixtures, will permit attaining sound pressure levels in occupied spaces conforming to the following NC curves as explained in the ASHRAE Guide and Data Book.

All Space NC-35

- B. Grilles, Registers, Diffusers

- 1. The maximum permissible sound power levels of air terminal devices when installed and operating per plans and specifications shall be as follows:

Maximum PWL re 10-12 Watts

<u>Octave Band</u>	<u>NC-35</u>
1	64
2	56
3	49
4	46
5	43
6	42
7	41
8	42

- C. Sound Power Levels shall be tested in accordance with ASHRAE Standard 36-72.

2.13 ACOUSTICAL PERFORMANCE WITHIN EQUIPMENT SPACES

- A. Equipment room noise levels and noise transmission to adjacent buildings shall comply with all Federal, State, and City Noise Ordinances.

B. Motor Acoustical Performance:

1. Motor drives for pumps and refrigerator machine when installed per plans and specifications shall operate with noise levels not to exceed 80 dbA.
2. Noise levels shall be determined in accordance with IEEE Standard #85 test "procedure for Air-Borne Noise Measurements on Rotating Electric Equipment".

2.14 DUCT LINING

A. Prefabricated Round Duct Lining

1. Basis of design Product: Subject to compliance with requirements, provide McGill round lined ductwork or approved equal.
2. Provide round metal ductwork with the McGill Acosuti-Line round acoustical/thermal duct liner system, or approved equal.
3. The duct liner shall have a thermal resistance (R-value) of 4/3 at 75 degrees F mean temperature, and noise reduction coefficients (NRC) per ASTM C423, type "A" mounting, as listed:
 - a. P-Liner – 0.70.
 - b. K-Liner – 0.80.
4. Metal ductwork with inside diameter of 8 inches to 18 inches shall be lined with 1-inch thick P-Liner.
5. Metal ductwork with inside diameters from 18 inches to 72 inches shall be lined with 10-foot lengths of 1-inch-thick K-Liner.
6. The duct liner shall be factory-coated with a black acrylic polymer that is formulated with an immobilized, EPA registered anti-microbial agent.
7. The coating shall be in conformance to the requirements of NFPA 90A and 90B for FHC 25/50 and limited combustibility.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where ductwork is to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF DUCTWORK

- A. Install ductwork in accordance with recognized industry practices, to ensure that ductwork complies with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation or ductwork with other components of systems.
- C. Duct sizes shown on the drawings at connection to fans or other equipment may vary in actual installation. Contractor shall provide transition pieces as required.

- D. Ducts, casings and hangers shall be installed straight and level and shall be free of vibration and noise when fans are operating.
- E. Ducts at ceilings shall be suspended from inserts in concrete slabs except where otherwise indicated. Inserts shall be Grinnel Fig. 279, 282, or 152 as required. Ducts at floor shall be supported by steel angles suitably anchored to floor construction. Each duct shall be independently supported and shall not be hung from or supported by another duct, pipe, conduit or equipment of any trade.
- F. Supports shall be placed at each joint and change in direction up to a maximum spacing of 8 feet on centers. Prevent buckling of ductwork.
- G. All fastenings to building structure shall be adequate to insure permanent stability of sheet metal work and shall be capable of resisting all applied forces.
- H. Vertical ducts in shafts or passing through floors shall be supported by steel angles or channels, welded, riveted, screwed or bolted to ducts and fastened to building structural members at each floor level. Provide safining to close all floor openings around ductwork - pack annular space with rockwool and 18 gauge sheet metal safining. Floor openings in plenums shall have ½ inch diameter steel bars.
- I. Rigid connections between ductwork and non-rotating equipment shall be made with flanged joints, sealed with fireproof material (Fiber or Neoprene gaskets).
- J. It is the intent to obtain low pressure ductwork construction with minimum leakage. The construction noted in Specifications can produce low or high leakage rates, depending upon the workmanship, particularly with regard to the connection at the top of the ducts. Guarantee that total diffuser volume, measured by means of velometer, shall be at least 95% of actual fan supply (measured by means of a duct traverse taken with a Pitot tube and water manometer). Seal the ductwork at joints with suitable sealers 3M EC-800 and tape. Use of "HARDCAST" or any other material is subject to Commissioner's approval.

3.3 DUCT HANGERS

- A. Ducts up to 24" on a side or up to 20" diameter shall be suspended with 16 gauge, galvanized strap hangers, 1" wide.
- B. Ducts 25" to 40" on a side or 21" to 40" diameter shall be suspended with galvanized strap hangers 1" wide by c" thick.
- C. Strap hangers shall be bent 90°, extended down sides of ducts and turned under bottom of ducts a minimum of 2". Strap hangers shall be fastened at ceiling with nuts, bolts and lock washers and to sides and bottom of ducts with sheet metal screws.
- D. Ducts 41" and larger on a side or diameter shall be suspended with eighter rod or angle type hangers.

- E. Rod type hangers shall be 3/8" diameter black steel rods threaded at both ends and bottom bracing angles on ducts, with nuts and lock washers.
- F. Angle type hangers shall be extensions of side bracing angles on ducts, bent 90° at ceiling and fastened with nuts, bolts and lock washers.
- G. Hangers for vertical ducts shall be as per SMACNA Duct Manual.
- H. Stainless steel ductwork shall be supported with rod or angle type hangers, so that there will be no penetration of the stainless steel ducts.
- I. Exposed ductwork shall be hung from galvanized steel, ¼ inch minimum diameter rods for lengths of 36" or less; 3/8"-inch minimum diameter for lengths longer than 36 inches. Exposed round ductwork shall be hung from top of duct in a even hanger pattern.

3.4 TESTING

- A. All ducts designed to operate at static pressures in excess of 3 inches water column shall be tested in accordance with industry accepted test procedures, of at minimum of 25% of the representative sections, in accordance with ASHRAE-90.1-2004 6.4.4.2.2. Submit all testing results.

3.5 CLEANING AND PROTECTION

- A. Clean ductwork internally, unit by unit as it is installed of dust and debris. Clean external surfaces of foreign substances, which might cause corrosion, deterioration of metal or interfere with painting.
- B. At end of ducts which are not connected to equipment or air distribution devices at the time of ductwork installation, provide temporary closure of polyethylene film or other covering.
- C. Cleaning of new and existing supply ductwork in existing buildings. After completion of ductwork installation clean ductwork as follows:
 - 1. Cover all supply registers and diffusers with oil cheese cloth.
 - 2. Use supply fan or install temporary fan to provide air to the system for four (4) hours.
 - 3. Remove oil cheese cloth.

END OF SECTION*

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SECTION 15850 - INSULATION FOR MECHANICAL WORK**PART 1- GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes furnishing and installing all labor, materials, equipment, accessories and services necessary to provide Piping, Ductwork and Equipment Insulation installation, which is complete in every respect and of the composition and quality as shown on the Drawings and hereinafter specified.

1.3 PIPE INSULATION

- A. The following pipes shall not be insulated. Insulate all other piping:
 - 1. Automatic air vent drain pipes.
 - 2. Drain pipes embedded in concrete.
 - 3. Drain piping from safety relief valve drip pan elbows.
 - 4. Instrument air piping.

1.4 DUCTWORK INSULATION

- A. Insulate all ductwork except the following portions of ductwork:
 - 1. All exhaust ductwork, except where otherwise noted.
 - 2. Return air ductwork passing through air conditioned space and/or hung ceiling of air conditioned space.
 - 3. Exposed supply and return air ducts in air conditioned spaces if same supply air duct serves that area only.

1.5 QUALITY ASSURANCE

- A. "Installer": A firm with at least three 3 years successful installation experience on projects with piping and ductwork insulation similar to that required for this project.
- B. All insulation shall have composite (including insulation jacket or facing and adhesive) fire and smoke hazard ratings as tested by procedure ASTM E-84,

NFPA 255 and UL 723 not exceeding:

- 1. Flame Spread..... 25
- 2. Smoke Developed..... 50
- 3. Fuel Contributed..... 50

- C. Accessories such as adhesives, mastics, cements, tapes and cloths for fittings shall have component ratings as listed above. All products shall bear UL labels indicating the above are not exceeded.
- D. Provide certifications or other data as necessary to show compliance with these Specifications and governing regulations. Include proof of compliance for test of products for fire rating, corrosiveness, and compressive strength.
- E. Provide products produced by the manufacturers which are listed in Section "Approved Manufacturers List".

1.6 SUBMITTALS

- A. Refer to Section 15000 - "Special Requirements for Mechanical and Electrical Work", and submit shop drawings and samples.

1.7 GUARANTEE

- A. Refer to Section 15000 - "Special Requirements for Mechanical and Electrical Work".

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation; remove from project site.
- B. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp, or label, affixed showing fire hazard ratings of the products.
- C. Store insulation in original wrappings and protect from weather and construction traffic.

PART 2- PRODUCTS

2.1 COLD AND DUAL TEMPERATURE PIPING INSULATION

- A. The following piping shall be covered with fiberglass insulation with vapor barrier of following thickness:

<u>Service</u>	<u>Thickness</u>
Chilled Water Supply & Return Up to 5"	1"

Hot-Chilled (Dual Temperature) Water Supply & Return	1"
Chemical Treatment (Hot Water, Chilled Water)	1"
Cold Water Make-Up and Air Conditioning Unit Drains	
Up to 2" pipe	½"
Above 2½"	1"

- B. Insulation shall be glass fiber with a maximum K factor of 0.23 at 75°F mean temperature with factory-applied all service vapor barrier jacket. Density shall be not less than 3 lbs. per cubic foot.
- C. Insulation shall be heavy density fiberglass sectional pipe insulation as made by Owens-Corning Fiberglas Corp. or CSG's "Snap-On" or Manville "Flame-Safe" fiberglass insulation.
- D. ASJ longitudinal lap and 4 inch wide vapor barrier joint sealing strips shall be adhered with Benjamin Foster fire-resistant vapor barrier lap adhesive BF 85-75, or equal. Ends of pipe insulation shall be sealed off at all flanges, fittings, valves and at intervals of 21 feet on continuous runs of pipe, with Benjamin Foster fire-resistant vapor barrier coating BF-30-35 or equal.
- E. All fittings, valves and flanges for pipe sizes smaller than 4" shall be insulated with molded fiberglass fittings of same thickness as the adjoining pipe insulation, secured with No. 20 gauge galvanized annealed steel wire and coated with ¼" thick finishing cement, J-M No. 375. Zeston 25/50 PVC as made by Manville, is approved.
- F. All fittings, valves and flanges for pipe sizes 4" and larger shall be insulated with fabricated mitered segments of pipe insulation of same thickness as the adjoining pipe insulation, secured with No. 20 gauge galvanized annealed steel wire and coated with ¼" thick finishing cement. "Smooth Coat" by Insulation Industries. Zeston 25/50 PVC fitting covers as made by Manville is approved.
- G. All coated molded fittings and mitered segments shall be vapor sealed with a layer of J-M Duramesh 207, or equal, open weave glass fabric embedded between two 1/16" thick coats of Benjamin Foster 30-35 and lap seal at least 1" for molded type and 2" for mitered type on itself and adjoining insulation.
- H. All fittings, valves and flanges exposed to view shall be additionally finished with J-M A-2070 fitting cloth or equal, smoothly adhered and coated with Benjamin Foster 30-36 and lap as described above.
- I. Direct contact between pipe and hanger shall be avoided. Hanger shall pass outside of a metal saddle which shall cover a section of high density insulation (such as calcium silicate) of sufficient length to support pipe without crushing insulation. Hangers shall not pierce insulation and all vapor barriers shall be

unbroken and continuous.

- J. At pipe supports insulation shield protection saddles and matching hanger shall be used.
- K. All strainers for chilled water and insulated condenser water piping shall be insulated and boxed in with galvanized sheet metal cover, and insulation shall be made removable.

2.2 HOT PIPE INSULATION

- A. The following piping shall be covered with fiberglass insulation:

<u>Service</u>	<u>Thickness</u>
Hot Water Supply and Return	
Up to 2"	1 ½"
2½" and above	2"

- B. Insulation shall be glass fiber with a maximum K factor of 0.23 at 75E F mean temperature. Density shall be not less than 3 lbs. per cubic foot. Insulation shall be suitable for 650EF (2" minimum thickness above 450EF).
- C. Insulation shall be heavy density sectional pipe insulation as made by Owens-Corning Fiberglas Corp., or CSG's "Snap-On" or Manville "Flame-Safe" Fiberglass insulation.
- D. Longitudinal jacket laps and butt strips shall be smoothly secured with Benjamin Foster 25-20 adhesive or equal.
- E. All fittings, valves and flanges for pipe sizes smaller than 4" shall be insulated with molded fiberglass fittings of same thickness as the adjoining pipe insulation, secured with No. 20 gauge galvanized annealed steel wire and coated with ¼" thick finishing cement, J-M No. 375, or equal. Zeston 25/50 PVC fittings as made by Manville is approved.
- F. All fittings, valves and flanges for pipe sizes 4" and larger shall be insulated with fabricated mitered segments of pipe insulation of same thickness as the adjoining pipe insulation, secured with No. 20 gauge galvanized annealed steel wire and coated with ¼" thick finishing cement. Smooth coat as made by Insulation Industries. Zestow 25/50 PVC is approved.
- G. All fittings, valves and flanges exposed to view shall be additionally finished with J-M A-2070 insulating fitting cloth or equal smoothly adhered and coated with Benjamin Foster 30-36. Lap to be at least 1" on pipe insulation below 4" and 2" on sizes 4" and above.
- H. Insulation shall be protected by saddles from hangers, guides and rollers.
- I. Strainers on hot pipes shall not be insulated.

2.3 PVC INSULATED FITTING COVERS

- A. The Contractor shall have option to use Zeston 25/50 rated PVC covers as made by Manville or approved equal.
- B. Hot Systems: Fittings shall be insulated by applying the proper factory precut Hi-Lo Temp insulation insert to the pipe fitting. The ends of the Hi-Lo Temp insulation insert shall be tucked snugly into the throat of the fitting and the edges adjacent to the pipe covering tufted and tucked in, fully insulating the pipe fitting. PVC fitting cover is then applied and shall be secured by tack fastening, banding or taping the ends to the adjacent pipe covering.
- C. On fittings where the operating temperature exceeds 250°, 2 or more layers of the Hi-Lo Temp insulation inserts shall be applied prior to the installation of the PVC fitting cover. The first layer shall be applied with a few wrappings of fiber glass yarn to eliminate voids or hot spots.
- D. Cold Systems: Fittings shall be insulated by applying the proper factory precut Hi-Lo Temp insulation insert to the pipe fitting. The ends of the Hi-Lo Temp insulation insert shall be tucked snugly into the throat of the fitting and the edges adjacent to the pipe covering tufted and tucked in, fully insulating the pipe fitting.
- E. A vapor barrier mastic compatible with the PVC shall be applied around the edges of the adjoining pipe insulation and on the fitting cover throat overlap seam. The PVC fitting cover is then applied and shall be secured with pressure sensitive pearl gray Z-Tape along the circumferential edges. The tape shall extend over the adjacent pipe insulation and have an overlap on itself at least 2" on the downward side.
- F. 2 or more layers of the Hi-Lo Temp insulation inserts shall be applied with the first layer being secured with a few wrappings of fiberglass yarn.
- G. Refrigerant systems and cold systems in severe ambient conditions: Fittings shall be insulated to a full thickness the same as the adjacent pipe insulation, with insulation which has been mitered to conform to the PVC fitting cover. An intermediate vapor barrier compatible with the PVC shall be applied, completely sealing the insulation and on the fitting cover overlap seam. The PVC fitting cover is then applied and shall be secured with pressure sensitive pearl gray Z-Tape along the throat seam and the circumferential edges overlapping itself 2" on the downward side.
- H. Qualifications for Using Insulation: When the pipe insulation thickness is greater than 1½" or the pipe temperature is greater than 250°F or less than 45°F, additional insulation inserts should be used. Use one Hi-Lo Temp insert for each additional 1" of pipe insulation.
- I. Fitting cover: The temperature of the PVC fitting cover must be kept below 150°F by the use of proper thickness of insulation and by keeping the PVC cover away from contact with, or exposure to, sources of direct or radiant heat.

2.4 PIPING EXPOSED TO FREEZING

- A. Insulation on any piping, fitting, flange and valve located in areas exposed to freezing in unheated areas, shall, in addition to above covering, be increased by one inch with the same finish as specified for the particular service when not subject to freezing. Insulation shall always be a minimum of 2½" inches in thickness.
- B. Weatherproofing of Piping:
1. Weatherproofing all insulated outdoor piping.
 2. Where weatherproofing is required, in addition to insulation and finishes specified for frostproofing, cover with Tedlar Film Jackets as made by ALPHA Assoc, Inc. (Woodbridge N.J.).
 3. Fittings insulation shall be heavily coat with weatherproof mastic. Embed into the wet coat a layer of open weave glass cloth and finish with a second coat of same mastic over entire surface.
 4. Where weatherproofing is required, in addition to insulation and finishes specified for frostproof, cover with crimped aluminum sheet .016 inch thick with lock seams at longitudinal seams, and preformed straps at transverse joints. Joints and jacket shall provide complete weatherproof protection either by mechanical contact or by use of a permanently plastic weatherproof sealant.

2.5 FIRE STOPPING

- A. Packing of openings, where ducts and pipes penetrate fire barriers, shall be done with Rockwool insulation as made by United States Gypsum, Co.
- B. Insulation shall comply with Fed. Spec. HH-1-558, Form A, Class 4, K=0.24, melting point 2000°F.

2.6 DUCTWORK INSULATION

A. Insulation for Concealed Duct

1. Except where otherwise noted, all concealed rectangular and round ductwork shall be covered with flexible duct insulation with or without vapor barrier and of the thickness indicated below.

<u>Service</u>	<u>Thickness</u>	<u>With</u>
Cold and Hot Air Supply Ducts	1½"	Vapor Barrier
Return Air Ducts	1½"	Vapor Barrier
Outside Air Duct	1½"	Vapor Barrier
Sound traps	1½"	Vapor Barrier

- B. Insulation with vapor barrier shall be duct wrap insulation FRK-25, type 100 as made by Owens-Corning or Manville Microlite with FRK vapor barrier facing or standard duct insulation as made by CGG with FRK facing.
- C. Adhere insulation to duct with Foster fire resistant adhesive 30-20 or equal, applied in 4 inch wide transverse strips at 8 inch intervals. Insulation shall be butted with facing overlapping all joints at least 2 inches and sealed with Foster fire resistant adhesive 30-20 or equal. For insulation with vapor barrier use Foster fire resistant vapor barrier adhesive or approved equal and joints without tabs shall be firmly sealed with aluminum foil tape adhered with same adhesive. Secure insulation with 18 gauge corrosion resistant wire spaced not more than 18 inches on center.
- D. Additionally, secure insulation to bottom of rectangular ducts over 24" wide with welded pins or stick clips on 18" centers.
- E. Insulation for Exposed Rectangular Duct
 - 1. Except where otherwise noted, all exposed rectangular ductwork shall be covered with rigid duct insulation with and of the thickness indicated below.

<u>Service</u>	<u>Thickness</u>	<u>With</u>
Cold and Hot Air Supply Ducts Except where otherwise noted	1½"	Vapor Barrier
Cold and Hot Air Return Air Ducts Except where otherwise noted	1½"	Vapor Barrier
Sound Traps Vapor Barrier	1½"	
Exhaust Ducts connected to penthouse louvers or goosenecks up to damper Barrier		1½" Vapor
Unused portion of Louvers	2" in 20 gauge sheetmetal sandwich.	

- 2. Rigid duct insulation with vapor barrier shall be 6 lbs. per cu. ft. density glass fiber with maximum K factor of 0.22 at 75°F mean temperature with fire retardant vapor barrier facing all service jacket (white finish).

3. Rigid duct insulation with vapor barrier shall be Fiberglass Type 705 by Owens-Corning or Manville, No. 817 w/ASJ or approved equal.
4. Rigid duct insulation without vapor barrier shall be 6 lbs. per. cu. ft. density glass fiber with maximum K factor of 0.22 at 75°F mean temperature. With fire retardant facing foil reinforced draft. (all service jacket).
5. Rigid duct insulation without vapor barrier shall be Fiberglass type 705 by Owens-Corning, Manville, No. 817 w/ASJ or approved equal.
6. Insulation shall be fastened to duct with 12 gauge welded pins and washers, or equivalent as approved. Fasteners shall be spaced 12 to 18 inches on center, a minimum of two rows per side of duct. Secure insulation in place with washers firmly embedded in insulation, or push a self-locking cap over pin after coating with fitting mastic type C by Owens-Corning or approved equal.
7. Seal all joints, breaks and impressions with Foster fire resistant vapor barrier adhesive Benjamin Foster 82-07, or equal, and apply 5" wide joint sealing tape to all joints. All surface must be clean and dry before applying tape.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this insulation is to be installed and determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install insulation in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that insulation complies with requirements and serves intended purposes.
- B. Coordinate with other work as necessary to interface installation of insulation with other components of systems.
- C. All insulating materials shall be applied only by experienced workmen, in accordance with the best covering practice. All piping, duct or equipment shall be blown out, cleaned, tested and painted prior to the application of any covering. Adhesives, sealers and mastics shall not be applied, when the ambient temperature is below 40°F., or surfaces are wet.

- D. Insulation for factory-fabricated air handling units, furnished as part of units.
- E. At all openings in insulation, insulate edges neatly and protect with sheet metal frames.
- F. All items described in general indicate the type of covering required, however, all piping, ductwork or equipment that transmits heat or will form condensation shall be insulated.
- G. Finish for Concealed Pipe Insulation:
 - 1. Hot Pipe - Factory ASJ (All service jacket) secured in place with Bostich staples 4" o.c. or ASJ/SSLII with self sealing lap with staples as made by Owens-Corning or approved equal.
 - 2. Cold and Hot-Cold Pipe - Factory ASJ sealed with vapor barrier adhesive Marathone IC-225 or approved equal, secured in place with Bostich staples 4" o.c. Cover staples with vapor proof adhesive or cement.
- H. Finish for Exposed Pipe Insulation:
 - 1. All exposed pipe insulation shall have 0.016 inch thick aluminum jacket banded with ½" aluminum bands spaced 18 inch o.c. or two bands per section.
 - 2. All piping and ductwork insulation shall be continuous through non-fire rated ceiling openings and sleeves passing through non-fire rated walls or floors. Sleeves shall be packed with mineral wool or thermofiber. Discontinue insulation as it passes through fire-rated wall or floor and use mineral wool or thermofiber packing instead. Specific mastics, adhesives and coating shall be applied in strict accordance with Manufacturer's instruction, including recommended coverages.

3.3 PROTECTION

- A. The installer of the ductwork insulation shall advise the Contractor of required protection for the insulation work during the remainder of the construction period, to avoid damage and deterioration.

END OF SECTION

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SECTION 15860 - HEAT PUMPS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, Heat Pumps as shown on the drawings and hereinafter specified.

1.3 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section 15390 – Manufacturers for Plumbing Work and Section 15600 - General Provisions for Mechanical Work.
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.
- D. Equipments must comply with ASHRAE 90.1-2004 & ASHRAE 62.1-2004

1.4 SUBMITTALS

- A. Refer to Section - Special Requirements for Mechanical and Electrical Work.
- B. Submit refrigerant safety system.

1.5 COORDINATION

- A. Refer to Section 15000- Special Requirements for Mechanical and Electrical Work.

1.6 GUARANTEE

- A. Refer to Section 15000- Special Requirements for Mechanical and Electrical Work.

PART 2 - PRODUCTS**2.1 HEAT PUMPS**

- A. Furnish and install Climate Master Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.
- B. Water-to-Water Heat Pumps: Units shall be supplied completely factory built and capable of operation with an entering water temperature range from 20° to 120°F (-6.7° to 49°C) as standard. Equivalent units from other manufacturers can be proposed. All equipment listed in this section must be rated and certified in accordance with ARI/ISO, NRTL or CSA. The units shall have ARI/ISO, NRTL or CSA labels. All units shall be factory run tested under normal operating conditions at nominal water flow rates. This testing shall generate a report card to be shipped with each unit stating performance in both heating and cooling modes. Serial numbers will be recorded by factory and furnished to contractor for ease of unit warranty status. Units tested without water flow ARE NOT acceptable.
- C. Basic Construction: Vertical Units shall have one of the following water flow arrangements:
1. Geothermal water from right front and building side water from either the top front panel or the top rear panel. Configuration as shown on the plans.
- D. If units with these arrangements or factory installed provisions ARE NOT used, the contractor is responsible for any extra costs incurred by his as well as other trades. All units must have a minimum of three access panels for serviceability of compressor compartment. If other arrangements make servicing difficult, the contractor must provide access panels and clear routes to ease service. Architect must approve any changes in layout. The vertical heat pumps shall be fabricated from heavy gauge galvanized sheet metal. All interior surfaces shall be lined with 1/2 inch thick, 1-1/2 lb. acoustic type glass fiber insulation. All fiberglass shall be coated and have exposed edges tucked under flanges to prevent the abrasion of the glass fibers. All insulation must meet NFPA 90A. All vertical heat pumps shall have a powder paint finish. The cabinet color will be Polar Ice.
- E. All units must have an insulated panel separating the building/load side compartment from the compressor compartment. Units with the compressor in the building/load side compartment ARE NOT acceptable.
- F. Cabinets shall have separate openings and knockouts for entrance of line voltage and low voltage control wiring. Both geo side and building/load supply and return water connections shall be copper FPT fittings and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a back-up wrench. Water connections that protrude through the cabinet or require the use of a backup wrench shall not be allowed. All water connections and electrical knockouts must be in the compressor compartment corner post as to not interfere with the serviceability of unit. Contractor shall be responsible for any extra costs involved in the installation of

units that do not have this feature. Contractor must ensure that units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

- G. Building (Inside) load side heat exchanger assembly: Supply and return water connections shall be copper FPT fittings and shall be mounted flush to the cabinet corner post allowing for connection to a flexible hose with the use of a back-up wrench. Water connections that protrude through the cabinet or require the use of a backup wrench shall not be allowed.
- H. Refrigerant Circuit: Units shall have a sealed refrigerant circuit including a high efficient scroll compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, a coaxial and fluted copper tube in tube refrigerant to water heat exchanger on the inside (building load), a reversing valve, a coaxial (tube in tube) fluted copper-nickel refrigerant to geo-water (outside) heat exchanger, and safety controls including a high pressure switch, a low pressure sensor, and a low water and low air temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a lockout device. The lockout shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset only at the disconnect switch only shall NOT be acceptable.
- I. Compressor shall have thermal overload protection and be located in an insulated compartment away from air stream to minimize sound transmission. Refrigerant to air heat exchangers shall utilize enhanced lanced aluminum fins and rifled copper tube construction rated to withstand 450 PSIG refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 450 PSIG working refrigerant pressure and 450 PSIG working water pressure. Plate to plate heat exchangers ARE NOT acceptable.
- J. The unit will be supplied with cupro nickel coaxial water to refrigerant heat exchangers. The unit will be supplied with insulated water circuit for units operating with entering water temperatures below dew point.
- K. Refrigerant metering shall be accomplished by thermostatic expansion valve only. Units intended for use in factory standard built operating range with entering water temperatures from 20° to 120°F (-6.7° to 49°C). Reversing valves shall be four-way solenoid activated refrigerant valves which shall fail to heating operation should the solenoid fail to function.
- L. Electrical: A control box shall be located within the unit compressor compartment and shall contain a 50VA transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Electro- mechanical operation will not be accepted. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 volt and provide heating or cooling as required by the remote thermostat/sensor.
- M. Solid-State Control System: Units shall have a solid-state control system (CXM). The control shall interface with a heat pump wall thermostat. The control system

microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall have the following features

1. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
 2. Anti-short cycle time delay on compressor operation, time delay shall be 5 minutes minimum.
 3. Random start on power up mode.
 4. Low voltage protection.
 5. High voltage protection.
 6. Unit shutdown on high or low refrigerant pressures.
 7. Unit shutdown on low water temperature.
 8. Water coil freeze protection (selectable for water or anti-freeze).
 9. Building/Load freeze protection.
 10. Option to reset unit at thermostat or disconnect. Fault type shall be retained in memory if reset at thermostat. Automatic intelligent reset. Unit shall automatically reset 5 minutes after trip if the fault has cleared. Should a fault re-occur 3 times sequentially then permanent lockout will occur.
 11. Ability to defeat time delays for servicing.
 12. Light emitting diodes (LED) to indicate high pressure, low pressure, low voltage, high voltage, air/water freeze protection, phase monitor and control status.
 13. The low pressure switch SHALL NOT be monitored for the first 90 seconds after a compressor start command to prevent nuisance safety trips.
 14. Remote fault type indication at thermostat.
 15. Selectable 24v or pilot duty dry contact alarm output.
 16. 24v output to cycle a motorized water valve with compressor contactor.
- N. Electronic Thermostats: Thermostat shall be single-stage, manual or automatic changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have a back-lit LCD display with temperature, setpoints, mode, and status indication. The temperature indication shall be selectable for °F or °C. A System Test feature shall be provided to simplify troubleshooting. The thermostat shall provide permanent memory of setpoints

without batteries. A fault LED shall be provided. Thermostat shall provide optional extended end of cycle fan operation, outdoor air temperature display, heating setpoint range limit, cooling setpoint range limit, and temperature display offset.

- O. Contractor to comply with all relevant codes regarding refrigerant safety relief points and in accordance with the refrigeration equipment manufacturers' instructions.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed and determine space conditions and notify architect in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that equipment comply with requirements and serve intended purposes.
- B. Coordinate with other work as necessary to interface installation of equipment with other components of systems.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, test equipment to demonstrate compliance with requirement. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

END OF SECTION

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SECTION 15870 - EARTH COUPLING WELLS**PART 1 - GENERAL****1.1 DESCRIPTION OF WORK**

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the City of New York, earth coupling/open to diffusion standing column wells (SCW) as shown on the drawings and hereinafter specified.

1.2 QUALITY ASSURANCE

- A. Firms regularly engaged in manufacture of this material with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide product produced by the manufacturers, which are listed in Section 15390 – Manufacturers for Plumbing Work and Section 15600 - General Provisions for Mechanical Work.
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings.

1.4 COORDINATION

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

1.5 WARRANTY

- A. Refer to Section 15000- Special Requirements for Mechanical and Electrical Work.

1.6 QUALIFICATIONS

- A. Refer to Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions and Bid Forms for qualifications and Special Experience requirements of Well Contractor and Mechanical Contractor.

1.7 STANDING COLUMN WELL SYSTEM CONSTRUCTION SEQUENCE

- A. Refer to Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions for additional information on SCW construction sequence, pump tests, water quality lab testing, water management, videography, and other project requirements.

PART 2 - PRODUCTS

2.1 WELLS

- A. As specified and as shown, furnish, install, test and place in satisfactory and successful operation all equipment and two (2) bore holes, material, devices and necessary appurtenances to provide a complete and operable standing column well system for the specified Geo-Exchange heating and cooling systems.
- B. Well(s) are defined as two (2): bore holes, casings, sanitary seals, pump wiring, screens and exterior piping and submersible pumps.
- C. Work includes trenching, final back-fill, grading or reseeding.
- D. Work includes water testing, rock sample collections, submittal design and necessary permitting.
- E. The Contractor shall use water as the heat transfer medium. The Contractor shall install two wells. Each well shall have a minimum yield of 4.5 gpm Water Flow.

2.2 WELL HEAD

- A. All wells shall be sealed with a standard sanitary well head seal and shall be protected at all locations as indicated by general contractor's stake or as shown on prints.
- B. The well head and sanitary seal shall be below grade and protected with a shallow manhole as shown on drawings.

2.3 PIPING

- A. Buried supply and return piping shall be three (3) inch High Density Polyethylene (HDPE), PE3408 resin with ratings of ASTM D3035-93 for pipe and ASTM D3261 for fusion fittings. A pipe cell classification of 355444C, SDR-11 is required. Drisco 5300 series or equal is required to insure abrasion resistance.
- B. It is desired that all underground pipe shall be free of joints. Should joints be required they shall be butt or socket heat fused by a method approved by the pipe manufacturer and the International Ground Source Heat Pump Association (IGSHPA) or the pipe manufacturer.

2.4 CASING

- A. The casings shall be 19+ pounds/linear foot ASTM A-500 steel, made in U.S.A. The casing shall be an alloy approved by the National Ground Water Association (NGWA).

2.5 OTHER WORK

- A. The Well Contractor shall protect the area to prevent flooding while drilling the well and associated operations.
- B. The Well Contractor prior to burial of piping and connection pit must perform testing of the well piping and coupling for leaks.
- C. The Well Contract will nominally return the area to its earth grade condition. The Contractor will perform landscape work as specified. The well contractor shall provide all trenching for the 3 inch HDPE pipe. Trench shall be a nominal three-foot wide. Back filling with 6 inches of sand above and below the HDPE pipe shall be by the Well Contractor.
- D. The Well Contractor shall provide temporary water pit and necessary de-watering pumps for drilling water. See also Section 02330 Earthworks and relevant requirements of the Contract Article "Standing Column Well System Construction Sequence."

2.6 SAFETY

- A. All material, equipment, labor and protection needed to safely complete this work shall be the responsibility of the Well Contractor.

2.7 HEALTH

- A. Disinfectant of the well, pumping and piping systems with a method approved by the National Ground Water Association is by the Well Contractor. In-process wells will be maintained in a disinfected state at all times.

2.8 SUBMERSIBLE PUMP

- A. Provide a submersible well pump with lift and flow capability as specified. Each well pump shall be carefully sized to insure a flow of 45 US gpm to the heat exchanger.

2.9 ELECTRICAL

- A. The well pump shall be provided to operated on 208 ac volts three phase with a variable frequency drive
- B. The Well Contractor shall provide water blocked and waterproof pump cable suitable for submersible well pumps from the well disconnect to the submersible pump. All submersible wiring and connections shall be by the Well Contractor.

2.10 PRESSURE TANK & SAFETY VALVES

- A. Provide where shown on prints one (1) pressure tank sized per the variable frequency drive manufacturer's specifications
- B. Pressure tanks may be adjusted for operation between 20- and 30 psig.

- C. Surface and well pump check valves shall be provided and a pressure relief set at 85 psig or as required by local code.
- D. Well Contractor shall provide a ball valve for connection to the heat pump manifold. Any other safety pressure controls and valves as required by New York State statutes are to be installed.

2.11 VARIABLE FREQUENCY DRIVE

- A. Provide Electronic Variable Speed Drive (VFD) system for all well pumps. Well pump controls will insure activation of the well pumps when the pressure of the heat pump manifold is below 20 psig. Controls may be field adjusted between pressures of 10 and 30 psig or as maybe set by local requirements.
- B. VFD controls will include both line side Radio Frequency. Interference (RFI) Filters and line reactors on the VFD to submersible pump line. RFI filter must be designed to meet or exceed FCC electrical noise specification Part 15, Subpart J, Class A. Line reactor must meet submersible motor manufacturer's requirements.
- C. Contractor shall adjust the VFD to permit operation of all the wells under VFD control. Minimum water pressure of fifteen (15) psig shall be maintained at all times.
- D. A suitable safety method must be included as part of the VFD package to insure well pumps can not operate should the system pressure sensors fail.
- E. Three phase disconnect to VFD and well pump controls are by Contractor, in accordance with the requirements of Division 16. VFD shall be field adjusted to insure control under all normal operating conditions. VFD controls are to be critically or slightly under damped.

2.12 CONTROLS

- A. Sequence of Operation: the sequence of operation for the submersible pumps shall be as follows:
 - 1. A temperature sensor shall be located in the pipe carrying circulated water from the pump room to the building heat pumps.
- B. Heating:
 - 1. When the temperature of the circulated water is between 47F and 73F (All temperature settings shall be easily adjusted by City of New York) the well pumps shall be off.
 - 2. When the temperature of the circulated water falls below 45F the lead well pump shall slowly increase in speed until the temperature of the circulated water rises to 45F. Thereafter its speed shall modulate to maintain 43-46F.
 - 3. When the lead well pump reaches 100% speed the lag pump shall start and modulate its speed to maintain 43-46F.

C. Cooling:

1. When the temperature of the circulated water rises above 73F the lead pump shall slowly increase in speed until the temperature of the circulated water falls to 74F. Thereafter its speed shall modulate to maintain 77-74F.
2. When the lead pump reaches 100% speed the lag pump shall start and modulate its speed to maintain 77-74F.
3. The designation of lead and lag pump shall be easily changed by City of New York to equalize wear on pumps.

PART 3 - EXECUTION

3.1 GENERAL

- B. Install equipment as shown, in accordance with all recommendations and beneficial options suggested by the manufacturer. Report all discrepancies between specifications and local regulations to the Commissioner and City of New York for resolution.
- C. Comply with all relevant requirements of the Contract Article 1.45 "Standing Column Well System Construction Sequence" in the Addenda to General Conditions.
- D. Drilling activities shall be performed under the supervision of qualified and experienced personnel hired by the Contractor and monitored by the Special Inspector retained by the City of New York.

3.2 INTEGRITY

- A. The completed systems shall be pressure tested with water to a pressure of 90 psig for at least one (1) hour before back-filling. If during the pressure test there is a nominal loss of pressure, the cause shall be identified and corrected and the systems re-tested.
- B. The Commissioner shall be notified one week prior to testing so that the exposed system can be inspected.

3.3 (DELETED)

3.4 DIG SAFE & CLEARANCES

- A. The Well Contractor shall arrange to have the site marked for underground utilities before digging, drilling or moving any heavy equipment on to the site.
- B. Adequate earth loading and minimum clearance of 40 feet above, shall be the responsibility of the Well Contractor.

- C. The Well Contractor will take particular care in not approaching any trees to within twenty-five (25) feet of the tree's drip line.

3.5 PERMITS

- A. The Well Contractor shall register, as required, the well system with the Local Health officials, and shall obtain required well drilling permits.
- B. The Well Contractor shall obtain all required permits under Article 23 of the New York State Environmental Conservation law.
- C. The Well Contractor shall obtain or assist the General Contractor in the preparation of request for temporary EPA permit to allow discharge of drilling water to the existing storm drains, if required. Discharge to sewer or sanitary systems is not anticipated nor allowed. See also Section 02300-Earthworks for additional information. See also Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions for additional requirements on water management, including the collection, temporary storage, control and ultimate disposal of the pump test water.

3.6 WATER & PUMP TEST

- A. A comprehensive water quality test shall be performed at each well after the well has cleared and been sufficiently flushed. See Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions for testing criteria and standards.
- B. Test results will be promptly forwarded to the General Contractor and Commissioner as soon as available and are a submittal item.
- C. Work includes 72-hour pump test of the designated well at a 4.5 (four and one-half) gpm rate. Pump test will be reported in graphic form. See Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions for additional requirements.

3.7 EXPERIENCE

- A. The Well Drilling Contractor and the contractor installing the geothermal equipment shall be able to show that they have proper experience. See Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions and Bid Form for Special Experience requirements.
- B. The Well Contractor's well driller must also be a three-year (or longer) member in good standing and a certified well driller and pump installer with the National Ground Water Association (NGWA).

- C. Preference will be given to Well Contractors with valid International Ground Source Heat Pump (IGSPHA) installer certification.

3.8 INSTALLATION SUBMITTAL

- A. A complete set of detailed drawings or sketches of the exterior and building interior installation shall be submitted to the General Contractor and Commissioner for approval before any work is initiated.
- B. The Well Contractor will submit a full well log to required regulatory agencies and a copy to the General Contractor and Commissioner promptly upon completion of the well bore.

3.9 STARTUP

- A. Well systems must be started by a qualified and licensed well/pump mechanic holding a National Ground Water Association (NGWA) certificate. The heat pump Factory's geothermal. Representative or local authorized geothermal distributor must supervise the startup.
- B. A field report summarizing well information, startup conditions and SCW (Standing Column Well) related equipment performance must be submitted to the Contracting Officer for each SCW.
- C. Provide the field report in a timely manner to the Contracting Officer and HVAC contractor.

3.10 COORDINATION

- A. Coordinate control components and operation with the heat pump control contractor and heat pump installer. Ensure non-duplication of components and correct and safe operation of the SCW pumping and control systems described above.

3.11 TESTING

- A. As specified in Section 15380- Testing and Adjustments. See also Article 1.45 Standing Column Well System Construction Sequence in the Addenda to General Conditions for additional requirements.

3.12 DEMONSTRATION

- A. Provide operating instructions and two operation manuals for the Geo Well system.

3.13 WARRANTY

- A. One year warranty on all components. The term of the SCW warranty shall be determined by the submission of the above listed field report or 15 months after the completion of drilling the bore holes.

END OF SECTION*

SECTION 15900 - TESTING AND BALANCING

PART 1- GENERAL1.1 RELATED DOCUMENTS

- A. This Section is coordinate with and complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.

1.2 DESCRIPTION OF WORK

- A. All piping and equipment shall be tested. Labor including standby electrician, materials, instruments and power required for testing shall be furnished unless otherwise indicated under the particular Section of the Specification.
- B. Tests shall be performed in the presence of and to the satisfaction of the Architect and such other parties as may have legal jurisdiction.
- C. In no case shall piping, equipment, or accessories be subjected to pressure exceeding their ratings.
- D. All defective work shall be promptly repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Architects.
- E. Any damage resulting from tests to any and all trades shall be repaired and damaged materials replaced, all to the satisfaction of the Architect.
- F. The duration of tests shall be as determined by all authorities having jurisdiction, but in no case less than the time prescribed below.
- G. Equipment and systems which normally operate during certain seasons of the year shall be tested during the appropriate season. Tests shall be performed on individual equipment, systems, and their controls. Whenever the equipment or system under test is interrelated and depends upon the operation of other equipment, systems and controls for proper operation, functioning and performance, the latter shall be operated simultaneously with the equipment or system being tested.
- H. All fans and duct systems shall be completely balanced by the adjustment of sheaves, dampers, registers and other volume and diverting control devices, to obtain the air quantities indicated on the design drawings. Replace sheaves if required to meet design conditions.
- I. All pumps and piping systems shall be completely balanced by the adjustment of plug cocks, globe valves or other control devices, to obtain flow quantities indicated on the design drawings.

- J. Tests shall be performed in presence and to satisfaction of Architect or his representatives, and such other parties as may have legal jurisdiction. Submit completed reports for approval. If air and water balancing cannot be verified in two, four hour tests (total of eight hours) the Contractor shall pay the Architect or his representative for any additional time spent to balance the system.

1.3 QUALITY ASSURANCE

- A. Prior to installation of the mechanical systems, engage the services of an independent air and water balancing firm that shall be subject to the approval of the Architect. The firm shall have no affiliation with a mechanical contracting or sheetmetal company. Balancing and testing company shall be a member of the Associated Air Balance Council. The balancing firm shall have at least one member of its full time staff who is a licensed professional engineer who shall supervise the balancing work. Prior to balancing, a list of instruments to be used shall be submitted to the Architect. All instruments shall be calibrated within six months before tests.
- B. When all specified testing and balancing procedures have been completed, a written report shall be submitted to the Architect for review. The report shall be tabulated in standard AABC format. As part of the Architect's review process, the accuracy of the balancing report shall be field spot checked on a random basis, with the assistance of the balancing firm's project supervisor.

1.4 SUBMITTALS

- A. Refer to Section 15000 "Special Requirements for Mechanical and Electrical Work". Submit all test and balancing reports as described hereinafter.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3- EXECUTION

3.1 FIELD TEST OF PIPING

- A. During construction properly cap or plug all lines to prevent the entrance of sand, dirt, etc. The system of piping shall be blown through wherever necessary after completion (for the purpose of removing grit, dirt, sand, etc., from all equipment and piping), for as long a time as is required to thoroughly clean the apparatus.
- B. All piping shall be tested as hereinafter specified. Tests shall be made after erection and before covering is applied or piping painted or concealed, and as sections of mains and groups of risers are completed. The extent of the work completed before pressure tests are made shall be determined by the Architect.
- C. All piping, unless otherwise specified, shall be tested to a hydrostatic pressure at least 1-1/2 times the maximum designed working pressure (but not less than 50 lbs. per square inch) for a sufficiently long time to detect all leaks and defects; and after

testing shall be made tight in the most approved manner. Tests shall be repeated once after leaks and defects have been repaired. When automatic control valves, equipment and similar devices which are incapable of withstanding test pressures applied to piping, such devices shall be removed, or otherwise protected during tests. After approval of such tests, devices shall be installed and tested with operating medium to operating pressures. The following shall be tested for four consecutive hours and proved tight. Leaks shall be remedied by replacing defective work.

Hydrostatic Item	Field Test
Overflow and drain	50 psi
Cold Water (domestic)	100 psi
Hot water heating	100 psi
Chilled water, dual temperature water	100 psi
Chemical Treatment	
-Chilled water	100 psi
-Hot water	100 psi

- D. Leaks appearing during the various pressure tests shall be corrected by replacing all defective materials or welds and subsequent tests shall be made until the piping is found perfect. Caulking of screwed joints or pending of welds is prohibited. Wherever it is necessary to cut out a weld and the ends of the pipe cannot be conveniently brought together, then a short piece of pipe shall be fitted in and welded as approved by the Architect.
- E. Provide all other tests required by the Building Department, Fire Department and all other authorities having jurisdiction.

3.2 RUNNING TEST OF PIPING SYSTEMS

- A. When directed, any section of the work, after it has been completed and otherwise satisfactorily tested, shall be put in actual operation and operated for a period of two (2) days of 24 hours each, during which time any defects which may appear shall be remedied and any adjustment which may be necessary shall be made.
- B. During the time of the tests, repack all valves, make all adjustments and otherwise put the apparatus in perfect condition for operation, and instruct the Owner's representative in the use and management of the apparatus.

3.3 EQUIPMENT TEST

- A. Demonstrate that all equipment and apparatus fulfill the requirements of the Specifications and that all equipment shall be operated and tested for rated capacities and specified characteristics. Voltage and amperage readings shall be taken on all electric motors.
- B. Set the system up to operate with maximum return air and minimum outside air.

- C. The following preliminary data should be obtained and recorded at the fans:
1. Fan and motor RPM.
 2. Motor and current voltage.
 3. Fan, coils and filter statics.
 4. Nameplate data on the fans and motors.
 5. Motor sheave, fan pulley and belt sizes.
- D. Traverse the main supply ducts and return ducts to determine CFM deliveries of the fans.
- E. Set the system to operate at 100% outside air and check the motor amperage. The motor amperage should remain relatively constant indicating no change in total air flow. If a change in flow does occur, adjust outside air, return air, and relief air dampers accordingly. Set enough variable volume controllers throughout the building to maximum in order to simulate a maximum load on the fan.
- F. Measure the system duct static pressure at selected points throughout the system. Monitoring points shall be in those duct runs which are of the longest equivalent length (greatest friction loss). Monitor these points during the adjusting and balancing procedures to assure proper inlet static pressure is being maintained to the variable volume units.
- G. Adjust the return fan to approximately 5% above design CFM and the supply fan to either 5% above design or to the point where the static pressure at the end of each branch is at required static pressure, whichever condition is reached first.
1. If the fan is adjusted to obtain the minimum static pressure, then it may be necessary to readjust the fan during the balancing as the static pressure will decrease as the constant volume controller deliveries are increased.
- H. Make preliminary outlet readings and balance the outlets to design CFM and record all readings.
- I. Individually set the controls for each variable volume damper to full heat the outlets.
- J. Adjust the damper minimum position so the outlet total CFM is at the design minimum delivery. At the minimum delivery rate, the balance between the outlets may not hold, but no outlet adjustments should be made.
- K. Check the variable volume controller for design delivery.
1. Check all the units, but make no adjustments. Report the results.
 2. If check passes, then proceed with balancing.

3. Do all setting and adjusting required.
 4. When necessary corrections have been made, a verification test will be required.
- L. Adjust the outlets for design delivery.
- M. The following final data should be obtained and recorded at the supply and return fans:
1. Fan and motor RPM.
 2. Motor current and voltage.
 3. Fans, coils and filter statics
 4. Approximate motor sheave setting
- N. Check the following controls:
1. Economizer system function, calibration, etc. All improperly operating items shall be promptly repaired or replaced and the tests shall be repeated until the particular system and component parts thereof receive the approval of the Architects.

3.4 AIR LEAKAGE TEST

- A. The testing of all joints for air leakage after erection and the repair of any leaks are positive requirements. Leakage must be kept to a specified minimum. The test for air leakage is divided into two phases; namely, testing of individual vertical risers and testing of all branches. Provide all required instruments.
- B. Test shall be made at (6) inches water gauge static pressure. All risers, branches and runouts shall be tested after installation before insulation is applied and before the air mixing units are installed. The total allowable leakage for the entire system shall be no more than one (1) percent of the total system capacity.
- C. Equipment necessary for performing this test shall include a rotary hand blower calibrated orifice section and a "U" tube gauge board complete with cocks and rubber tubing. The test hookup, as well as details for the fabrication of the orifice section shall be in accordance with the recommendation of the "High Velocity Duct Manual" of Sheet Metal and Air Conditioning Contractors National Association, Inc.

3.5 TEST PREPARATION AND PROCEDURE

- A. On initial startup, prior to any tests, check the rotation and running amperage of all fan and pump motors to prevent damage to equipment by overload.
- B. Final balancing must be done with all systems completely installed and operating,

and after the automatic temperature controls have had their final adjustment.

- C. New, clean filters must be installed in all supply systems prior to balancing.
- D. All water systems shall be completely filled and vented, and all strainers cleaned prior to balancing. Inspect expansion tanks for proper water level and operating of makeup water valves.
- E. All main supply air ducts shall be traversed, using a pitot tube and manometer. The manometer shall be calibrated to read two significant figures in all velocity pressure ranges.
- F. A main duct is defined as either of the following:
 - 1.A duct serving five or more outlets.
 - 2.A duct serving two or more branch ducts.
 - 3.A duct serving a reheat coil.
 - 4.A zone duct from a multizone unit.
 - 5.A duct emanating from a fan discharge or plenum and terminating at one or more outlets.
- G. The intent of this operation is to measure by traverse the total air quantity supplied by the fan and to verify the distribution of air to zones.
- H. Submit data in support of all supply fan deliveries by the following four methods:
 - 1.By summation of the air quantity readings at all outlets.
 - 2.By duct traverse of main supply ducts.
 - 3.By a rotating vane traverse across a filter or coil bank.
 - 4.By plotting RPM and static pressure readings on the fan curve. Air density corrections must be indicated.
- I. For return air and exhaust fans, summation and duct traversing shall be sufficient.
- J. Inspect all fan scrolls and remove objects or debris. Inspect all coils and remove debris or obstructions. Verify that all fire dampers are open.
- K. The supply air systems shall be completely balanced prior to the final balancing of the water systems.
- L. Upon completion of all air and water balancing, all duct dampers, plug valves and other throttling devices shall be marked in the final adjusted position.

3.6 AIR BALANCE

- A. Record the following design requirements for all fans and fan motors from the approved shop drawings.
1. Air quantities - CFM
 2. Approximate fan speed - RPM
 3. Fan static pressure (total or external) - inches of water.
 4. Maximum tip speed - FPM
 5. Outlet velocity - FPM
 6. Fan brake horsepower
 7. Motor horsepower
 8. Volts, phases, cycles and amps at design conditions.
- B. Record the following data from all fans and fan motors installed at the project:
1. Manufacturer, model and size
 2. Motor horsepower, service factor and RPM
 3. Volts, phases, cycles and full load amps
 4. Motor starter and heaters size
 5. Equipment location
- C. All fans and duct systems shall be completely balanced by the adjustment of sheaves, dampers, registers and other volume and diverting control devices, to obtain the air quantities indicated on the Drawings. Outside air and return air modulating dampers shall be adjusted to admit the specified quantities of air under all cycles of operation. All final adjusted air quantities shall be within 10% of the design requirements. Replace sheaves if required to meet design conditions.
- D. Record the following test data for all fans and motors installed at the Project at final balanced conditions:
1. Fan speed RPM.
 2. Fan static pressure (external and total) inches of water.
 3. Static pressure drop across all filters, dampers, coils and other items in the supply fan casings.
 4. Motor operating amps.
 5. Actual voltage
 6. Fan CFM
 7. Calculated brake horsepower.
- E. Submit single line diagrams of all duct systems indicating all terminal outlets

identified by number. Data sheets shall list all such outlets denoted by the same numbers, including the outlet's size, "K" factor, location, CFM and jet velocity.

- F. Submit this data for all supply, return and exhaust air systems.
- G. Adjust the outside air and return air dampers to admit the required amounts of air under both summer and winter cycles. Record and submit the outside, return and mixed air temperatures for both cycles after final adjustments.
- H. Air balancing shall be performed with filters partially blocked to simulate a pressure drop across the filters equal to that midway between the clean and the dirty condition.

3.7 VARIABLE AIR VOLUME SYSTEM

- A. Check and record the following items on the supply and return fans:
 - 1. Correct fan rotation.
 - 2. Filter condition (clean or dirty).
 - 3. Cooling coil condition (dry or wet).
- B. Set the controls for the supply and return fans to operate at maximum capacity and for all variable volume dampers to be at the full open position.
- C. Set the system up to operate with maximum return air and minimum outside air.
- D. The following preliminary data should be obtained and recorded at the supply and return fans:
 - 1. Fan and motor RPM.
 - 2. Motor and current voltage.
 - 3. Fan, coils and filter statics.
 - 4. Nampelate data on the fans and motors.
 - 5. Motor sheave, fan pulley and belt sizes.
- E. Traverse the main supply ducts and return ducts to determine CFM deliveries of the fans.
- F. Set the system to operate at 100% outside air and check the motor amperage. The motor amperage should remain relatively constant indicating no change in total air flow. If a change in flow does occur, adjust outside air, return air, and relief air dampers accordingly. Set enough variable volume controllers throughout the building to maximum in order to simulate a maximum load on the fan.
- G. Measure the system duct static pressure at selected points throughout the system. Monitoring points shall be in those duct runs which are of the longest equivalent length (greatest friction loss). Monitor these points during the adjusting and balancing procedures to assure proper inlet static pressure is being maintained to the variable volume units.

- H. Adjust the return fan to approximately 5% above design CFM and the supply fan to either 5% above design or to the point where the static pressure at the end of each branch is at required static pressure, whichever condition is reached first.
 - 1. If the fan is adjusted to obtain the minimum static pressure, then it may be necessary to readjust the fan during the balancing as the static pressure will decrease as the constant volume controller deliveries are increased.
- I. Make preliminary outlet readings and balance the outlets to design CFM and record all readings.
- J. Individually set the controls for each variable volume damper to comply with correct sequence of operation.
- K. Check the variable volume controller for design delivery.
 - 1. Check all the units, but make no adjustments. Report the results.
 - 2. If check passes, then proceed with balancing.
 - 3. Do all setting and adjusting required.
 - 4. When necessary corrections have been made, a verification test will be required.
- L. Adjust the outlets for design delivery.
- M. The following final data should be obtained and recorded at the supply and return fans:
 - 1. Fan and motor RPM.
 - 2. Motor current and voltage.
 - 3. Fans, coils and filter statics
 - 4. Approximate motor sheave setting
- N. Check the following controls:
 - 1. Economizer system function, calibration and damper synchronization.
 - 2. Face and bypass dampers function and calibration, if any.
 - 3. High temperature limit shutoff function and calibration, if any.
 - 4. Low temperature limit shutoff function and calibration, if any.
- O. Set all controls to their normal set points and allow all controllers to reach a

satisfied state.

- P. Measure the mixed air plenum static pressure to verify that the return fan capacity controller is functioning properly. The static pressure in the plenum should be within .05" W.C. of the final balance condition.
- Q. Walk through the building and listen for noise generated by the air distribution system. Excessive noise should be reported.
- R. All above recorded items and readings shall be submitted to the Architect.
- S. Balance all induction units by primary air nozzle pressure. Record the following data in addition to the design requirements for each unit.
 - 1. Unit size and location.
 - 2. Final nozzle pressure - inches of water.
 - 3. Water entering and leaving temperature and pressure drop through coil at full flow.
 - 4. Primary air temperature, room temperature and supply air temperature.
- T. Adjust and test all terminal boxes, mixing boxes and their controls to deliver the required air quantities. Record the following data in addition to the design requirements for each unit:
 - 1. Box size and location.
 - 2. Air temperatures in the hot duct and cold duct inlets for cooling and full heating.
 - 3. Static, velocity and total pressures in hot duct and cold duct inlets for full cooling and full heating.

3.8 WATER BALANCE

- A. Record the following design requirements for all pumps and pump motors from the approved shop drawings:
 - 1. Water quantity - GPM
 - 2. Total head - feet of water
 - 3. Pump speed - RPM
 - 4. Impeller size
 - 5. NPSH (if required)
 - 6. Motor horsepower
 - 7. Volts, phases, cycles and amps at design conditions
- B. Record the following data from all pumps motors installed at the project:

1. Manufacturer, model and size.
 2. Impeller size
 3. Motor horsepower, service factor and RPM
 4. Volts, phases, cycles and full load amps
 5. Motor starter and heaters size
 6. Equipment location
- C. All pumps and piping systems shall be completely balanced by the adjustment of plug cocks, globe valves or other control devices, to obtain the flow quantities indicated on the Drawings. Balancing shall be done with all controls set for full flow through coils. All automatic throttling valves shall be in the full-open position. All automatic three-way valves shall have the bypass port closed.
- D. Record the following test data for all pumps and pump motors installed at the Project:
1. Pump speed - RPM
 2. Total head at shut-off or dead-end discharge - feet of water. (Plot this value on pump curve as a verification of impeller size.)
 3. Suction, discharge and total head at final adjusted flow - feet of water.
- E. Balance the water flow through all heat pumps, coils, cabinet heaters in accordance with design requirements.
- F. Upon completion of the water balance, reconcile the total heat transfer through all coils by recording the entering and leaving water temperatures and the entering and leaving air dry bulb and wet bulb temperatures.
- G. Upon completion of balancing adjust all differential bypasses and three-way valve bypasses for the same pressure drop or full bypass as on full flow.

END OF SECTION

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SECTION 15960- DIRECT DIGITAL CONTROL SYSTEM**1.1 RELATED DOCUMENTS**

- A. All work of this Division shall be coordinated and provided by the single Direct Digital Control System (DDCS) Contractor.
- B. The work of this Division shall be scheduled, coordinated, and interfaced with the associated work of other trades. Reference the Division 15 Sections for details.
- C. The work of this Division shall be as required by the Specifications, Point Schedules and Drawings.
- D. If the DDCS Contractor believes there are conflicts or missing information in the project documents, the Contractor shall promptly request clarification and instruction from the Commissioner.

1.2 DEFINITIONS

- A. Analog: A continuously variable system or value not having discrete levels. Typically exists within a defined range of limiting values.
- B. Binary: A two-state system where an "ON" condition is represented by one discrete signal level and an "OFF" condition is represented by a second discrete signal level.
- C. Direct Digital Control System (DDCS): The total integrated system of fully operational and functional elements, including equipment, software, programming, and associated materials, to be provided by this Division DDCS Contractor and to be interfaced to the associated work of other related trades.
- D. DDCS Contractor: The single Contractor to provide the work of this Division. This Contractor shall be the primary manufacturer, installer, commissioner and ongoing service provider for the DDCS work.
- E. Control Sequence: DDCS pre-programmed arrangement of software algorithms, logical computation, target values and limits as required to attain the defined operational control objectives.
- F. Direct Digital Control: The digital algorithms and pre-defined arrangements included in the DDCS software to provide direct closed-loop control for the designated equipment and controlled variables. Inclusive of Proportional, Derivative and Integral control algorithms together with target values, limits, logical functions, arithmetic functions, constant values, timing considerations and the like.
- G. DDCS Network: The total digital on-line real-time interconnected configuration of DDCS digital processing units, workstations, panels, sub-panels, controllers, devices and associated elements individually known as network nodes. May exist as one or more fully interfaced and integrated sub-networks, LAN, WAN or the like.
- H. Node: A digitally programmable entity existing on the DDCS network.
- I. DDCS Integration: The complete functional and operational interconnection and interfacing of all DDCS work elements and nodes in compliance with all applicable codes, standards and ordinances so as to provide a single coherent DDCS as required by this Division.

- J. Provide: The term "Provide" and its derivatives when used in this Division shall mean to furnish, install in place, connect, calibrate, test, commission, warrant, document and supply the associated required services ready for operation.
1. PC: IBM-compatible Personal Computer from a recognized major manufacturer
 2. Furnish: The term "Furnish" and its derivatives when used in this Division shall mean supply at the DDCCS Contractor's cost to the designated third party trade contractor for installation. DDCCS Contractor shall connect furnished items to the DDCCS, calibrate, test, commission, warrant and document.
 3. Wiring: The term "Wiring" and its derivatives when used in this Division shall mean provide the DDCCS wiring and terminations.
 4. Install: The term "Install" and its derivatives when used in this Division shall mean receive at the jobsite and mount.
 5. Protocol: The term "protocol" and its derivatives when used in this Division shall mean a defined set of rules and standards governing the on-line exchange of data between DDCCS network nodes.
 6. Software: The term "software" and its derivatives when used in this Division shall mean all of programmed digital processor software, preprogrammed firmware and project specific digital process programming and database entries and definitions as generally understood in the DDCCS industry for real-time, on-line, integrated DDCCS configurations.
 7. The use of words in the singular in these Division documents shall not be considered as limiting when other indications in these documents denote that more than one such item is being referenced.
 8. Headings, paragraph numbers, titles, shading, bolding, underscores, clouds and other symbolic interpretation aids included in the Division documents are for general information only and are to assist in the reading and interpretation of these Documents.
 9. The following abbreviations and acronyms may be used in describing the work of this Division:

ADC	-	Analog to Digital Converter
AI	-	Analog Input
AN	-	Application Node
ANSI	-	American National Standards Institute
AO	-	Analog Output
ASCII	-	American Standard Code for Information Interchange
ASHRAE	-	American Society of Heating, Refrigeration and Air Conditioning Engineers
AWG	-	American Wire Gauge
CPU	-	Central Processing Unit
CRT	-	Cathode Ray Tube
DAC	-	Digital to Analog Converter
DDC	-	Direct Digital Control
DI	-	Digital Input
DO	-	Digital Output

EEPROM Read	-Electronically Erasable Programmable Only Memory
EMI	- Electromagnetic Interference
FAS	- Fire Alarm Detection and Annunciation System
GUI	- Graphical User Interface
HOA	- Hand-Off-Auto
ID	- Identification
IEEE Engineers	- Institute of Electrical and Electronics Engineers
I/O	- Input/Output
LAN	- Local Area Network
LCD	- Liquid Crystal Display
LED	- Light Emitting Diode
MCC	- Motor Control Center
NC	- Normally Closed
NIC	- Not In Contract
NO	- Normally Open
OWS	- Operator Workstation
OAT	- Outdoor Air Temperature
PC	- Personal Computer
RAM	- Random Access Memory
RF	- Radio Frequency
RFI	- Radio Frequency Interference
RH	- Relative Humidity
ROM	- Read Only Memory
RTD	- Resistance Temperature Device
SPDT	- Single Pole Double Throw
SPST	- Single Pole Single Throw
XVGA	- Extended Video Graphics Adapter
TBA	- To Be Advised
TCP/IP-	- Transmission Control Protocol/Internet Protocol
TTD	- Thermistor Temperature Device
UPS	- Uninterruptible Power Supply
VAC	- Volts, Alternating Current
VAV	- Variable Air Volume
VDC	- Volts, Direct Current
WAN	- Wide Area Network

1.3 SYSTEM DESCRIPTION

- A. The Direct Digital Control System (DDCS) shall be a complete system designed for use with the enterprise IT systems. This functionality shall extend into the equipment rooms. Devices residing on the hardwired automation network located in equipment rooms and similar shall be fully IT compatible devices that mount and communicate directly on the IT infrastructure in the facility. Contractor shall be responsible for coordination with the owner's IT staff to ensure that the FMS will perform in the owner's environment without disruption to any of the other activities taking place on that LAN.

- B. The work of the single DDCS Contractor shall be as defined individually and collectively in all Sections of this Division specification together with the associated Point Sheets and Drawings and the associated interfacing work as referenced in the related documents.
- C. The DDCS work shall consist of the provision of all labor, materials, tools, equipment, software, software licenses, software configurations and database entries, interfaces, wiring, tubing, installation, labeling, engineering, calibration, documentation, samples, submittals, testing, commissioning, training services, permits and licenses, transportation, shipping, handling, administration, supervision, management, insurance, temporary protection, cleaning, cutting and patching, warranties, services, and items, even though these may not be specifically mentioned in these Division documents which are required for the complete, fully functional and commissioned DDCS.
- D. Provide a complete, neat and workmanlike installation. Use only manufacturer employees who are skilled, experienced, trained, and familiar with the specific equipment, software, standards and configurations to be provided for this Project.
- E. Manage and coordinate the DDCS work in a timely manner in consideration of the Project schedules. Coordinate with the associated work of other trades so as to not impede or delay the work of associated trades.
- F. The DDCS as provided shall incorporate, at minimum, the following integrated features, functions and services:
 - 1. Operator workstation PC with Graphics.
 - 2. Operator information, alarm management and control functions.
 - 3. Enterprise-level information and control access.
 - 4. Information management including monitoring, transmission, archiving, retrieval, and reporting functions.
 - 5. Diagnostic monitoring and reporting of DDCS functions.
 - 6. Compatibility and seamless connectivity with Johnson Controls BMS.
 - 7. Offsite monitoring and management access.
 - 8. Energy management
 - 9. Standard applications for terminal HVAC systems.

1.4 QUALITY ASSURANCE

- A. General
 - 1. The Direct Digital Control System Contractor shall be the primary manufacturer-owned branch office that is regularly engaged in the engineering, programming, installation and service of total integrated Metasys Direct Digital Control Systems. Acceptable DDCS manufacturers shall be one of the following:
 - a. Johnson Controls Inc. Hasbrouck Heights, NJ (201) 462-5203
 - b. Acceptable product Metasys BACnet V3.0.
 - c. Honeywell Building Controls, Lake Success, NY
 - d. Acceptable product Excel BCI
 - e. Siemens Building Controls Group Pine Brook, NJ, Apogee
 - 2. The DDCS Contractor shall be a recognized national manufacturer, installer and service provider of DDCS.

3. Systems which are not UUKL 864 listed for smoke control are not acceptable. Manufacturer shall provide a NYC MEA number.
4. If a franchised dealer is to be considered, the dealer must provide a letter written by a minimum Vice President of Operations for the specific automatic temperature control manufacturer with the following verbiage; "should the Franchise Dealer fail to provide a complete and operational system (as judged by the owner/engineer), the Manufacturer will complete the project to the Engineer's satisfaction at no additional cost to the City of New York". This letter must be provided to the engineer along with the other supporting documentation.
5. The DDCS Contractor shall have a branch facility supplying complete maintenance and support services on a 24 hour, 7-day-a-week basis.
6. As evidence and assurance of the contractor's ability to support the Owner's system with service and parts, the contractor must have been in the DDCS business for at least the last three (3) years and have successfully completed total projects of at least 3 times the value of this contract in each of the preceding three years.
7. The Direct Digital Control System architecture shall consist of the products of a manufacturer regularly engaged in the production of Direct Digital Control Systems, and shall be the manufacturer's latest standard of design.

1.5 REFERENCES

- A. All work shall conform to the following Codes and Standards, as applicable:
 1. National Fire Protection Association (NFPA) Standards.
 2. National Electric Code (NEC) and applicable local Electric Code.
 3. Underwriters Laboratories (UL) listing and labels.
 4. UL 864 UUKL Smoke Control
 5. UL 268 Smoke Detectors.
 6. UL 916 Energy Management
 7. NFPA 70 - National Electrical Code.
 8. NFPA 90A - Standard For The Installation Of Air Conditioning And Ventilating Systems.
 9. NFPA 92A and 92B Smoke Purge/Control Equipment.
 10. Factory Mutual (FM).
 11. American National Standards Institute (ANSI).
 12. National Electric Manufacturer's Association (NEMA).
 13. American Society of Mechanical Engineers (ASME).
 14. Institute of Electrical and Electronic Engineers (IEEE).
 15. American Standard Code for Information Interchange (ASCII).
 16. Electronics Industries Association (EIA).
 17. Occupational Safety and Health Administration (OSHA).
 18. American Society for Testing and Materials (ASTM).
 19. Federal Communications Commission (FCC) including Part 15, Radio Frequency Devices.

ANSI/ASHRAE Standard 195-2004 (BACnet)
SHRAE 90.1- 2004 and ASHRAE 62.1- 2004

- B. In the case of conflicts or discrepancies, the more stringent regulation shall apply.
- C. All work shall meet the approval of the Authorities Having Jurisdiction at the project site.

1.6 WORK BY OTHERS

- A. The demarcation of work and responsibilities between the DDCS Contractor and other related trades shall be as outlined in the DDCS RESPONSIBILITY MATRIX

DDCS RESPONSIBILITY MATRIX				
WORK	FURNISH	INSTALL	Low Volt. WIRING/TUBE	LINE POWER
DDCS low voltage and communication wiring	DDCS	DDCS	DDCS	N/A
VAV box nodes	DDCS	15	DDCS	16
DDCS conduits and raceway	DDCS	DDCS	DDCS	DDCS
Automatic damper actuators	DDCS	15	N/A	N/A
Manual valves	15	15	N/A	N/A
Automatic valves	DDCS	15	DDCS	N/A
VAV boxes	15	15	N/A	16
Pipe insertion devices and taps including thermowells, flow and pressure stations.	DDCS	15	DDCS	N/A
DDCS Current Switches.	DDCS	DDCS	DDCS	N/A
DDCS Control Relays	DDCS	DDCS	DDCS	N/A
Control air compressors	DDCS	DDCS	N/A	16
Concrete and/or inertia equipment pads and seismic bracing	15	15	N/A	N/A
DDCS interface with terminal unit controls	DDCS	DDCS	DDCS	16
Terminal unit controls interface with DDCS	15	15	DDCS	16
All DDCS Nodes, equipment, housings, enclosures and panels.	DDCS	DDCS	DDCS	DDCS
Smoke Detectors	16	16	16	16
Fire/Smoke Dampers	15	15	16	16
Fire Dampers	15	15	N/A	N/A
Pump Flow Switches	15	15	DDCS	N/A
VFDs	15	16	DDCS	16
Fire Alarm shutdown relay interlock wiring	16	16	16	16
Fire Alarm smoke control relay interlock wiring	16	16	16	16
Fireman's Smoke Control Override Panel	16	16	16	16
Fan Coil Unit controls	DDCS	DDCS	DDCS	16

Unit Heater controls	DDCS	DDCS	DDCS	16
Packaged AHU space mounted controls	15*	DDCS	DDCS	16
Packaged AHU factory-mounted controls	15*	15	DDCS	16
Packaged AHU field-mounted controls	DDCS	DDCS	DDCS	16
Starters, HOA switches	16	16	N/A	16
Control damper actuators	DDCS	DDCS	DDCS	16

1.7 SUBMITTALS

A. Shop Drawings, Product Data, and Samples

1. The DDCS contractor shall submit a list of all shop drawings with submittals dates within 30 days of contract award.
2. Submittals shall be in defined packages. Each package shall be complete and shall only reference itself and previously submitted packages. The packages shall be as approved by the Architect and Engineer for Contract compliance.
3. Allow 15 working days for the review of each package by the Architect and Engineer in the scheduling of the total DDCS work.
4. Equipment and systems requiring approval of local authorities must comply with such regulations and be approved. Filing shall be at the expense of the DDCS Contractor where filing is necessary. Provide a copy of all related correspondence and permits to the Owner.
5. Prepare an index of all submittals and shop drawings for the installation. Index shall include a shop drawing identification number, Contract Documents reference and item description.
6. The DDCS Contractor shall correct any errors or omissions noted in the first review.
7. At a minimum, submit the following:
8. DDCS network architecture diagrams including all nodes and interconnections.
9. Systems schematics, sequences and flow diagrams.
10. Points schedule for each point in the DDCS, including: Point Type, Object Name, Expanded ID, Display Units, Controller type, and Address.
11. Samples of Graphic Display screen types and associated menus.
12. Detailed Bill of Material list for each system or application, identifying quantities, part numbers, descriptions, and optional features.
13. Control Damper Schedule including a separate line for each damper provided under this section and a column for each of the damper attributes, including: Code Number, Fail Position, Damper Type, Damper Operator, Duct Size, Damper Size, Mounting, and Actuator Type.
14. Control Valve Schedules including a separate line for each valve provided under this section and a column for each of the valve attributes: Code Number, Configuration, Fail Position, Pipe Size, Valve Size, Body Configuration, Close off Pressure, Capacity, Valve CV, Design Pressure, and Actuator Type.
15. Room Schedule including a separate line for each VAV box and/or terminal unit indicating location and address

16. Details of all DDCS interfaces and connections to the work of other trades.
17. Product data sheets or marked catalog pages including part number, photo and description for all products including software.

1.8 RECORD DOCUMENTATION

A. Operation and Maintenance Manuals

1. Three (3) copies of the Operation and Maintenance Manuals shall be provided to the Owner's Representative upon completion of the project. The entire Operation and Maintenance Manual shall be furnished on Compact Disc media, and include the following for the DDCS provided:
2. Table of contents.
3. As-built system record drawings. Computer Aided Drawings (CAD) record drawings shall represent the as-built condition of the system and incorporate all information supplied with the approved submittal.
4. Manufacturers product data sheets or catalog pages for all products including software.
5. System Operator's manuals.
6. Archive copy of all site-specific databases and sequences.
7. DDCS network diagrams.
8. Interfaces to all third-party products and work by other trades.
9. The Operation and Maintenance Manual CD shall be self-contained, and include all necessary software required to access the product data sheets. A logically organized table of contents shall provide dynamic links to view and print all product data sheets. Viewer software shall provide the ability to display, zoom, and search all documents.

1.9 WARRANTY

A. Manufacturers Warranty:

1. Provide a one-year manufacturers warranty on the DDCS.
2. If within twelve (12) months from the date of acceptance of product, upon written notice from the Commissioner, it is found to be defective in operation, workmanship or materials, it shall be replaced, repaired or adjusted at the option of the Contractor.
3. Maintain an adequate supply of materials such that replacement of key parts and labor support, including programming. Warranty work shall be done during DDCS Contractor's normal business hours.

PART 2 – PRODUCTS

2.1 GENERAL DESCRIPTION

- A. The Direct Digital Control System (DDCS) shall use an open architecture and fully support a multi-vendor environment. To accomplish this effectively, the DDCS shall support open communication protocol standards and integrate a wide variety of third-party devices and applications. The system shall be

designed for use on the Internet, or intranets using off the shelf, industry standard technology compatible with other owner provided networks.

- B. The Direct Digital Control System shall consist of the following:
1. Standalone Network Automation Engine(s)
 2. Field Equipment Controller(s)
 3. Input/Output Module(s)
 4. Local Display Device(s)
 5. Portable Operator's Terminal(s)
 6. Distributed User Interface(s)
 7. Network processing, data storage and communications equipment
- C. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, controllers and operator devices, while re-using existing controls equipment.
- D. System architectural design shall eliminate dependence upon any single device for alarm reporting and control execution.
1. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.
 2. The System shall maintain all settings and overrides through a system reboot.
- E. System architectural design shall eliminate dependence upon any single device for alarm reporting and control execution.
- F. The System shall comply with (UL) 864 (UUKL) Ninth Edition Smoke Control Listing including the UL 864 Ninth Edition Standard for Control Units and Accessories for Fire Alarm Systems.
1. The System shall comply with the following NFPA Codes and Standards as applicable:
 2. NFPA 70 National Electrical Code
 3. NFPA 72 National Fire Alarm Code
 4. NFPA 101 Life Safety Code
 5. NFPA 90A Standard for the Installation of Air-Conditioning and Ventilation Systems
 6. The System shall comply with the following International Code Council (ICC) Codes:
 7. Building Officials and code Administrators International (BOMA) model code
 8. International Conference of Building Officials (ICBO) model code
 9. Southern Building Code Congress International (SBCCI) regulations
 10. Provide New York City MEA numbers for all Smoke control system and products.
- G. Acceptable Manufacturers
1. Johnson Controls, Metasys Bacnet V3.0
 2. Honeywell, Enterprise Building Integrator (EBI)

3. Siemens Building Systems, APOGEE
4. Or approved equal

2.2 DDCS ARCHITECTURE

A. Automation Network

1. The automation network shall be based on a PC industry standard of Ethernet TCP/IP. Where used, LAN controller cards shall be standard "off the shelf" products available through normal PC vendor channels.
2. The automation network shall be capable of operating at a communication speed of 100 Mbps, with full peer-to-peer network communication.
3. Network Automation Engines (NAE) shall reside on the automation network.
4. The automation network will be compatible with other enterprise-wide networks. Where indicated, the automation network shall be connected to the enterprise network and share resources with it by way of standard networking devices and practices.
5. The Network Automation Engines (NAE) shall be interfaced with the existing JCI system on the campus. Coordinate with the medical Center's IT personnel for integration requirements.

B. Control Network

1. Network Automation Engines (NAE) shall provide supervisory control over the control network and shall support all three (3) of the following communication protocols:
2. BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9
 - a. The NAE shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - b. The NAE shall be tested and certified as a BACnet Building Controller (B-BC).
 - c. LonWorks enabled devices using the Free Topology Transceiver (FTT-10a).
 - d. The Johnson Controls N2 Field Bus.
3. Control networks shall provide either "Peer-to-Peer," Master-Slave, or Supervised Token Passing communications, and shall operate at a minimum communication speed of 9600 baud.
4. DDC Controllers shall reside on the control network.
5. Control network communication protocol shall be BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135.
6. A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided for each controller device (master or slave) that will communicate on the BACnet MS/TP Bus.

C. Integration

1. Hardwired
 - a. Analog and digital signal values shall be passed from one system to another via hardwired connections.

- b. There will be one separate physical point on each system for each point to be integrated between the systems.
2. BACnet Protocol Integration – BACnet
 - a. The neutral protocol used between systems will be BACnet over Ethernet and comply with the ASHRAE BACnet standard 135-2003.
 - b. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
 - c. The ability to command, share point object data, change of state (COS) data and schedules between the host and BACnet systems shall be provided.

2.3 USER INTERFACE

- A. Dedicated Web Based User Interface
 1. Where indicated on plans the BMS Contractor shall provide and install a personal computer for command entry, information management, network alarm management, and database management functions. All real-time control functions, including scheduling, history collection and alarming, shall be resident in the BMS Network Automation Engines to facilitate greater fault tolerance and reliability.
 2. Dedicated User Interface Architecture – The architecture of the computer shall be implemented to conform to industry standards, so that it can accommodate applications provided by the BMS Contractor and by other third party applications suppliers, including but not limited to Microsoft Office Applications. Specifically it must be implemented to conform to the following interface standards.
 - a. Microsoft Internet Explorer for user interface functions
 - b. Microsoft Office Professional for creation, modification and maintenance of reports, sequences other necessary building management functions
 - c. Microsoft Outlook or other e-mail program for supplemental alarm functionality and communication of system events, and reports
 - d. Required network operating system for exchange of data and network functions such as printing of reports, trends and specific system summaries
 3. PC Hardware – The personal computer(s) shall be configured as follows:
 - a. Memory – 1 GB (512 MB Minimum)
 - b. CPU– Pentium 4 processor. 2.8 Hz Clock Speed (2.0 GHz minimum)
 - c. Hard Drive – 80 GB free hard drive space (40GB minimum)
 - d. Hard drive backup system – CD/RW, DVD/RW or network backup software provided by IT department
 - e. CD ROM Drive – 32X performance
 - f. Ports – (2) Serial and (1) parallel, (2) USB ports
 - g. Keyboard – 101 Keyboard and 2 Button Mouse
 - h. CRT configuration – 1-2 CRTs as follows:
Each Display – 17" Flat Panel Monitor 1280 x 1024 resolution minimum 16 bit or higher color resolution

- Display card with multiple monitor support
 - i. LAN communications – Ethernet communications board; 3Comm or equal
 - 4. Operating System Software
 - a. Windows XP Professional
 - b. Where user interface is not provided via browser, provide complete operator workstation software package, including any hardware or software keys. Include the original installation disks and licenses for all included software, device drivers, and peripherals.
 - c. Provide software registration cards to the Owner for all included software.
 - 5. Peripheral Hardware
 - a. Reports printer:
 - Printer Make – Hewlett Packard DeskJet
 - Print Speed – 600 DPI Black, 300 DPI Color
 - Buffer – 64 K Input Print Buffer
 - Color Printing – Include Color Kit
- B. Distributed Web Based User Interface
- 1. All features and functions of the dedicated user interface shall be available on any computer connected directly or via a wide area or virtual private network (WAN/VPN) to the automation network and conforming to the following specifications.
 - 2. The software shall run on the Microsoft Internet Explorer (6.0 or higher) browser.
 - 3. Minimum hardware requirements:
 - 256 MB RAM
 - 2.0 GHz Clock Speed Pentium 4 Microprocessor
 - 40.0 GB Hard Drive.
 - 1 Keyboard with 83 keys (minimum).
 - SVGA 1024x768 resolution display with 64K colors and 16 bit color depth
 - Mouse or other pointing device
- C. Portable Operator Terminal
- 1. Provide full access to systems configuration and definition via the Browser Based user interface the DDCS Contractor shall provide a portable operator terminal for programming purposes. The terminal shall be configured as follows:
 - a. Personal Laptop Computer Manufacturer – Dell, Compaq or HP
 - b. 1 GB RAM (256 MB minimum) – XP Professional
 - c. 1.8 GHz Clock Speed Pentium 4 Microprocessor (800 MHz minimum)
 - d. 40 GB Hard Drive (40 GB minimum)
 - e. (1) CD-ROM Drive, 32x speed
 - f. (1) Serial (1) Parallel (2) USB ports
 - g. 1 Keyboard with 83 keys (minimum).
 - h. Integral 2 button Track Point or Track Ball.

- i. 10" SVGA 1024x768 resolution color display
 - j. Two PCMCIA Type II or one Type III card slot
 - k. Complete operator workstation software package, including any hardware or software.
 - l. Original printed manuals for all software and peripherals.
 - m. Original installation disks or CD for all software, device drivers, and peripherals
 - n. Software registration cards for all included software shall be provided to the Owner.
 - o. Carrying case
 - p. Spare battery.
 - q. External power supply/battery charger
2. Proprietary Portable Terminal
- a. Manufacturers providing proprietary portable terminals shall submit technical data sheets for the terminal and all associated software and hardware.
 - b. The proprietary terminal shall meet the same operator interface software requirements as specified above.
3. Software
- a. Portable operator terminals shall support all controllers within the system on a direct-connect communications basis.
 - b. When used to access First or Second Tier controllers, the portable operator terminal shall utilize the standard operator workstation software, as previously defined.
 - c. When used to access Application Specific Controllers, the portable operator terminal shall utilize either the standard operator workstation software, as previously defined, or controller-specific utility software.

2.4 NETWORK AUTOMATION ENGINES (NAE)

D. Network Automation Engine

- 1. The Network Automation Engine (NAE) shall be a fully user-programmable, supervisory controller. The NAE shall monitor the network of distributed application-specific controllers, provide global strategy and direction, and communicate on a peer-to-peer basis with other Network Automation Engines.
- 2. Automation network – The NAE shall reside on the automation network and shall support a subnet of system controllers.
- 3. User Interface – Each NAE shall have the ability to deliver a web based User Interface (UI) as previously described. All computers connected physically or virtually to the automation network shall have access to the web based UI.
 - a. The web based UI software shall be imbedded in the NAE. Systems that require a local copy of the system database on the user's personal computer are not acceptable.
 - b. The NAE shall support up a minimum of four (4) concurrent users.
 - c. The web based user shall have the capability to access all system data through one NAE.

- d. Remote users connected to the network through an Internet Service Provider (ISP) or telephone dial up shall also have total system access through one NAE.
 - e. Systems that require the user to address more than one NAE to access all system information are not acceptable.
 - f. The NAE shall have the capability of generating web based UI graphics. The graphics capability shall be imbedded in the NAE.
 - g. Systems that support UI Graphics from a central database or require the graphics to reside on the user's personal computer are not acceptable.
 - h. The web based UI shall support the following functions using a standard version of Microsoft Internet Explorer:
 - Configuration
 - Commissioning
 - Data Archiving
 - Monitoring
 - Commanding
 - System Diagnostics
 - i. Systems that require workstation software or modified web browsers are not acceptable.
 - j. The NAE shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems.
4. Processor – The NAE shall be microprocessor-based with a minimum word size of 32 bits. The NAE shall be a multi-tasking, multi-user, and real-time digital control processor. Standard operating systems shall be employed. NAE size and capability shall be sufficient to fully meet the requirements of this Specification.
5. Memory – Each NAE shall have sufficient memory to support its own operating system, databases, and control programs, and to provide supervisory control for all control level devices.
6. Hardware Real Time Clock – The NAE shall include an integrated, hardware-based, real-time clock.
7. The NAE shall include troubleshooting LED indicators to identify the following conditions:
- a. Power - On/Off
 - b. Ethernet Traffic – Ethernet Traffic/No Ethernet Traffic
 - c. Ethernet Connection Speed – 10 Mbps/100 Mbps
 - d. FC Bus A – Normal Communications/No Field Communications
 - e. FC Bus B – Normal Communications/No Field Communications
 - f. Peer Communication – Data Traffic between NAE Devices
 - g. Run – NAE Running/NAE in Startup/NAE Shutting Down/Software Not Running
 - h. Bat Fault – Battery Defective, Data Protection Battery Not Installed
 - i. 24 VAC – 24 VAC Present/Loss Of 24VAC
 - j. Fault – General Fault
 - k. Modem RX – NAE Modem Receiving Data

- I. Modem TX – NAE Modem Transmitting Data
8. Communications Ports – The NAE shall provide the following ports for operation of operator Input/Output (I/O) devices, such as industry-standard computers, modems, and portable operator's terminals.
 - a. Two (2) USB port
 - b. Two (2) URS-232 serial data communication port
 - c. Two (2) RS-485 port
 - d. One (1) Ethernet port
9. Diagnostics – The NAE shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all panel components. The Network Automation Engine shall provide both local and remote annunciation of any detected component failures, low battery conditions, or repeated failures to establish communication.
10. Power Failure – In the event of the loss of normal power, The NAE shall continue to operate for a user adjustable period of up to 10 minutes after which there shall be an orderly shutdown of all programs to prevent the loss of database or operating system software.
 - a. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions. All critical configuration data shall be saved into Flash memory.
 - b. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.
11. Certification – The NAE shall be listed by Underwriters Laboratories (UL).
12. Controller network – The NAE shall support the following communication protocols on the controller network:
 - a. The NAE shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
 - b. The NAE shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - c. The NAE shall be tested and certified as a BACnet Building Controller (B-BC).
 - d. A BACnet Protocol Implementation Conformance Statement shall be provided for the NAE.
 - e. The Conformance Statements shall be submitted 10 days prior to bidding.
 - f. The NAE shall support a minimum of 100 control devices.
 - g. The NAE shall support LonWorks enabled devices using the Free Topology Transceiver FTT10.
 - h. All LonWorks controls devices shall be LonMark certified.
 - i. The NAE shall support a minimum of 255 LonWorks enabled control devices.
 - j. The NAE shall support the Johnson Controls N2 Field Bus.
 - k. The NAE shall support a minimum of 100 N2 control devices.
 - l. The Bus shall conform to Electronic Industry Alliance (EIA) Standard RS-485.
 - m. The Bus shall employ a master/slave protocol where the NAE is the master.

- n. The Bus shall employ a four (4) level priority system for polling frequency.
- o. The Bus shall be optically isolated from the NAE.
- p. The Bus shall support the Metasys Integrator System.

2.5 NETWORK CONTROL ENGINE

- A. The Network Control Engine (NCE) shall be a fully user-programmable, supervisory controller. The NCE shall monitor the network of distributed application-specific controllers, provide global strategy and direction, and communicate on a peer-to-peer basis with other Network Automation Engines.
- B. The Network Control Engine (NCE) shall be a fully user-programmable, digital controller that includes a minimum of 33 I/O points.
- C. Automation Network – The NCE shall reside on the automation network and shall support a subnet of 32 Field controllers.
- D. User Interface – Each NCE shall have the ability to deliver a web based User Interface (UI) as previously described. All computers connected physically or virtually to the automation network shall have access to the web based UI.
 - 1. The web based UI software shall be imbedded in the NCE. Systems that require a local copy of the system database on the user's personal computer are not acceptable.
 - 2. The NCE shall support a minimum of two (2) concurrent users.
 - 3. The NCE shall have the capability of generating web based UI graphics. The graphics capability shall be imbedded in the NCE.
 - 4. Systems that support UI Graphics from a central database or require the graphics to reside on the user's personal computer are not acceptable.
 - 5. The web based UI shall support the following functions using a standard version of Microsoft Internet Explorer:
 - Configuration
 - Commissioning
 - Data Archiving
 - Monitoring
 - Commanding
 - System Diagnostics
 - 6. Systems that require workstation software or modified web browsers are not acceptable.
 - 7. The NCE shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems.
- E. The NCE shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
- F. The NCE shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only, shall not be acceptable.
- G. The NCE shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.

- H. The NCE shall support the following number and types of inputs and outputs:
1. Ten Universal Inputs - shall be configured to monitor any of the following:
 2. Analog Input, Voltage Mode
 3. Analog Input, Current Mode
 4. Analog Input, Resistive Mode
 5. Binary Input, Dry Contact Maintained Mode
 6. Binary Input, Pulse Counter Mode
 7. Eight Binary Inputs - shall be configured to monitor either of the following:
 8. Dry Contact Maintained Mode
 9. Pulse Counter Mode
 10. Four Analog Outputs - shall be configured to output either of the following
 11. Analog Output, Voltage Mode
 12. Analog Output, Current Mode
 13. Seven Binary Outputs - shall output the following:
 14. 24 VAC Triac
 15. Four Configurable Outputs - shall be configured to output either of the following:
 16. Analog Output, Voltage Mode
 17. Binary Output, 24 VAC Triac Mode
- I. The NCE shall have the ability to monitor and control a network of sensors and actuators over a Sensor-Actuator Bus (SA Bus).
1. The SA Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 2. The SA Bus shall support a minimum of 10 devices.
 3. The SA Bus shall operate at a maximum distance of 1,200 Ft. between the NCE and the furthest connected device.
- J. The NCE shall have the capability to execute complex control sequences involving direct wired I/O points as well as input and output devices communicating over the Field Trunk or the SA Bus.
- K. The NCE shall support, but not be limited to, the following applications:
1. Central Equipment including chillers and boilers
 2. Lighting and electrical distribution
 3. Built-up air handling units for special applications
 4. Power generation and energy monitoring equipment
 5. Interfaces to security and fire detection systems
- L. The NCE shall support a Local Controller Display (DIS1710) either as an integral part of the NCE or as a remote device communicating over the SA Bus.
1. The Display shall use a BACnet Standard SSPC-135, clause 9 Master-Slave/Token-Passing protocol.
 2. The Display shall allow the user to view monitored points without logging into the system.
 3. The Display shall allow the user to view and change setpoints, modes of operation, and parameters.

4. The Display shall provide password protection with user adjustable password timeout.
 5. The Display shall be menu driven with separate paths for:
Input/Output
Parameter/Setpoint
Overrides
 6. The Display shall use easy-to-read English text messages.
 7. The Display shall allow the user to select the points to be shown and in what order.
 8. The Display shall support a back lit Liquid Crystal Display (LCD) with adjustable contrast and brightness and automatic backlight brightening during user interaction.
 9. The display shall be a minimum of 4 lines and a minimum of 20 characters per line
 10. The Display shall have a keypad with no more than 6 keys.
 11. The Display shall be panel mountable.
- M. The NCE shall be microprocessor-based with a minimum word size of 32 bits. The NAE shall be a multi-tasking, multi-user, and real-time digital control processor. Standard operating systems shall be employed. NCE size and capability shall be sufficient to fully meet the requirements of this Specification.
- N. The NCE shall employ an industrial single board computer.
- O. Each NCE shall have sufficient memory to support its own operating system, databases, and control programs, and to provide supervisory control for all control level devices.
- P. The NCE shall include an integrated, hardware-based, real-time clock.
- Q. The NCE shall employ nonvolatile Flash memory to store all programs and data. The NCE shall employ a data protection battery to save data and power the real time clock when primary power is interrupted.
- R. The NCE shall provide removable, color coded, screw terminal blocks for 24 VAC power, communication bus and I/O point field wiring.
- S. The NCE shall include troubleshooting LED indicators to identify the following conditions:
1. Power
 2. Fault
 3. SA Bus
 4. FC Bus
 5. Modem TX
 6. Modem RX
 7. Battery Fault
 8. Ethernet
 9. 10 LNK
 10. 100 LNK
 11. Run
 12. Peer Com

- T. Communications Ports – The NCE shall provide the following ports for operation of operator Input/Output (I/O) devices, such as industry-standard computers, modems, and portable operator's terminals.
1. USB port
 2. RS-232 serial data communication port
 3. RS-485 port
 4. RJ-45 Ethernet port
 5. RJ-12 jack
- U. Diagnostics – The NCE shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all panel components. The Network Control Engine shall provide both local and remote annunciation of any detected component failures, low battery conditions, or repeated failures to establish communication.
- V. Power Failure – In the event of the loss of normal power, The NCE shall continue to operate for a user adjustable period of up to 10 minutes after which there shall be an orderly shutdown of all programs to prevent the loss of database or operating system software.
1. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions. All critical configuration data shall be saved into Flash memory.
 2. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.
- W. Certification – The NCE shall be listed by Underwriters Laboratories (UL). File E107041, CCN PAZX, UL 916, Energy Management Equipment. FCC Compliant to CFR47, Part 15, Subpart B, Class A
- X. Field Controller Bus – The NCE shall support the following communication protocols on the Field Controller Bus:
1. The NCE shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
The NCE shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
The NAE shall be tested and certified as a BACnet Building Controller (B-BC).
A BACnet Protocol Implementation Conformance Statement shall be provided for the NCE.
The Conformance Statements shall be submitted 10 days prior to bidding.
The NCE shall support a minimum of 32 control devices.
 2. The NCE shall support LonWorks enabled devices using the Free Topology Transceiver FTT10 on the Field Controller Bus (LonWorks Network).
All LonWorks controls devices shall be LonMark certified.
The NCE shall support a minimum of 32 LonWorks enabled control devices.
 3. The NCE shall support the N2 devices on the Field Controller Bus (Johnson Controls N2 Bus).
The NCE shall support a minimum of 32 N2 control devices.

The Bus shall conform to Electronic Industry Alliance (EIA) Standard RS-485.
The Bus shall employ a master/slave protocol where the NCE is the master.
The Bus shall employ a four (4) level priority system for polling frequency.
The Bus shall be optically isolated from the NCE.
The Bus shall support the Metasys Integrator System.

2.6 DDC SYSTEM CONTROLLERS

A. Field Equipment Controller

1. The Field Equipment Controller (FEC) shall be a fully user-programmable, digital controller that communicates via BACnet MS/TP protocol.
 - a. The FEC shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
 - b. The FEC shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - c. The FEC shall be tested and certified as a BACnet Application Specific Controller (B-ASC).
 - d. A BACnet Protocol Implementation Conformance Statement shall be provided for the FEC.
 - e. The Conformance Statement shall be submitted 10 days prior to bidding.
2. The FEC shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
3. Controllers shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only shall not be acceptable.
4. The FEC shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
5. The FEC shall include a removable base to allow pre-wiring without the controller.
6. The FEC shall include troubleshooting LED indicators to identify the following conditions:
 - a. Power On
 - b. Power Off
 - c. Download or Startup in progress, not ready for normal operation
 - d. No Faults
 - e. Device Fault
 - f. Field Controller Bus - Normal Data Transmission
 - g. Field Controller Bus - No Data Transmission
 - h. Field Controller Bus - No Communication
 - i. Sensor-Actuator Bus - Normal Data Transmission
 - j. Sensor-Actuator Bus - No Data Transmission

- k. Sensor-Actuator Bus - No Communication
7. The FEC shall accommodate the direct wiring of analog and binary I/O field points.
8. The FEC shall support the following types of inputs and outputs:
 - a. Universal Inputs - shall be configured to monitor any of the following:
 - Analog Input, Voltage Mode
 - Analog Input, Current Mode
 - Analog Input, Resistive Mode
 - Binary Input, Dry Contact Maintained Mode
 - Binary Input, Pulse Counter Mode
 - b. Binary Inputs - shall be configured to monitor either of the following:
 - Dry Contact Maintained Mode
 - Pulse Counter Mode
 - c. Analog Outputs - shall be configured to output either of the following
 - Analog Output, Voltage Mode
 - Analog Output, current Mode
 - d. Binary Outputs - shall output the following:
 - 24 VAC Triac
 - e. Configurable Outputs - shall be capable of the following:
 - Analog Output, Voltage Mode
 - Binary Output Mode
9. The FEC shall have the ability to reside on a Field Controller Bus (FC Bus).
 - a. The FC Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 - b. The FC Bus shall support communications between the FECs and the NAE.
 - c. The FC Bus shall also support Input/Output Module (IOM) communications with the FEC and with the NAE.
 - d. The FC Bus shall support a minimum of 100 IOMs and FECs in any combination.
 - e. The FC Bus shall operate at a maximum distance of 15,000 Ft. between the FEC and the furthest connected device.
10. The FEC shall have the ability to monitor and control a network of sensors and actuators over a Sensor-Actuator Bus (SA Bus).
 - a. The SA Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard Protocol SSPC-135, Clause 9.
 - b. The SA Bus shall support a minimum of 10 devices per trunk.
 - c. The SA Bus shall operate at a maximum distance of 1,200 Ft. between the FEC and the furthest connected device.
11. The FEC shall have the capability to execute complex control sequences involving direct wired I/O points as well as input and output devices communicating over the FC Bus or the SA Bus.
12. The FEC shall support, but not be limited to, the following:

- a. Hot water, chilled water/central plant applications
 - b. Built-up air handling units for special applications
 - c. Terminal units
 - d. Special programs as required for systems control
13. The FEC shall support a Local Controller Display (DIS1710) either as an integral part of the FEC or as a remote device communicating over the SA Bus.
- a. The Display shall use a BACnet Standard SSPC-135, clause 9 Master-Slave/Token-Passing protocol.
 - b. The Display shall allow the user to view monitored points without logging into the system.
 - c. The Display shall allow the user to view and change setpoints, modes of operation, and parameters.
 - d. The Display shall provide password protection with user adjustable password timeout.
 - e. The Display shall be menu driven with separate paths for:
Input/Output
Parameter/Setpoint
Overrides
 - f. The Display shall use easy-to-read English text messages.
 - g. The Display shall allow the user to select the points to be shown and in what order.
 - h. The Display shall support a back lit Liquid Crystal Display (LCD) with adjustable contrast and brightness and automatic backlight brightening during user interaction.
 - i. The display shall be a minimum of 4 lines and a minimum of 20 characters per line
 - j. The Display shall have a keypad with no more than 6 keys.
 - k. The Display shall be panel mountable.

2.7 FIELD DEVICES

A. Input/Output Module

1. The Input/Output Module (IOM) provides additional inputs and outputs for use in the FEC.
2. The IOM shall communicate with the FEC over the FC Bus or the SA Bus.
3. The IOM shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
 - a. The IOM shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - b. The IOM shall be tested and certified as a BACnet Application Specific Controller (B-ASC).
 - c. A BACnet Protocol Implementation Conformance Statement shall be provided for the FEC.
4. The IOM shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
5. The IOM shall have a minimum of 4 points to a maximum of 17 points.

6. The IOM shall support the following types of inputs and outputs:
 - a. Universal Inputs - shall be configured to monitor any of the following:
 - Analog Input, Voltage Mode
 - Analog Input, Current Mode
 - Analog Input, Resistive Mode
 - Binary Input, Dry Contact Maintained Mode
 - Binary Input, Pulse Counter Mode
 - b. Binary Inputs - shall be configured to monitor either of the following:
 - Dry Contact Maintained Mode
 - Pulse Counter Mode
 - c. Analog Outputs - shall be configured to output either of the following:
 - Analog Output, Voltage Mode
 - Analog Output, current Mode
 - d. Binary Outputs - shall output the following:
 - 24 VAC Triac
 - e. Configurable Outputs - shall be capable of the following:
 - Analog Output, Voltage Mode
 - Binary Output Mode
 7. The IOM shall include troubleshooting LED indicators to identify the following conditions:
 - a. Power On
 - b. Power Off
 - c. Download or Startup in progress, not ready for normal operation
 - d. No Faults
 - e. Device Fault
 - f. Normal Data Transmission
 - g. No Data Transmission
 - h. No Communication
- B. Networked Thermostat
1. The networked thermostat shall be capable of controlling two- or four-pipe fan coils, cabinet unit heaters or other similar equipment.
 2. The TEC shall communicate over the Field Controller Bus using BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9.
 3. The TEC shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - a. The TEC shall be tested and certified as a BACnet Application Specific Controller (B-ASC).
 - b. A BACnet Protocol Implementation Conformance Statement shall be provided for the TEC.
 4. The Networked Thermostat shall support remote read/write and parameter adjustment from the web based User Interface through a Network Automation Engine.
 5. The Networked Thermostat shall include an intuitive User Interface providing plain text messages.

- a. Two line, 8 character backlit display
 - b. LED indicators for Fan, Heat, and Cool status
 - c. Five (5) User Interface Keys
 - Mode
 - Fan
 - Override
 - Degrees C/F
 - Up/Down
 - d. The display shall continuously scroll through the following parameters:
 - Room Temperature
 - System Mode
 - Schedule Status – Occupied/Unoccupied/Override
 - Applicable Alarms
6. The Networked Thermostat shall provide the flexibility to support any one of the following inputs:
- a. Integral Indoor Air Temperature Sensor
 - b. Duct Mount Air Temperature Sensor
 - c. Remote Indoor Air Temperature Sensor with Occupancy Override and LED Indicator
 - d. Two configurable binary inputs
7. The Networked Thermostat shall provide the flexibility to support any one of the following outputs:
- a. Three Speed Fan Control
 - b. Two On/Off
 - c. Two Floating
 - d. Two Proportional (0 to 10V)
8. The Networked Thermostat shall provide a minimum of six (6) levels of keypad lockout.
9. The Networked Thermostat shall provide the flexibility to adjust the following parameters:
- a. Adjustable Temporary Occupancy from 0 to 24 hours
 - b. Adjustable heating/cooling deadband from 2° F to 5° F
 - c. Adjustable heating/cooling cycles per hour from 4 to 8
10. The Networked Thermostat shall employ nonvolatile electrically erasable programmable read-only memory (EEPROM) for all adjustable parameters.

C. VAV Modular Assembly

1. The VAV Modular Assembly shall provide both standalone and networked direct digital control of pressure-independent, variable air volume terminal units. It shall address both single and dual duct applications.
2. The VMA shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - a. The VMA shall be tested and certified as a BACnet Application Specific Controller (B-ASC).

- b. A BACnet Protocol Implementation Conformance Statement shall be provided for the VMA.
3. The VAV Modular Assembly shall communicate over the FC Bus using BACnet Standard protocol SSPC-135, Clause 9.
4. The VAV Modular Assembly shall have internal electrical isolation for AC power, DC inputs, and MS/TP communications. An externally mounted isolation transformer shall not be acceptable.
5. The VAV Modular Assembly shall be a configurable digital controller with integral differential pressure transducer and damper actuator. All components shall be connected and mounted as a single assembly that can be removed as one piece.
6. The VAV Modular Assembly shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
7. 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.
8. The controller 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.
9. Each controller shall have the ability to automatically calibrate the flow sensor to eliminate pressure transducer offset error due to ambient temperature / humidity effects.
10. The controller shall utilize a proportional plus integration (PI) algorithm for the space temperature control loops.
11. Each controller 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.
12. The controller shall provide the ability to download and upload VMA 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.
13. Control setpoint changes initiated over the network shall be written to VMA non-volatile memory to prevent loss of setpoint changes and to provide consistent operation in the event of communication failure.
14. The controller firmware shall be flash-upgradeable remotely via the communications bus to minimize costs of feature enhancements.
15. The controller shall provide fail-soft operation if the airflow signal becomes unreliable, by automatically reverting to a pressure-dependent control mode.
16. The controller 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.
17. Controller 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 VMA 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.

- a. Absolute temperature loop error
 - b. Signed temperature loop error
 - c. Absolute airflow loop error
 - d. Signed airflow loop error
 - e. Average damper actuator duty cycle
18. The controller shall detect system error conditions to assist in managing the VAV zones. The error conditions shall consist of:
- a. Unreliable space temperature sensor
 - b. Unreliable differential pressure sensor
 - c. Starved box
 - d. Actuator stall
 - e. Insufficient cooling
 - f. Insufficient heating
19. The controller shall provide a flow test function to view damper position vs. flow in a graphical format. The information would alert the user to check damper position. The VMA would also provide a method to calculate actuator duty cycle as an indicator of damper actuator runtime.
20. The controller 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.
21. The controller 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.
22. Inputs:
- a. Analog inputs with user defined ranges shall monitor the following analog signals, without the addition of equipment outside the terminal controller cabinet:
 - 0-10 VDC Sensors
 - 1000ohm RTDs
 - NTC Thermistors
 - b. Binary inputs shall monitor dry contact closures. Input shall provide filtering to eliminate false signals resulting from input "bouncing."
 - c. For noise immunity, the inputs shall be internally isolated from power, communications, and output circuits.
 - d. Provide side loop application for humidity control.
23. Outputs
- a. Analog outputs shall provide the following control outputs:
 - 0-10 VDC

- b. Binary outputs shall provide a SPST Triac output rated for 500mA at 24 VAC.
 - c. For noise immunity, the outputs shall be internally isolated from power, communications, and other output circuits.
24. Application Configuration
- a. The VAV Modular Assembly shall be configured with a software tool that provides a simple Question/Answer format for developing applications and downloading.
25. Sensor Support
- a. The VAV Modular Assembly shall communicate over the Sensor-Actuator Bus (SA Bus) with a Network Sensor.
 - b. The VMA shall support an LCD display room sensor.
 - c. The VMA shall also support standard room sensors as defined by analog input requirements.
 - d. The VMA shall support humidity sensors defined by the AI side loop.
- D. Network Sensors
1. The Network Sensors (NS) shall have the ability to monitor the following variables as required by the systems sequence of operations:
 - a. Zone Temperature
 - b. Zone Humidity
 - c. Zone Setpoint
 - d. Discharge Air Temperature
 2. The NS shall transmit the information back to the controller on the Sensor-Actuator Bus (SA Bus) using BACnet Standard protocol SSPC-135, Clause 9.
 3. The NS shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - a. The NS shall be tested and certified as a BACnet Smart Sensors (B-SS).
 - b. A BACnet Protocol Implementation Conformance Statement shall be provided for the NS.
 4. The Network Zone Sensors shall include the following items:
 - a. A backlit Liquid Crystal Display (LCD) to indicate the Temperature, Humidity and Setpoint
 - b. An LED to indicate the status of the Override feature
 - c. A button to toggle the temperature display between Fahrenheit and Celsius
 - d. A button to initiate a timed override command
 - e. Available in either surface mount or wall mount
 - f. Available with either screw terminals or phone jack
 5. The Network Discharge Air Sensors shall include the following:
 - a. 4 inch or 8 inch duct insertion probe
 - b. 10 foot pigtail lead
 - c. Dip Switches for programmable address selection
 - d. Ability to provide an averaging temperature from multiple locations

- e. Ability to provide a selectable temperature from multiple locations

2.8 SYSTEM TOOLS

A. System Configuration Tool

1. The Configuration Tool shall be a software package enabling a computer platform to be used as a stand-alone engineering configuration tool for a Network Automation Engine (NAE) or a Network Integration Engine (NIE).
2. The configuration tool shall provide an archive database for the configuration and application data.
3. The configuration tool shall have the same look-and-feel at the User Interface (UI) regardless of whether the configuration is being done online or offline.
4. The configuration tool shall include the following features:
 - a. Basic system navigation tree for connected networks
 - b. Integration of Metasys N1, LonWorks, and BACnet enabled devices
 - c. Customized user navigation trees
 - d. Point naming operating parameter setting
 - e. Graphic diagram configuration
 - f. Alarm and event message routing
 - g. Graphical logic connector tool for custom programming
 - h. Downloading, uploading, and archiving databases
5. The configuration tool shall have the capability to automatically discover field devices on connected buses and networks. Automatic discovery shall be available for the following field devices:
 - a. BACnet Devices
 - b. LonWorks devices
 - c. N2 Bus devices
 - d. Metasys N1 networks
6. The configuration tool shall be capable of programming the Field Equipment Controllers.
 - a. The configuration tool shall provide the capability to configure, simulate, and commission the Field Equipment Controllers.
 - b. The configuration tool shall allow the FECs to be run in Simulation Mode to verify the applications.
 - c. The configuration tool shall contain a library of standard applications to be used for configuration.
7. The configuration tool shall be capable of programming the field devices.
 - a. The configuration tool shall provide the capability to configure, simulate, and commission the field devices.
 - b. The configuration tool shall allow the field devices to be run in Simulation Mode to verify the applications.
 - c. The configuration tool shall contain a library of standard applications to be used for configuration
8. A wireless access point shall allow a wireless enabled portable PC to make a temporary Ethernet connection to the automation network.

- a. The wireless connection shall allow the PC to access configuration tool through the web browser using the User Interface (UI).
 - b. The wireless use of configuration tool shall be the same as a wired connection in every respect.
 - c. The wireless connection shall use the Bluetooth Wireless Technology.
- B. Wireless MS/TP Converter
1. The converter shall provide a temporary wireless connection between the SA or FC Bus and a wireless enabled portable PC.
 2. The converter shall support downloading and troubleshooting FEC and field devices from the PC over the wireless connection.
 3. The converter shall employ Bluetooth Wireless Technology.
 4. The converter shall be powered through a connection to either the Sensor-Actuator (SA) or the Field Controller (FC) Bus.
 5. The converter shall operate over a minimum of thirty three (33) feet within a building.
 6. The converter shall have LED indicators to provide information regarding the following conditions:
 - Power - On/Off
 - Fault – Fault/No Fault
 - SA/FC Bus – Bus Activity/ No Bus Activity
 - Blue – Bluetooth Communication Established/ Bluetooth Communication Not Established
 7. The SWCVT shall comply with FCC Part 15.247 regulations for low-power unlicensed transmitters.
- C. Handheld VAV Balancing Sensor
1. The sensor shall be a light weight portable device of dimensions not more than 3.2 x 3.2 x 1.0 inches.
 2. The sensor shall be capable of displaying data and setting balancing parameters for VAV control applications.
 3. The sensor shall be powered through a connection to either the Sensor-Actuator (SA) or the Field Controller (FC) Bus.
 4. The sensor shall be a menu driven device that shall modify itself automatically depending upon what type of application resides in the controller.
 5. The sensor shall contain a dial and two buttons to navigate through the menu and to set balancing parameters.
 6. The sensor shall provide an adjustable time-out parameter that will return the controller to normal operation if the balancing operation is aborted or abandoned.
 7. The sensor shall include the following
 - 5 foot retractable cable
 - Laminated user guide
 - Nylon carrying case

8. The sensor shall be Underwriters Laboratory UL 916 listed and CSA certified C22.2 N. 205, CFR47.

2.9 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
Hot/Chilled Water	$\pm .5^{\circ}\text{F}$.
Room Temp	$\pm .5^{\circ}\text{F}$.
Duct Temperature	$\pm .5^{\circ}\text{F}$.
All Others	$\pm .75^{\circ}\text{F}$.

2. Room Temperature Sensors

- a. Room sensors shall be constructed for either surface or wall box mounting.
- b. Room sensors shall have the following options when specified:
Setpoint reset slide switch providing a ± 3 degree (adjustable) range.
Individual heating/cooling setpoint slide switches.
A momentary override request push button for activation of after-hours operation.
Analog thermometer.

3. Room Temperature Sensors with Integral Display

- a. Room sensors shall be constructed for either surface or wall box mounting.
- b. Room sensors shall have an integral LCD display and four button keypad with the following capabilities:
Display room and outside air temperatures.
Display and adjust room comfort setpoint.
Display and adjust fan operation status.
Timed override request push button with LED status for activation of after-hours operation.
Display controller mode.
Password selectable adjustment of setpoint and override modes.

4. Thermo wells

- a. When thermo wells are required, the sensor and well shall be supplied as a complete assembly, including wellhead and Greenfield fitting.
 - b. Thermo wells shall be pressure rated and constructed in accordance with the system working pressure.
 - c. Thermo wells 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. Thermo wells shall be constructed of 316 stainless steel.
5. 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 3R construction and rated for ambient temperatures.
6. 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.
7. 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.
8. Acceptable Manufacturers: Johnson Controls, Setra.
- 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 meet the following overall accuracy, including lead loss and Analog to Digital conversion. 3% between 20% and 80% RH @ 77 Deg F unless specified elsewhere.

4. Outside air relative humidity sensors shall be installed with a rain proof, perforated cover. The transmitter shall be installed in a NEMA 3R enclosure with sealite 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. Acceptable Manufacturers: Johnson Controls, Veris Industries, and Mamac.

D. 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 Contractor and Owner 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:
.01-20" w.c. input differential pressure range.
4-20 mA output.
Maintain accuracy up to 20 to 1 ratio turndown.
Reference Accuracy: +0.2% of full span.
 - c. Acceptable Manufacturers: Setra and Mamac.
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:
Differential pressure range 10" w.c. to 300 PSI.
Reference Accuracy: ±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. Acceptable Manufacturers: Setra and Mamac.
 - 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:
 - 1.00 to +1.00 w.c. input differential pressure ranges. (Select range appropriate for system application)
 - 4-20 mA output.
 - Maintain accuracy up to 20 to 1 ratio turndown.
 - Reference Accuracy: +0.2% of full span.
 - c. Acceptable Manufacturers: Johnson Controls and Setra.
 - 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:
 - (0.00 - 1.00" to 5.00") w.c. input differential pressure ranges. (Select range appropriate for system application.)
 - 4-20 mA output.
 - Maintain accuracy up to 20 to 1 ratio turndown.
 - Reference Accuracy: +0.2% of full span.
 - c. Acceptable Manufacturers: Johnson Controls and Setra.
 - 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:
 - Zero & span: (c/o F.S./Deg. F): .04% including linearity, hysteresis and repeatability.
 - Accuracy: 1% F.S. (best straight line) Static Pressure Effect: 0.5% F.S. (to 100 PSIG).
 - 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. Acceptable manufacturers: Johnson Controls and Setra.
- E. Flow Monitoring
- 1. Air Flow Monitoring
 - a. Fan Inlet Air Flow Measuring Stations: At the inlet of each fan and near the exit of the inlet sound trap, airflow traverse probes shall

be provided that shall continuously monitor the fan air volumes and system velocity pressure. Each traverse probe shall be of a dual manifolded, cylindrical, type 3003 extruded aluminum configuration, having an anodized finish to eliminate surface pitting and unnecessary air friction. The multiple total pressure manifold shall have sensors located along the stagnation plane of the approaching airflow. The manifold should not have forward projecting sensors into the air stream. The static pressure manifold shall incorporate dual offset static tops on the opposing sides of the averaging manifold so as to be insensitive to flow-angle variations of as much as $\pm 20^\circ$ in the approaching air stream.

- b. The airflow traverse probe shall not induce a measurable pressure drop, nor shall the sound level within the duct be amplified by its singular or multiple presence in the air stream. Each airflow-measuring probe shall contain multiple total and static pressure sensors placed at equal distances along the probe length. The number of sensors on each probe and the quantity of probes utilized at each installation shall comply with the ASHRAE Standards for duct traversing. Airflow measuring stations shall be manufactured by Air Monitor Corp., Tek-Air Systems, Inc., Ebtron, or Dietrich Standard.
- c. **Single Probe Air Flow Measuring Sensor:** The single probe airflow-measuring sensor shall be duct mounted with an adjustable sensor insertion length of up to eight inches. The transmitter shall produce a 4-20 mA or 0-10 VDC signal linear to air velocity. The sensor shall be a hot wire anemometer and utilize two temperature sensors and a heater element temperature. The other sensor shall measure the downstream air temperature. The temperature differential shall be directly related to airflow velocity.
- d. **Duct Air Flow Measuring Stations:** 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. 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.
- e. 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. 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. The main take-off point from both the total pressure and the static pressure manifolds must be symmetrical.

- f. 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.
2. Installation Considerations
 - a. 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. 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.
 - e. Stations shall be installed in strict accordance with the manufacturer's published requirements, and in accordance with ASME Guidelines affecting non-standard approach conditions.
 3. Acceptable manufacturers: Air Monitor Corp., Tek-Air, Ebtron, and Dietrich Standard.
 - a. Static Pressure Traverse Probe
 - b. Duct static traverse probes shall be provided where required to monitor duct static pressure. The probe shall contain multiple static pressure sensors located along exterior surface of the cylindrical probe.
 4. Acceptable manufacturers: Cleveland Controls
 - a. Shielded Static Air Probe:
A shielded static pressure probe shall be provided at each end of the building. The probe shall have multiple sensing ports, an impulse suppression chamber, and airflow shielding. A suitable probe for indoor and outdoor locations shall be provided.
 5. Water Flow Monitoring
 - a. Water flow meters shall be electromagnetic type with integral microprocessor-Based electronics. The meter shall have an accuracy of 0.25%.
 6. Acceptable manufacturers: Onicon
- F. Power Monitoring Devices

1. Current Measurement (Amps)
 - a. Current measurement shall be by a combination current transformer and a current transducer. The current transformer shall be sized to reduce the full amperage of the monitored circuit to a maximum 5 Amp signal, which will be converted to a 4-20 mA DDC compatible signal for use by the Facility Management System.
 - b. Current Transformer – A split core current transformer shall be provided to monitor motor amps.
Operating frequency – 50 - 400 Hz.
Insulation – 0.6 Kv class 10Kv BIL.
UL recognized.
Five amp secondary.
Select current ration as appropriate for application.
Acceptable manufacturers: Veris Industries
 - c. Current Transducer – A current to voltage or current to mA transducer shall be provided. The current transducer shall include:
6X input over amp rating for AC inrushes of up to 120 amps.
Manufactured to UL 1244.
Accuracy: +.5%, Ripple +1%.
Minimum load resistance 30kOhm.
Input 0-20 Amps.
Output 4-20 mA.
Transducer shall be powered by a 24VDC regulated power supply (24 VDC +5%).
Acceptable manufacturers: Veris Industries

G. Smoke Detectors

1. Ionization type air duct detectors shall be furnished as specified elsewhere in Division 16 for installation under Division 15. All wiring for air duct detectors shall be provided under Division 16, Fire Alarm System.

H. Status and Safety Switches

1. General Requirements
 - a. Switches shall be provided to monitor equipment status, safety conditions, and generate alarms at the DDCS 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. Acceptable manufacturers: Veris Industries
 - 3. Air Filter Status Switches
 - a. Differential pressure switches used to monitor air filter status shall be of the automatic reset type with SPDT contacts rated for 2 amps at 120VAC.
 - b. A complete installation kit shall be provided, including: static pressure tops, tubing, fittings, and air filters.
 - c. Provide appropriate scale range and differential adjustment for intended service.
 - d. Acceptable manufacturers: Johnson Controls, Cleveland Controls
 - 4. Air Flow Switches
 - a. Differential pressure flow switches shall be bellows actuated mercury switches or snap acting micro-switches with appropriate scale range and differential adjustment for intended service.
 - b. Acceptable manufacturers: Johnson Controls, Cleveland Controls
 - 5. Air Pressure Safety Switches
 - a. Air pressure safety switches shall be of the manual reset type with SPDT contacts rated for 2 amps at 120VAC.
 - b. Pressure range shall be adjustable with appropriate scale range and differential adjustment for intended service.
 - c. Acceptable manufacturers: Johnson Controls, Cleveland Controls
 - 6. Water Flow Switches
 - a. Water flow switches shall be equal to the Johnson Controls P74.
 - 7. 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 equal to Johnson Controls A70.
 - I. Indoor Air Quality (CO₂/VOC) Sensors
 - 1. Provide indoor air quality sensors to monitor Carbon Dioxide (CO₂) and Volatile Organic Compound (VOC) levels.

2. The sensors shall be of microprocessor-based photoacoustic type with heated stannic dioxide semiconductor.
3. 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.
4. The units shall be wall or duct mounted type as indicated on plans and in the sequence of operation.
5. Wall mounted sensors shall be provided with white plastic cover, without LED indicators.
6. Duct mounted sensors shall be provided with LED indicators in a dust proof plastic housing with transparent cover. The VOC sensor shall have automatic self calibrating capability to ensure accuracy.
7. The sensor shall meet the following requirements:

Operating voltage:	24 VAC +/- 20%
Frequency:	50/60 Hz
Power consumption:	max. 6 VA
CO ₂ measuring range:	0 - 2000 ppm
Tolerance:	+/- 100 ppm
Output:	0 - 10 VAC
Calibration:	none required
VOC measurement range:	0 - 10 V VOC
Permissible air velocity in duct:	<26.2 Ft/s.
8. The sensors shall be model:
Siemens QPA63 Series.
9. In addition to the indoor sensors, provide a single outdoor air quality (CO₂/VOC) sensor for the project.

2.10 OUTPUT DEVICES

A. Actuators

1. General Requirements
 - a. Damper and valve actuators shall be electronic and/or pneumatic, as specified in the System Description section.
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 either direction, and a gear release to allow manual positioning.

- c. 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.
 - d. 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.
 - e. Acceptable manufacturers: Johnson Controls, Mamac.
3. 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. 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.
 - d. 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.
 - e. 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 pump or chiller.
 - f. Acceptable manufacturers: Johnson Controls

B. Control Dampers

1. The DDCS Contractor shall furnish all automatic dampers. All automatic dampers shall be sized for the application by the DDCS 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 galvanized steel or aluminum. Maximum blade length in any section shall be 60". Damper blades shall be 16-gauge minimum and shall not exceed eight (8) inches in width. Damper frames shall be 16-gauge minimum hat channel type with corner bracing. All damper bearings shall be made of reinforced nylon, 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 8.0 cfm per square foot when closed against 4" w.g. static pressure when tested in accordance with AMCA Std. 500.
5. Airfoil 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. Acceptable manufacturers are Johnson Controls D-7250 D-1250 or D-1300, Ruskin CD50, and Vent Products 5650.
6. One piece rolled blade dampers with exposed or concealed linkage may be used with face velocities of 1500 FPM or below. Acceptable manufacturers are: Johnson Controls D-1600, Ruskin CD36, and Vent Products 5800.
7. Multiple section dampers may be jack-shafted to allow mounting of piston pneumatic actuators and direct connect electronic actuators. Each end of the jackshaft shall receive at least one actuator to reduce jackshaft 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. Acceptable manufacturers: Johnson Controls, Lectro
2. Lighting Control Relays
 - a. Lighting control relays shall be latching with integral status contacts.
 - b. Contacts shall be rated for 20 amps at 277 VAC.

- c. The coil shall be a split low-voltage coil that moves the line voltage contact armature to the ON or OFF latched position.
- d. Lighting control relays shall be controlled by:
Pulsed Tri-state Output – Preferred method.
Pulsed Paired Binary Outputs.
A Binary Input to the Facility Management System shall monitor integral status contacts on the lighting control relay. Relay status contacts shall be of the “dry-contact” type.
- e. The relay shall be designed so that power outages do not result in a change-of-state, and so that multiple same state commands will simply maintain the commanded state. Example: Multiple OFF command pulses shall simply keep the contacts in the OFF position.

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 pipe schedule elsewhere in this Specification.
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 or 3-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 5 PSI. Valves (3-way) serving constant flow air handling unit coils with secondary circuit pumps shall be sized for a pressure drop equal to 25% the actual coil pressure drop, but no less than 2 PSI. Mixing valves (3-way) serving secondary water circuits shall be sized for a pressure drop of no less than 5 PSI. Valves for terminal reheat coils shall be sized for a 2 PSIG pressure drop, but no more than a 5 PSI drop.
3. Ball valves shall be used for hot and chilled water applications, water terminal reheat coils, radiant panels, unit heaters, package air conditioning units, and fan coil units except those described hereinafter.
4. Modulating plug water valves of the single-seat type with equal percentage flow characteristics shall be used for all special applications as indicated on the valve schedule. Valve discs shall be composition type. Valve stems shall be stainless steel.
5. 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.

6. Acceptable manufacturers: Johnson Controls
- E. Electronic Signal Isolation Transducers
 1. A signal isolation transducer shall be provided whenever an analog output signal from the DDCS 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 signal from a remote system.
 2. The signal isolation transducer shall provide ground plane isolation between systems.
 3. Signals shall provide optical isolation between systems.
 4. Acceptable manufacturers: Advanced Control Technologies
- F. External Manual Override Stations
 1. External manual override stations shall provide the following:
 - a. An integral HAND/OFF/AUTO switch shall override the controlled device pilot relay.
 - b. A status input to the Facility Management System shall indicate whenever the switch is not in the automatic position.
 - c. A Status LED shall illuminate whenever the output is ON.
 - d. An Override LED shall illuminate whenever the HOA switch is in either the HAND or OFF position.
 - e. Contacts shall be rated for a minimum of 1 amp at 24 VAC.
- G. Electronic/Pneumatic Transducers
 1. Electronic to Pneumatic transducers shall provide:
 - a. Output: 3-15 PSIG.
 - b. Input: 4-20 mA or 0-10 VDC.
 - c. Manual output adjustment.
 - d. Pressure gauge.
 - e. External replaceable supply air filter.
 - f. Acceptable manufacturers: Johnson Controls, Mamac

2.11 MISCELLANEOUS DEVICES

- A. Local Control Panels
 1. All control panels shall be factory constructed, incorporating the DDCS manufacturer's 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 perforated sub-panel, hinged door, and slotted flush latch.
 2. In general, the control panels shall consist of the DDC controller(s), display module as specified and indicated on the plans, 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. Where specified the display module shall be flush mounted in the panel face unless otherwise noted.
 3. All I/O connections on the DDC controller shall be provide via removable or fixed screw terminals.

4. Low and line voltage wiring shall be segregated. All provided terminal strips and wiring shall be UL listed, 300-volt service and provide adequate clearance for field wiring.
 5. 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
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.
- C. Thermostats
1. Electric room thermostats of the heavy-duty type shall be provided for unit heaters, cabinet unit heaters, and ventilation fans, where required. All these items shall be provided with concealed adjustment. Finish of covers for all room-type instruments shall match and, unless otherwise indicated or specified, covers shall be manufacturer's standard finish.

PART 3 – PERFORMANCE/ EXECUTION

3.1 DDCS SPECIFIC REQUIREMENTS

- A. Graphics
1. Provide a color graphic system flow diagram display for each system with all points as indicated on the point list. All terminal unit graphic displays shall be from a standard design library.
 2. User shall access the various system schematics via a graphical penetration scheme and/or menu selection.
- B. Custom Reports:
1. Provide custom reports as required for this project:
- C. Actuation / Control Type
1. Primary Equipment
 - a. Controls shall be provided by equipment manufacturer as specified herein.
 - b. All damper and valve actuation shall be electric.
 2. Air Handling Equipment
 - a. All air handlers shall be controlled with a HVAC-DDC Controller
 - b. All damper and valve actuation shall be electric.
 3. Terminal Equipment:

- a. Terminal Units (VAV, UV, etc.) shall have electric damper and valve actuation.
- b. All Terminal Units shall be controlled with HVAC-DDC Controller)

3.2 INSTALLATION PRACTICES

A. DDCS Wiring

1. All conduit, wiring, accessories and wiring connections required for the installation of the Direct Digital Control System, as herein specified, shall be provided by the DDCS Contractor unless specifically shown on the Electrical Drawings under Division 16 Electrical. All wiring shall comply with the requirements of applicable portions of Division 16 and all local and national electric codes, unless specified otherwise in this section.
2. All DDCS wiring materials and installation methods shall comply with DDCS manufacturer recommendations.
3. The sizing, type and provision of cable, conduit, cable trays, and raceways shall be the design responsibility of the DDCS Contractor. If complications arise, however, due to the incorrect selection of cable, cable trays, raceways and/or conduit by the DDCS Contractor, the Contractor shall be responsible for all costs incurred in replacing the selected components.
4. Class 2 Wiring
 - a. All Class 2 (24VAC or less) wiring shall be installed in conduit unless otherwise specified.
 - b. Conduit is not required for Class 2 wiring in concealed accessible locations. 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 local code requirements.
5. Class 2 signal wiring and 24VAC power can be run in the same conduit. Power wiring 120VAC and greater cannot share the same conduit with Class 2 signal wiring.
6. Provide for complete grounding of all applicable signal and communications cables, panels and equipment so as to ensure system integrity of operation. Ground cabling and conduit at the panel terminations. Avoid grounding loops.

B. DDCS Line Voltage Power Source

1. 120-volt AC circuits used for the Direct Digital Control System shall be taken from panel boards and circuit breakers provided by Division 16.
2. Circuits used for the DDCS shall be dedicated to the DDCS and shall not be used for any other purposes.
3. DDC terminal unit controllers may use AC power from motor power circuits.

C. DDCS Raceway

1. All wiring shall be installed in conduit or raceway except as noted elsewhere in this specification. Minimum control wiring conduit size 1/2".

2. Where it is not possible to conceal raceways in finished locations, surface raceway (Wiremold) may be used as approved by the Architect.
3. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
4. Flexible Metal Conduit shall be used for vibration isolation and shall be limited to 3 feet in length when terminating to vibrating equipment. Flexible Metal Conduit may be used within partition walls. Flexible Metal Conduit shall be UL listed.

D. Penetrations

1. Provide fire stopping for all penetrations used by dedicated DDCS conduits and raceways.
2. All openings in fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
3. All wiring passing through penetrations, including walls shall be in conduit or enclosed raceway.
4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true, and square.

E. DDCS Identification Standards

1. Node Identification. All nodes shall be identified by a permanent label fastened to the enclosure. Labels shall be suitable for the node location. Cable types specified in Item A shall be color coded for easy identification and troubleshooting.

F. DDCS Panel Installation

1. The DDCS panels and cabinets shall be located as indicated at an elevation of not less than 2 feet from the bottom edge of the panel to the finished floor. Each cabinet shall be anchored per the manufacturer's recommendations.
2. The DDCS contractor shall be responsible for coordinating panel locations with other trades and electrical and mechanical contractors.

G. Input Devices

1. All Input devices shall be installed per the manufacturer recommendation
2. Locate components of the DDCS in accessible local control panels wherever possible.

H. HVAC Input Devices – Genera1

1. All Input devices shall be installed per the manufacturer recommendation
2. Locate components of the DDCS in accessible local control panels wherever possible.
3. The mechanical contractor shall install all in-line devices such as temperature wells, pressure taps, airflow stations, etc.
4. Input Flow Measuring Devices shall be installed in strict compliance with ASME guidelines affecting non-standard approach conditions.
5. Outside Air Sensors

- a. 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 conditions accurately.
 - b. Sensors shall be installed with a rain proof, perforated cover.
6. Water Differential Pressure Sensors
- a. Differential pressure transmitters used for flow measurement shall be sized to the flow-sensing device.
 - b. Differential pressure transmitters shall be supplied with tee fittings and shut-off valves in the high and low sensing pick-up lines.
 - c. The transmitters shall be installed in an accessible location wherever possible.
7. Medium to High Differential Water Pressure Applications (Over 21" w.c.):
- a. Air bleed units, bypass valves and compression fittings shall be provided.
8. Building Differential Air Pressure Applications (-1" to +1" w.c.):
- a. Transmitters exterior sensing tip shall be installed with a shielded static air probe to reduce pressure fluctuations caused by wind.
 - b. The interior tip shall be inconspicuous and located as shown on the drawings.
9. Air Flow Measuring Stations:
- a. 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.
 - b. Station flanges shall be two inch to three inch to facilitate matching connecting ductwork.
10. Duct Temperature 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. The sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate.
 - c. For ductwork greater in any dimension than 48 inches or where air temperature stratification exists such as a mixed air plenum, utilize an averaging sensor.
 - d. The sensor shall be mounted to suitable supports using factory approved element holders.
11. Space Sensors:
- a. Shall be mounted per ADA requirements.
 - b. Provide lockable tamper-proof covers in public areas and/or where indicated on the plans.
12. Low Temperature Limit Switches:
- a. Install on the discharge side of the first water or steam coil in the air stream.
 - b. Mount element horizontally across duct in a serpentine pattern insuring each square foot of coil is protected by 1 foot of sensor.

- c. 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.
 - 13. Air Differential Pressure Status Switches:
 - a. Install with static pressure tips, tubing, fittings, and air filter.
 - 14. Water Differential Pressure Status Switches:
 - a. Install with shut off valves for isolation.
- I. HVAC Output Devices
 - 1. All output devices shall be installed per the manufacturers recommendation. The mechanical contractor shall install all in-line devices such as control valves, dampers, airflow stations, pressure wells, 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. When any pneumatic actuator is sequenced with another device, pilot positioners shall be installed to allow for proper sequencing.
 - 3. Control Dampers: Shall be opposed blade for modulating control of airflow. 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 Direct Digital Control 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 TRAINING

- A. The DDCS contractor shall provide the following training services:
 - 1. One day of on-site orientation by a system technician who is fully knowledgeable of the specific installation details of the project. This orientation shall, at a minimum, consist of a review of the project as-built drawings, the DDCS software layout and naming conventions, and a walk through of the facility to identify panel and device locations.

3.4 COMMISSIONING

- A. Fully commission all aspects of the Direct Digital Control System work.
- B. Acceptance Check Sheet
 - 1. Prepare a check sheet that includes all points for all functions of the DDCS as indicated on the point list included in this specification.
 - 2. Submit the check sheet to the Engineer for approval

3. The Engineer will use the check sheet as the basis for acceptance with the DDCS Contractor.
- C. VAV box performance verification and documentation:
1. The DDCS Contractor shall test each VAV box for operation and correct flow. At each step, after a settling time, box air flows and damper positions will be sampled. Following the tests, a pass/fail report indicating results shall be produced. Possible results are Pass, No change in flow between full open and full close, Reverse operation or Maximum flow not achieved. The report shall be submitted as documentation of the installation.
 2. The DDCS Contractor shall issue a report based on a sampling of the VAV calculated loop performance metrics. The report shall indicate performance criteria, include the count of conforming and non-conforming boxes, list the non-conforming boxes along with their performance data, and shall also include graphical representations of performance.
- D. Promptly rectify all listed deficiencies and submit to the Engineer that this has been done.

3.5 GROUND WATER SYSTEM

- A. Ground Water System: The Ground Water System consists of open wells, well pumps, pump VFD's and a well pump control system. The well pump control system shall be furnished and installed by the well water contractor.
- B. The Ground Water System will provide cooling water to the building's heat pump loop heat exchanger at a constant temperature.
- C. The BMS shall monitor the system pressure, supply and return temperatures of the well water.

3.6 HEAT PUMP LOOP

- A. The Building's heat pump loop consists of four water to water heat pumps which produce hot water or chilled water for the building's AHU's and Radiant Floor heating system. Primary pumps P-3 & 4 circulate water into the primary heat pump loop. System pumps P-5 & P-6 circulate water to the AHU's and pumps P-7 & P-8 supply water to the radiant floor heating system.
- B. The heat pumps will be supplied with condenser water from the well at a constant temperature of 50°F. The BMS shall monitor the inlet and outlet well water temperatures. An alarm shall be generated whenever the return water temperature to the well rises above 65°F (adjustable).
- C. The heat pumps will be sequenced on and off according to the system load as measured at the chilled/hot water storage tanks by tank temperature sensors.
- D. Whenever the Outdoor air temperature is below 50°F, the heat pump heating mode shall be initiated. In the heating mode, the heat pumps shall be controlled to maintain a supply water temperature of 115°F (adjustable).
- E. Whenever the Outdoor air temperature is above 55°F, the heat pump cooling mode shall be initiated. In the heating mode, the heat pumps shall be controlled to maintain a supply water temperature of 45°F (adjustable).
- F. A differential pressure control valve will be modulated in the secondary water loop to maintain a constant differential pressure set point of 25 psi (adjustable).

- G. Summer-Winter Switch Over
1. Heating Mode: DDC shall close the 3-way summer-winter switch valves to chilled water storage tank (open to hot water storage tank).
 2. Cooling Mode: DDC shall close the 3-way summer-winter valves to hot water storage tank (open to chilled water storage tank).
- H. Heating Mode:
1. In the heating mode, the Heat pumps shall be controlled by the BMS in sequence to maintain the Heating water supply temperature setpoint of 115°F (adjustable).
 2. Whenever each of the heat pumps are called to start, the motorized isolation valves shall be opened. Upon proof of valve open position and flow, the heat pump shall start. The heat pump shall start and run continuously with the reversing valve energized.
 3. The BMS shall monitor the hot water storage tank temperature and if the storage tank temperature is below 115°F (adjustable), An additional heat pump will be started. There will be a programmed time delay of 10 minutes before starting or stopping any heat pump. This sequence shall continue until the storage tank temperature is maintained at set point.
 4. Whenever the storage tank temperature rises 5°F (adjustable) above the set point for more than the time delay setting, the first heat pump to start will be turned off. Heat pumps will be started and stopped based on an auto-rotation sequence. Should the BMS detect an alarm on an operating heat pump, the heat pump in alarm shall be disabled and taken off line. The next heat pump in line will then start.
 5. The heat pump loop pump's speed will be modulated between the minimum speed and maximum speed in response to the heat pump loop differential pressure set point of 20 psi (adjustable).
- I. Cooling Mode:
1. In the cooling mode, the heat pumps shall be controlled by the BMS in sequence to maintain the Cooling water supply temperature set point of 45°F (adjustable).
 2. Whenever each of the heat pumps are called to start, the motorized isolation valves shall be opened. Upon proof of valve open position and flow, the heat pump shall start. The heat pump shall start and run continuously.
 3. The BMS shall monitor the chilled water storage tank temperature and if the storage tank temperature is above 45°F (adjustable), An additional heat pump will be started. There will be a programmed time delay of 10 minutes before starting or stopping any heat pump. This sequence shall continue until the storage tank temperature is maintained at set point.
 4. Whenever the storage tank temperature drops 5°F (adjustable) below the set point for more than the time delay setting, the first heat pump to start will be turned off. Heat pumps will be started and stopped based on an autorotation sequence. Should the BMS detect an alarm on an operating heat pump, the heat pump in alarm shall be disabled and taken off line. The next heat pump in line will then start.

5. The heat pump loop pump's speed will be modulated between the minimum speed and maximum speed in response to the heat pump loop differential pressure setpoint of 20 psi (adjustable).

3.7 AIR HANDLING UNIT AHU-1

- A. **SUPPLY FAN START/STOP:** The supply fan will be started according to the programmed time schedule. If the supply fan status does not match the commanded value, an alarm will be generated. When the supply fan status indicates the fan started, the control sequence will be enabled.
- B. **RETURN FAN START/STOP:** When the supply fan is started a start command will be sent to the return fan. If the return fan status does not match the commanded value, an alarm will be generated.
- C. **DISCHARGE AIR CONTROL:** The discharge air temperature setpoint will be reset as necessary to maintain the space temperature setpoint as sensed by the space temperature sensor. The mixed air dampers and DTW control valve will modulate in sequence to maintain the discharge air temperature at setpoint.
- D. **ECONOMIZER DRY BULB SWITCHOVER:** When the global outside air temperature is below the switchover setpoint, the economizer will be enabled. When the shared outside air temperature rises above the switchover setpoint plus a differential, the economizer will be disabled. A CO2 sensor in the return duct will override the position of the outside air damper to the open position whenever the CO2 levels rise above the trip setpoint.
- E. **COIL LOW LIMIT CONTROL:** The DTW valve will modulate open when the coil discharge temperature falls below the coil low limit set point. If the coil temperature continues to fall below the low limit set point the mixed air dampers will close to the outside air and an alarm shall be generated.
- F. **NIGHT SETBACK/NIGHT SETUP:** When in "unoccupied" mode, the unit will cycle as necessary to maintain the night setback zone temperature at set point. A differential prevents the unit from cycling excessively.
- G. **SAFETY:**
 1. All of the safety devices are manual reset; the device that has tripped must be manually reset before restarting the air handling unit.
 2. If the temperature low limit switch senses a temperature below set point the supply fan will be shutdown.
 3. A fire alarm shutdown contact by the division 16 contractor will cause the supply fan and return fan to be shutdown when triggered.
- H. **SMOKE PURGE:** The smoke purge system is provided by the electrical contractor. To implement the smoke purge requires either the supply or return fan in the air conditioning units shut down depending on the floor being purged of smoke. Coordinate with the electrical contractor and the vendor supplying the AC units the control of the supply and return fan operation. The following is the smoke purge operation provided under the electrical work.
 1. Supply air fan shall shut down during purge operation. The return fan will run at full speed.
 2. All the FSD's on the supply duct will remain closed while the FSD's on the return duct will be opened.
 3. Outside air damper will be closed and exhaust damper will be opened.

I. SHUTDOWN:

When the unit is shutdown by either a stop command or system safety the unit will be set as follows:

1. Supply fan will be off
2. Return fan will be off
3. Outside air damper will close
4. Return air damper will open
5. Exhaust air damper will close
6. Control valve will remain in control

3.8 VAV BOXES:

- A. **OCCUPIED MODE:** When the zone temperature is between the occupied heating and cooling setpoints (inside of the bias), the primary air damper shall be at the minimum CFM. On a rise in zone temperature above the cooling set point, the primary air damper shall increase the CFM. On a drop in zone temperature below the heating set point, the damper is controlled to provide a minimum CFM.
- B. **UNOCCUPIED (NIGHT SETBACK) MODE:** When the air handling unit shuts down, all box controllers are indexed to unoccupied mode. When the zone temperature is between the unoccupied heating and cooling set points (inside of the bias), the primary air damper shall be at the minimum CFM. On a rise in zone temperature above the unoccupied cooling set point, the primary air damper shall increase the CFM (if available).

3.9 RADIANT FLOOR HEATING SYSTEM:

- A. The radiant floor heating system shall be controlled by a manufacturer provided control panel and control devices. This contractor shall install the radiant floor heating system controls in accordance to the manufacturer's wiring diagrams.
- B. The radiant floor loop Pumps shall be started in response to heating demand from the radiant heating control panel. The BMS shall start/stop the pumps and monitor pump status, radiant floor supply temperature and return temperature.

3.10 CO2 Sequence:

- A. **CO2 Monitoring.**
 1. The Control System shall monitor CO2 level via four (4) sensors located in the space as follows:
 - a. Multipurpose Room
 - b. Conference Room
 - c. Classroom
 - d. Lunchroom
 2. The B.M.S. will display and an alarm at the front end whenever the CO2 sensors measurement is above 500 PPM (adj.).
 3. The CO2 monitoring shall be used for indication only, not for demand control ventilation.
- B. Air flow monitoring.

1. The BMS shall monitor CFM airflow on the supply and return fans and in the outside air intake duct via fan inlet or duct mounted type air flow measuring stations.
 2. Space pressurization. Return fan CFM shall track supply fan CFM with a 5% adjustable differential to ensure positive space pressurization.
 3. Minimum outside air flow. Modulate the outside air damper to maintain CFM set point as necessary to satisfy minimum outside air flow requirements in the kitchen area.
- C. The air handling unit operates in Occupied, Unoccupied, Warmup/Cooldown, and Safety modes as follows. (All suggested set points and settings are adjustable).

3.11 MISCELLANEOUS SEQUENCE:

- A. The exhaust fans shall start in conjunction with the AHU's. The BMS shall start/stop each fan and monitor fan status. Any associated dampers shall open when the fan is started and shall close when the fan is stopped.
- B. Hydronic Unit Heaters shall be controlled by a wall mounted line voltage thermostat. The thermostat shall call for the fan to start and the control valve to open whenever the space temperature drops below 80°F.
- C. Cabinet Unit Heaters shall be controlled by a wall mounted thermostat. The thermostat shall call for the fan to start and the control valve to open whenever the space temperature drops below 80°F.
- D. All pumps shall be controlled in a lead/lag sequence. The lead pump shall be rotated every month. Whenever a lead pump fails, the lag pump shall be automatically started.

END OF SECTION

SECTION 16000 - GENERAL PROVISIONS FOR ELECTRICAL WORKPART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings are diagrammatic and are a graphic representation of contract requirements to the best available standards at the scale required.
- B. Light and power and miscellaneous systems riser diagrams, as well as schematic diagrams, generally indicate connections to be used for various systems and equipment. Systems conduit and wiring shall be as required for the actual systems installed on this Project. Provide all work shown on diagrams whether or not it is duplicated on the plans.

1.2 SCOPE OF WORK

- A. The Specifications and the accompanying drawings are intended to secure the provisions of all material, labor, equipment, and services necessary to install complete, tested, and ready for operation the Electrical Systems in accordance with the Specifications and Drawings. All systems shall be complete with all necessary appurtenances and minor auxiliaries, including pull boxes, offsets to clear interferences, and supports which are not shown but are needed to make each system complete in every respect. All work described in the Specifications and not shown on the Drawings, or vice versa, shall be furnished in complete working order. If mention has been omitted of any item of work or material, necessary for completion of the system, then such items must be and are hereby included.
 - 1. Secondary service installation (in coordination with Utility Company).
 - 2. Power and light distribution system (system characteristics, equipment).
 - 3. Fuses and/or circuit breakers.
 - 4. Installation and wiring of individual controllers. Erecting starter racks where required.
 - 5. Control devices, only where specifically called for.
 - 6. Safety and disconnect switches, unless furnished with starters or on equipment. Weatherproof devices for outdoor equipment. Six (6) pole switches for two-speed, three-phase motors.
 - 7. Motor power wiring.
 - 8. Raceways and installation components.
 - 9. Wire and Cable.

10. Underfloor duct system.
11. Grounding system in conformance with applicable codes.
12. Wiring devices.
13. Lighting fixtures, interior and exterior, including lamps, as described in these Specifications and in accordance with Schedule on Drawings.
14. Occupancy sensors for light control.
15. Emergency battery packs in selected fluorescent lighting fixtures.
16. Power wiring for fan coil, incremental units.
17. Power wiring for unit and cabinet heaters.
18. 120 Volt supply to EP switches and temperature control and/or data gathering panels.
19. Furnishing and setting of all sleeves through the floors, roof and wall, where required including waterproofing and fireproof sealing and cap flashing.
20. Excavation and backfill (excavation in rock shall be included). All concrete work for pads (including housekeeping pads), bases for outdoor lighting fixtures, and conduit envelopment shall be included.
21. Hardware, such as inserts, bolts, etc., associated with concrete pads.
22. Cutting and core drilling associated with electrical work.
23. Prime painting, where required for electrical equipment and installation.
24. Provision for temporary light and power.
25. Paying all fees and performing all testing and adjusting and furnishing all certificates of approval, and those of Underwriters.
26. Receptacle and grounding modules.
27. Communications, alarm and signaling systems, including the following:
 - a. Fire alarm (coded/non-coded), smoke and heat detection, sprinkler alarm systems.
 - b. Furnishing, installing and connecting of all alarm initiating and signaling devices, except as noted hereinafter:
 - 1) Installation of duct smoke detectors.

- c. All fan shutdown wiring and furnishing, installing and connecting relay cabinets required for fan shutdown. Wiring associated with elevator recall feature.
- d. Telephone empty conduit system, including terminal cabinets and plywood backboards.
- e. Data (processing/transmitting) empty conduit system including terminal cabinets.

1.3 QUALITY ASSURANCE AND STANDARDS

- A. The complete installation shall be in accordance with the applicable requirements and standards of National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), New York City Electrical Code (NYCEC), National Electrical Code (NEC), Institute of Electrical and Electronic Engineers (IEEE), American National Standard Institute (ANSI), Occupational Safety and Health Administration (OSHA), National Electrical Safety Code, Insulated Cable Engineers Association (ICEA), Underwriters' Laboratories (UL), Factory Mutual (FM), Factory Insurance Association (FIA), National Contractors Association (NECA) "Standard of Installation", Local Inspection Agency, Local Power Company, Local Telephone Company, along with state and local municipal codes and all applicable codes and authorities having jurisdiction. Any items or requirements noted in the Specifications or on Drawings, which conflict with these shall be referred to the Architect for decision. All work necessary to comply with these requirements shall be performed by the Contractor at no extra cost to the Owner.
- B. Where reference is made to the National Electrical Code only, without mention of the New York City Electrical Code, the requirements of the latter, where they differ from the former, shall take precedence, where applicable.
- C. All electrical equipment, materials and appliances shall have the listing of the Underwriters' Laboratories, Inc., and shall bear labels attesting to UL listing, and types approved by Municipal Departments having jurisdiction.

1.4 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings.
- B. The Contractor shall submit shop drawings with such promptness as to cause no delay in his own work or that of another contractor.
- C. Submit shop drawings complete in every detail for items as described in the Contract Documents, or as may be required by the Architect.
- D. Submit shop drawings as indicated in subsequent Sections of this Specification.

1.5 COORDINATION OF WORK WITH OTHER TRADES

- A. The work of this Section shall be coordinated with the work of all other Contracts, the Utility Company and the Telephone Company, and shall be so arranged that there will be no delay in the proper installation and completion of any part or parts of each respective work wherein it may be interrelated with that of this Contract so that generally all construction work can proceed in its natural sequence without unnecessary delay. All communications of a coordinating nature to the Architect shall be via the Construction Manager or General Contractor.
- B. Examine all Architectural, Structural, Heating, Ventilating and Air Conditioning, Sprinkler and Plumbing Drawings relating to this Project, and verify all governing conditions at the site and become fully informed as to the extent and character of the work required and its relation to other work in the building. No consideration will be granted for any alleged misunderstanding of the materials to be furnished for work to be done.
- C. Scaled and figured dimensions with respect to the items are approximate only; sizes of equipment have been taken from typical equipment items of the class indicated. Before proceeding with work, the Contractor shall care-fully check all dimensions and sizes and shall assume full responsibility for the fitting-in of equipment and materials to the building and to meet architectural and structural conditions.
- D. Coordinate work with other disciplines. Confer with other contractors whose work might affect this installation; and arrange all parts of this work and equipment in proper relation to the work and equipment of others, with the building construction and with architectural finish so that this work will harmonize in service, appearance, and function.
- E. Exposed piping shall be installed to provide the maximum amount of headroom but in no case shall piping be installed less than seven feet (7'-0") above the finished floor. Piping installed in areas where hung ceilings or other furred spaces are indicated shall be installed concealed.
- F. The Contractor is referred to the Architectural Drawings for locations and types of hung ceilings and furred spaces.

1.6 INSPECTION AND TESTS

- A. At the time of the final inspection and tests, all connections at the panels and all splices, etc., must have been completed. All fuses must be in place and the circuits continuous from service switches to all receptacles, outlets, motors, etc. Each entire wiring system must test free from short circuits and grounds. When wiring systems are "megger" tested, the insulation resistance between conductors and between conductors and grounds, based on maximum load, shall not be less than that required by National Electrical Code and local authorities having jurisdiction. A written record of all test data shall be supplied to the Architect (five copies). The tests shall cover but not be limited to the following:
 - 1. Secondary service and distribution system.

2. Emergency equipment and distribution system
 3. Fire alarm, smoke detection and sprinkler alarm systems.
 4. All communications, signaling and alarm systems.
 5. Power installations and motor controls.
 6. Light installations and circuit switching.
 7. Any part of the work called for in the Specifications, or Drawings and as designated by the Architect or Engineers.
- B. Provide all necessary testing equipment, instruments, and skilled personnel for the tests. If in the opinion of the Architect, the results of such tests show that the work has not complied with the requirements of the Specifications or Drawings, the Contractor shall make all additions or changes necessary to put the system in proper working condition and shall pay for all the expenses and for all subsequent tests which are necessary to determine whether the work is satisfactory. Any additional work or subsequent tests shall be carried out at the convenience of the Owner, prior to final payment.

1.7 PERMITS, CERTIFICATES AND FEES

- A. Obtain and deliver a final Certificate of Approval from the applicable inspection authority having jurisdiction. Make delivery to the Owner upon completion of the work and before final payment. Pay all charges made by the inspection authority and include their cost in the bid.
- B. This work shall include the procurement of and payment for all permits, certificates and fees for the performance of the electrical work in compliance with codes, applicable laws and municipal regulations including those from local utilities for services.

1.8 PROTECTION, MAINTENANCE AND PRODUCT HANDLING OF ELECTRICAL EQUIPMENT

- A. Electrical equipment shall be delivered and stored at the site, properly packed and crated until finally installed. Store materials in spaces as designated by the General Contractor. Investigate each space through which equipment must be moved. If necessary, equipment shall be shipped from manufacturer in crated sections of size suitable for moving through restricted spaces.
- B. Uninstalled and installed equipment and materials shall be adequately protected against loss or stealing; damage caused by water, paint, fire, plaster, moisture, acids, fumes, dust or other environmental conditions; or physical damage, during delivery, storage, installation and shutdown conditions. This Contractor shall replace any damage or stolen material without extra cost to the Owner.
- C. Provide effective protection for all material and equipment against damage that may be caused by environmental conditions. Do no work when conditions of

temperature in area or moisture on materials or substrates are not in accordance with material manufacturer's recommended conditions for installation.

- D. This Contractor shall be responsible for the maintenance of all equipment and systems installed, until final acceptance by the Owner. The Operation of the equipment by the Owner does not constitute an acceptance of the work. Work will be accepted only after the Contractor has adjusted his equipment, demonstrated that it fulfills the requirements of the Drawings and Specifications, and has furnished all required certificates.
- E. This Contractor shall guarantee in writing to the Owner that all work installed by him shall be free of defects in workmanship and materials and that all apparatus will develop the capacities and characteristics as indicated, and that, if during a period of one year from date of final approval of work by the Architect, any defects in workmanship, materials or performance appear, he will remedy them without any cost to the Owner. Guarantee requirements shall consist of the aforesaid and other requirements, as established under applicable Contract Documents.
- F. Provide effective protection against damage for all material and equipment during shipment, and storage at the Project Site. Cover all stored equipment to exclude dust and moisture. Place stored conduit on dunnage with appropriate weather cover and caps on exposed ends.
- G. After cabinets and boxes are installed, cover openings to prevent entrance of water and foreign materials. Close conduit openings with temporary metal or plastic caps, including those terminated in cabinets.
- H. Protect all rough and finished floors and other finished surfaces from damage which may be caused by construction materials and methods. Protect floors with tarpaulins, chip pans and oil-proof floor covering. Protect finished surfaces from welding and cutting splatters with baffles and asbestos splatter blankets. Protect finished surfaces from paint droppings, adhesive and other marring agents with drop cloths. Protect other surfaces with appropriate protective measures.
- I. Have materials delivered to site. Unload and store materials in designated location, and protect from damage. Deliver materials to their point of installation.
- J. Deliver materials to Project site in manufacturer's original unopened containers with manufacturer's name and product identification clearly marked thereon.

1.9 DELIVERY AND RECEIVING

- A. Owner-furnished equipment will be delivered, crated or otherwise packaged to the Site delivery point selected by the Resident Engineer. This Contractor shall accept delivery of all Owner-furnished items which are under his trade jurisdiction and place them in their final location.
- B. Where items cannot be immediately placed in their final position, this Contractor shall store and protect all Owner-furnished items until the time of their final

installation. He shall be responsible for the care and protection of the items until acceptance by the Owner. Delivery of Utility Company furnished equipment shall be coordinated with the delivery policy of that company.

1.10 ACCESSIBILITY AND MEASUREMENTS

- A. All work shall be installed so as to be readily accessible for operation, maintenance and repair. Minor deviations from the plans may be made to accomplish this, subject to the approval of the Architect or Engineers.
- B. Before ordering any material or doing any work, the Contractor shall verify all measurements at the Building, and shall be responsible for the correctness of same as related to the work under this Contract.

1.11 TEMPORARY LIGHT AND POWER

- A. Electric services for temporary light and power shall be obtained from the nearest existing switchboard and extended as required. Consult the Owner prior to making any connections to existing services.
- B. The Contractor shall furnish, install and maintain the temporary lighting and power system for all Contractors. The use of electricity shall be kept to a minimum.
- C. The Owner or Owner's Representative will pay for all energy required by the temporary lighting and power system, under separate bid item allowance.
- D. Provide all wiring, supports, lamp sockets, receptacle sockets and any other materials, supplies or equipment necessary for temporary light and power system.
- E. Ground fault protection required by OSHA for temporary receptacle circuits shall be accomplished by providing branch circuit panels containing ground fault protection branch circuit breakers.
- F. Provide a grounding conductor connection to each receptacle grounding terminal. Minimum size branch circuit and grounding conductors shall be No. 12 AWG.
- G. Install separate stringer circuits for lighting and receptacles. Provide one lamp socket and one duplex receptacle (or two single receptacles) for every 400 square feet of new general construction area. (Approximately 20 feet on centers). Furthermore, provide one lamp socket and one duplex receptacle every 20 feet along the peripheral walls of the construction areas for temporary conditions. Each lamp socket shall be provided with a 100 watt lamp. Replace burned out lamps as required for as long as the temporary lighting system is maintained in operation.
- H. Provide sufficient supplementary temporary lighting to permit proper execution of the work. This supplementary lighting shall consist of but not be limited to the following:

1. Construction hoist landings.
 - I. Provide 50 trailer extension cords, each 25 feet long. Cords shall be 16-3, Type SJ. 25 of the trailer cord sets shall be receptacle type ITT No. 6112 and 25 of the trailer cord sets shall be trouble light type with receptacle ITT No. J-3270. Distribution of these cord sets to Mechanical and other contractors shall be as directed by the Owner's Representative.
 - J. Keep the temporary lighting and power system operational commencing fifteen (15) minutes before the established starting time of that trade which starts work earliest in the morning and ending fifteen (15) minutes after the established quitting time of that trade which stops work latest in the evening. This applies to all weekdays, Monday through Friday inclusive, which are established as regular working days for any trade engaged in the work, and shall continue until Final Acceptance of the work or until these services are ordered terminated by the Owner or the Owner's Representative.

1.12 NAMEPLATES

- A. Furnish a nameplate for each separately installed feeder switch and circuit breaker, each individual panel, dry-type transformer, disconnect switch, starter push-button station and equipment enclosure.
- B. Unless otherwise noted, nameplates shall be black laminate with white letters of uniform size consisting of reasonably large caps, easily visible.
- C. Inscriptions shall consist of name and number of equipment as shown on the Drawings and as approved by the Architect.

1.13 NAMES AND TRADE NAMES

- A. Where trade and manufacturers' names are specified or indicated on the Drawings, they are intended to indicate the standard of material or articles required. This shall not remove the responsibility of the Contractor from verifying the equipment's compliance with all rules and regulations governing the use of such equipment. No purchase of any equipment shall be done without written authorization, if such equipment will not abide with all rules and regulations, covering its intended use.

1.14 MATERIAL AND WORKMANSHIP

- A. All material shall be new and of the best quality and shall have the Underwriters Laboratories label attached. The label shall be of the type for the intended application. The work throughout shall be executed in the best and most thorough manner under the direction of, and to the satisfaction of the Architect who will interpret the meaning of the Drawings and Specifications. The Architect shall have the power to reject any work and materials which, in his opinion, is not in full accordance therewith.
- B. If, after installation, operation of the equipment proves to be unsatisfactory to the

Owner by reason of defects, errors or omissions, the Owner reserves the right to operate equipment until it can be removed from service for correction by Contractor. Contractor shall pay for damages to work of other trades caused by this defective equipment and its replacement.

- C. Two months prior to the completion of all work and the final inspection of the installation by the Owner, five copies of a complete Instruction Manual, bound in booklet form and suitably indexed, shall be submitted to the Architect for approval. All written material contained in the Manual shall be typewritten or printed.
- D. The Manual shall contain the following items:
1. Table of Contents
 2. Introduction - Explanation of manual and its use.
 3. Description of system or equipment.
 - a. Complete schematic drawings of all systems.
 - b. Functional and sequential description of all systems.
 4. Systems Operation
 - a. Operation procedures.
 - b. All posted instruction charts.
 5. Maintenance
 - a. Systems trouble-shooting charts
 - b. Procedures for checking out functions.
 - c. Recommended list of spare parts.
 6. Listing of Manufacturers
 7. Manufacturer's Data (where multiple model, type and size listings are included, clearly and conspicuously indicate those that are pertinent to this installation.
 - a. Description - literature, drawings, illustrations, certified performance charts, technical data, etc.
 - b. Operation
 - c. Maintenance - including complete trouble-shooting charts
 - d. Parts list
 - e. Names, addresses and telephone numbers of recommended repair and service companies.
 - f. Guarantee data.

PART 2- PRODUCTS
(Not Used)

PART 3 – EXECUTION
(Not Used)

END OF SECTION

SECTION 16111- RACEWAYS AND INSTALLATION COMPONENTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The requirements of this section apply to raceway work required for the protection of electrical conductors. Raceways are required for all wiring unless otherwise specified.
- B. The work includes the furnishing and installation of completely coordinated, effectively grounded raceway systems complete with boxes, fittings, flexible connections to vibrating equipment and other accessories, as required. Conduit or tubing sizes referred to in the Specifications and on the Drawings are nominal trade sizes.

1.2 QUALITY ASSURANCE

- A. Manufacturers - Firm regularly engaged in manufacture of raceways and accessories of the types required and whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Raceways and installation components shall be listed and labeled by Underwriters Laboratories and comply with applicable sections of National Electrical Manufacturers Association standards.
- C. All outdoor installations shall be weatherproof.

1.3 SUBMITTALS

- A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.
- B. Submit a list of proposed manufacturers for all raceways and components.
- C. Submit shop drawings for the following:
 - 1. Conduits
 - 2. Conduit Fittings
 - 3. Surface Metal Raceways
 - 4. Support fittings, straps.
 - 5. Boxes

PART 2 - PRODUCTS

2.1 RACEWAYS AND FITTINGS

- A. Raceways:
 - 1. All conduit shall be ¾-inch minimum.

2. Rigid steel conduit: Shall be full weight steel pipe, hot dipped galvanized inside and outside, threaded.
3. Intermediate metal conduit: Shall be intermediate steel pipe, hot dipped galvanized, threaded.
4. Conduit for direct burial: Shall be galvanized rigid steel with PVC jacket.
5. Rigid aluminum conduit: Shall be full weight pipe, threaded.
6. Electric metallic tubing (EMT) shall be steel thin wall pipe, galvanized, threadless.
7. Flexible steel conduit (Greenfield): Shall be continuous single strip, galvanized.
8. Liquid-tight, flexible steel conduit: Shall be zinc coated and consist of flexible galvanized steel tubing over which is extruded a liquid-tight jacket of polyvinyl chloride (PVC).
9. Polyvinyl chloride conduit (PVC):
 - a. Provide only where noted.
 - b. Shall be self-extinguishing, UL listed.
 - c. Concrete encased: Shall be thin wall, Type A.
 - d. Exposed and direct burial: Shall be heavy wall, Type 40.
10. Wiring troughs: Refer to Section 16141, 2.2 B.
11. Surface metal raceways: Shall consist of base and snap-on type cover sections, of nominal material thickness .040" minimum. Shall be steel, baked enamel finish, and shall be provided with all the required fittings. Sizes as noted on the Drawings.

B. Conduit Fittings:

1. Thread compounds shall be UL approved conductive type to insure low resistance ground continuity through conduit.
2. Metallic conduit fittings shall be corrosion resistant.
3. Bushings shall be of the metallic insulated type.
4. For weatherproof and dusttight installations provide liquid-tight fittings with sealing rings and insulated throat.
5. Rigid steel and IMC conduit fittings:

- a. Fittings shall be standard threaded couplings, locknuts, bushings, and elbows.
 - b. Sealing fittings shall be of the threaded cast iron type. Sealing fittings used to prevent passage of water vapor shall be of the continuous drain type. In concealed work, each fitting shall be installed in a flush steel box with blank coverplate having the same finish as that of other electrical plates in the room.
6. Rigid aluminum conduit fittings:
- a. Fittings shall be standard threaded couplings, locknuts, bushings, and elbows. Iron or steel fittings shall be zinc or cadmium plated. Aluminum fittings shall not contain more than 0.4 percent copper.
 - b. Set screw fittings shall not be used with aluminum conduit.
7. Electrical metallic tubing fittings:
- a. Couplings and connectors shall be steel body-malleable iron nut, "concrete tight". They shall be compression type, afford raintight integrity, and provide positive ground. Connectors shall have insulated throats.
8. Flexible steel conduit (Greenfield) fittings:
- a. Shall be pressure clamp type with insulated throat and UL approved for ground continuity.
9. Liquid-tight flexible metal conduit fittings:
- a. Shall be of a type incorporating a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats. Shall be UL approved for ground continuity.
10. Direct burial conduit fittings shall be as recommended by the conduit manufacturer. Maintain continuous integrity of PVC jacket over couplings, etc.
11. Expansion and deflection couplings:
- a. Shall accommodate 0.75 inch deflection, expansion, or contraction in any direction and allow 30 degree angular deflections. Couplings shall comply with UL 467 and 514 and shall qualify seismically.
 - b. Shall include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC tables for ground conductors.

2.2 INSTALLATION COMPONENTS

A. Sleeves:

1. Provide and assume responsibility for locating and maintaining in proper position all sleeves required for the work. See Section 15000 - General Requirements for Mechanical and Electrical Work for sleeves specification.
2. For raceways through sleeves, provide seals of oakum packing and lead or O.Z. Type WSC compound on both sides.
3. For cables in raceways through sleeves, provide seals similar to O.Z. Type WSC compound or Type C series terminators.
4. Through floors, exterior masonry walls, roof, and underground, sleeves shall be schedule 40 galvanized steel pipe. For other areas, sleeves shall be 18 gauge galvanized sheet steel.

B. Fire sealants:

1. Openings through floors and walls in which cables, conduits, or pipe pass shall be sealed by U.L. classified smoke and fire stop fittings, and have an hourly rating equal to the fire rating of the floor or wall. Fittings shall be similar to O-Z Gedney Type "CFS" or CAFS".
2. Penetrations through fire-rated floors in which wiring for floor service outlets in routed shall be sealed by U.L. classified smoke and fire-stop fittings, and shall have an hourly rating equal to the floor rating. Fittings shall be similar to O-Z Gedney Type "PTFS".

2.3 SUPPORTS

A. Conduit Supports:

1. All parts and hardware shall be zinc-coated or have equivalent corrosion protection.
2. Individual conduit hangers, shall be designed for the purpose, have pre-assembled closure bolt and nut, and provisions for receiving hanger rod.
3. Multiple conduit (trapeze) hangers shall be not less than 1½ by 1½ inch, 12 gauge steel, cold formed, lipped channels. Hanger rods shall be not less than d-inch diameter steel.
4. Solid masonry and concrete anchors shall be a type approved for the purpose.

B. Fasteners:

1. Furnish all fasteners and hardware compatible with the materials and methods required for attachment of supporting devices.
 - a. Slotted-Type Concrete Inserts: Galvanized pressured steel plate complying with ASTM A 283; box-typed welded construction with slot designed to receive steel nut and with knockout cover; hot-dipped galvanized in compliance with ASTM A 386.
 - b. Masonry Anchorage Devices: Expansion shields complying with Federal Specification FF-S-325, as follows:
 - 1) Furnish lead expansion shields for machine screws and bolts $\frac{1}{4}$ " and smaller; head-out embedded nut type, single unit class, Group I, Type 1, Class 1.
 - 2) Furnish lead expansion shields for machine screws and bolts larger than $\frac{1}{4}$ " in size; head-out embedded nut type, multiple unit class, Group I, Type 1, Class 2.
 - 3) Furnish bolt anchor expansion shields for lag bolts, zinc alloy, long-shield anchors class, Group II, Type 1, Class 1.
 - 4) Furnish bolt anchor expansion shields for bolts, closed-end bottom bearing class, Group II, Type 2, Class I.
 - c. Toggle Bolts:
 - 1) Tumble-wing type, complying with Federal Specification FF-B-588, type, class and style as required.
 - d. Nuts, Bolts, Screws, Washers:
 - 1) General: Furnish zinc-coated fasteners, with galvanized complying with ASTM A 153 for exterior use or where built into exterior walls. Furnish fasteners for the type, grade and class required for the particular installation.
 - 2) Standard Nuts and Bolts: Regular hexagon head type, complying with ASTM A 307, Grade A.
 - 3) Lag Bolts: Square head type, complying with Federal Specification FF-B-561.
 - 4) Machine Screws: Cadmium plated steel, complying with Federal Specification FF-S-92.
 - 5) Wood Screws: Flat head carbon steel, complying with Federal Specification FF-W-92.

- 6) Plain Washers: Round, general assembly grade carbon steel, complying with Federal Specification FF-W-92.
- 7) Lock Washers: Helical spring type carbon steel, complying with Federal Specification FF-W-84.

C. "C" Beam Clamps:

1. For 1" Conduit Maximum: Caddy Fastner Div./Erico Products Inc. BC-8P and BC-8PSM Series, HIT Spring Steel Fasteners, Inc. CH Series, or approved equal.
2. For 3" Conduit Maximum: Kindorf Elec. Prod. Div./Midland Ross Corp. 500 Series hanger; Gedney Electric Co. IS-500 Series beam clamp with H50WB Series hangers; Appleton Electric Co. BH-500 Series beam clamp with H50W/B Series hanger, or approved equal.
3. For 4" Conduit Maximum: Kindorf Elec. Prod. Div./Midland Ross Corp. E-231 beam clamp and E-234 anchor clip and C-149 Series lay-in hanger; Unistrut Corp. P2676 beam clamp and P-1659 Series anchor clip with J1-205 Series lay-in hanger, or approved equal.
4. For Threaded Rods (100 lbs. load max.): Caddy Fastner Div./ Erico Products Inc. Cat. No. BC-4A; HIT Spring Steel Fasteners Inc. master clamp MC, or approved equal.
5. For Threaded Rods (200 lbs. load max.): Kindorf Elec. Prod. Div./Midland Ross Corp. 500 Series; Gedney Electric Co. IS-500 Series; Appleton Electric Co. BH-500 Series, or approved equal.
6. For Threaded Rods (300 lbs. load max.): Kindorf Elec. Prod. Div./Midland Ross Corp. E-231 beam clamp and E-234 anchor clip; Unistrut Corp. P2676 beam clamp and P-1659A Series anchor clip, or approved equal.

D. Pipe Straps:

1. Two hole steel conduit straps with Galv-Krom finish, Kindorf Elec. Prod. Div./Midland Ross Corp. C-144 or C-280 Series, or approved equal.

E. Pipe Clamps:

1. One hole malleable iron type clamps, Kindorf Elec. Prod. Div./ Midland Ross Corp. HS-400 Series; Gedney Electric Co., 14-50 Series, or approved equal.

F. Deck Clamps:

1. Caddy Fasteners Div./Erico Products Inc. DH-4-T1 Series. HIT Spring Steel Fasteners, Inc. RD Series, or approved equal.

G. Fixture Stud and Strap:

1. Steel Electrical Products Div. FE-431; Gedney Electric Co. SL-134, or approved equal.

H. Channel Support System and Accessories:

1. Furnish 12 gauge galvanized steel channel and accessories as manufactured by:
 - a. Kindorf Elec. Prod. Div./Midland Ross Corp.; B-9000 (1½" x 1½"), B-901 (1½" x 1"), B-902 (1½" x 3"), or approved equal.
 - b. Unistrut Corp.; P-3000 (1d" x 1e"), P-5500 (1e" x 2-7/16"), P-5500 (1e" x 3¼").
 - c. B-Line Division - The Brinkley Co.; B-22 (1e" x 1e"), B-12 (1e" x 2-7/16"), B-11 (1e" x 3¼").
 - d. Versabar Corp.; VA-1 (1e" x 1e"), VA-3 (1e" x 2½").
 - e. Or approved equal.

I. Support Fittings for Industrial Fluorescent Fixtures on Exposed Conduit System:

1. Ball Hanger: Crouse-Hinds Co. ALC, Appleton Electric Co. AL Series, or approved equal.
2. Flexible Fixture Hanger: Crouse-Hinds Co. UNJ115, Appleton Electric Co. UNJ-50 or UNJ-75, or approved equal.
3. Flexible (Hook Type) Fixture Hanger: Crouse-Hinds Co. UNH-1, Appleton Electric Co. FHFF, or approved equal..
4. Eyelet: Steel City Electrical Products Div. H-263, Unistrut Corp. M2250, or approved equal.
5. Eyelet with Stud: Steel City Electrical Products Div. H262, Unistrut M2250, or approved equal.
6. Conduit Hook: Crouse-Hinds Co. UNH-13, Appleton Electric Co. FHSN, or approved equal.

2.4 BOXES

A. Outlet boxes:

1. Outlet boxes for concealed work shall be galvanized steel, 4 in. square or octagonal, or as required by construction, devices or wiring, and shall conform to UL's "Standard for Outlet Boxes and Fittings." Outlet boxes shall be provided with a galvanized steel cover or extension ring depth as required. As a minimum, boxes shall be of the following depths and as

described for specific applications hereinafter:

Above ceiling	1½ in. deep.	
In ceiling or slab		3 in. deep.
In wall for fixture		2¾ in. deep.
In wall for receptacles and switches	1½ in. deep.	

With raised covers and fixtures studs where required.

Through-the-wall type are not permitted.

Receiving 1¼" conduit. 2½" deep min

2. Ceiling fixture outlet boxes, except as noted, shall be 4" octagonal and 1e" deep and with d" fixture stud. Where cast in slab, boxes shall be open back concrete type.
3. Wall bracket outlets shall be 4" square and 1e" deep with cover having 2f" round openings and except for lampholders shall be furnished with fixture stud.
4. All outlet boxes for concealed convenience receptacles or local switches shall be 4" square and 1e" deep with regular deep switch extension cover, except where installed on columns they shall be of sufficient depth so that conduits may be installed into these boxes in back of fireproofing. Outlet boxes for gang receptacles and switches shall suit space conditions.
5. Outlet boxes for exposed work shall be galvanized cast iron or aluminum with threaded hubs. Except as otherwise required by construction, devices or wiring, the outlet boxes shall be 4 in. round x 2 in. deep for mounting on ceilings and 4 in. square x 2 in. deep for mounting on walls.
6. Boxes shall be of the cast type for switches and receptacles when installed on the exterior of the project. Such boxes shall be aluminum or malleable iron of the threaded hub type, with covers without projecting edges or corners and with openings suitable for the devices to be contained therein. Outlet boxes and covers shall be galvanized or anodized and shall be gasketed.
7. Outlet boxes located outdoors and damp locations shall be weatherproof.
8. Outlet boxes without fixture or device, shall have blank cover.
9. Offset back-to-back outlets, shall have minimum 6 in. separation between them.
10. Extension rings shall be provided as required to suit various conditions.
11. Grounding screw and cable wiring connector shall be provided as required by wiring method.

12. Boxes for use with surface mounted raceways shall be of the same construction and manufacture as the raceway.
13. Except where special outlets are required, wall outlets for signaling systems shall be 4" square with single gang raised cover and bushed plate.
14. Junction outlets shall be the same as bracket outlets but without stud, furnished with covers to suit each condition and as directed. Where number of conductors exceed capacity of standard box, provide special size box.

B. Junction and Pull Boxes:

1. Junction and pull boxes shall be made of galvanized sheet steel and with screw-on covers, except as noted, and will include insulated supports for cables.
2. Provide junction and/or pull boxes as noted or as required. all junction and pull boxes shall be accessible.
3. Junction and pull boxes located outdoors and in damp locations shall be galvanized cast iron with threaded hubs and gaskets.

C. Floor Boxes:

1. Floor boxes shall be galvanized cast iron watertight, corrosion-resistant with brass covers and flanges. They shall be suitable for the conduits and the devices noted. Floor boxes shall be similar to Hubbell Dualevel Series.

2.5 MANUFACTURERS

A. RACEWAYS

1. Metallic:

Allied Tube & Conduit Corp.
Triangle PWC, Inc.
Western Tube & Conduit Corp.
Wheatland Tube Co.
Or approved equal.
2. PVC:

Carlton
Electri-Flex Co.
Thomas & Betts
Or approved equal.

3. Metallic, Plastic Coated
Robroy Industries, Inc.
Electri-Flex Co.
Perma-Cote Industries
Or approved equal.
4. Wireways:
Panduit Corp.
Square "D" Company
Hoffman Engineering Co.
Or approved equal.
5. Surface Metal Raceway:
The Wiremold Co.
Isoduct Energy Systems
Unistrut International Corp.
Walker Parkersburg
Or approved equal.
6. RACEWAY FITTINGS
Appleton Electric Co.
Crouse-Hinds Co.
O.Z. Electrical Mfg. Co., Inc.
Thomas and Betts Co.
Or approved equal.
7. BOXES
Crouse-Hinds Co.
O.Z./Gedney
Raco Inc.
Russell & Stoll Co.
Steel City Electric Co.
Thomas & Betts Co.
Or approved equal.

PART 3 - EXECUTION

A. INSPECTION

1. Contractor shall examine locations where raceways and installation components are to be installed, determine space conditions and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
2. Do not proceed with the work until unsatisfactory conditions have been

corrected.

B. INSTALLATION

1. Raceways:

- a. Install raceways in accordance with applicable requirements of NEC and National Electrical Contractors Association's "Standard of Installation", and in accordance with recognized industry practices.
- b. The routing and location of conduit runs are generally not dimensional on the drawings but shall be determined in the field to suit the locations of equipment, to conform to structural features and to avoid interferences. Where exposed conduits are dimensional on drawings, they shall be installed to a tolerance of $\frac{1}{2}$ inch. Coordinate with equipment configuration and exact location prior to connection.
- c. Support by means of ceiling trapeze, strap hangers, or wall brackets, structural steel angles or channels. Secure raceways to supports with pipe straps or U-bolts. Spacing of support shall be as per NEC. Provide U-bolts at each floor level for riser raceways and connect to acceptable supports.
- d. Mount supports to structure with toggle bolts on hollow masonry, expansion shields or inserts on concrete and brick, machine screws on metal, wood screws on wood.
- e. Allow a 6 in. minimum separation between raceways and steam and hot water pipes. Provide approved thermal insulation for electric lines where this separation cannot be maintained.
- f. Keep raceways clear of motor foundations and from underside of boilers. Also, install raceway so that they will not obstruct headroom, doorways, or walkways.
- g. For outlets located in hung ceilings, run raceways in hung ceilings and connect to main ceiling support channels.
- h. Run raceways concealed, except as noted. Exposed raceways shall be run parallel with or at right angles to walls. In walls, run raceways vertically only.
- i. Mechanically join all metal raceways, enclosures and junction boxes to form a continuous electrical conductor. Connect all electrical boxes, fittings and cabinets so as to provide effective electrical continuity and firm mechanical assembly. Maintain grounding continuity of interrupted metallic raceways with ground conductor, sized in accordance with the NEC.

- j. Provide long radius bends for empty raceway system where required to satisfy the system cabling requirements.
- k. Install complete conduit runs before pulling in wire or cable. Install raceways so that required conductors may be drawn in without injury or excessive strain to raceway or cable. Where raceway size is not indicated, follow applicable code.
- l. Do not cross pipe shafts or ventilation duct openings. Route raceway to avoid present or future openings in floor, wall or ceiling construction, when so indicated on the drawings.
- m. Keep end of raceways plugged or capped during construction.
- n. For empty raceways over 10 ft. long, provide fish or pull wire. Pull wire shall consist of nylon or polypropylene cord.
- o. Damaged or deformed raceway shall be removed and replaced.
- p. Branch circuit conduits shall not be supported by lighting fixtures, piping, or air conditioning ducts.
- q. For conduits and direct burial cable entering the building, perform the following:
 - 1) Plug all empty raceways.
 - 2) Enter through floor or wall entrance fittings. The entrance fittings shall have a gland assembly which shall be capable of providing a seal around the conduit or cable to withstand 50 foot head of water without leakage. The sealing assembly shall be similar to O-Z Gedney Type "FSK" or "FSCS".
- r. Work with extreme care near existing ducts, conduits, cables and other utilities to avoid damaging them.
- s. For conduit installation in or under concrete.
 - 1) Where located in slabs, the maximum outside diameter of the conduit shall be a the slab thickness. When locating in the slab, place conduits in a manner so as not to interfere with the placement of reinforcing bars or cause damage to structural members or structural support.
 - 2) Where located in concrete fill, the conduit shall have a minimum of 1 in. cover.
 - 3) In terrazzo floor finish, rigid steel conduit is not permitted.
 - 4) Where located under the building, conduit shall be

concrete encased or PVC coated rigid steel.

t. Permitted Uses:

1) Rigid Galvanized Steel Conduit (RGS):

- a) RGS shall be used under slab, for underground installation (PVC coated if direct burial), in wet or damp locations, for exposed runs on the exterior of the building, in concrete slabs, in mechanical equipment spaces, hazardous locations, for fire alarm, smoke detection, sprinkler alarm systems, where subject to physical damage, and as noted.

2) Intermediate metal conduit (IMC):

- a) IMC may be used in place of RGS in dry locations only.
- b) IMC shall not be used in hazardous locations and for underground and exterior installations.
- c) IMC shall not be used for service cables to be installed by Utility Co.
- d) IMC shall not be used for Fire Alarm System wiring in NY City.

3) Electric Metallic Tubing (EMT):

- a) EMT shall be used for branch circuit wiring only, installed in dry locations (hung ceilings, hollow block walls and furred spaces).
- b) EMT shall be used for low voltage system wiring, (communications, signaling, alarm, remote controls, etc.) installed in dry locations (hung ceilings, hollow block walls, riser shafts, and furred spaces).
- c) EMT shall not be used for Fire Alarm Systems in New York City.
- d) EMT shall not be used for cable above 600 volts.

4) Armored Cable or Metal Clad Cable (BX) or Metal Clad Cable (MC):

- a) Armored cable (Type AC/BX), factory assembled with insulated copper conductors in a flexible metallic enclosure shall be used for branch circuit

wiring above suspended ceiling, concealed in dry hollow partitions and block walls. Armored cable shall include a green ground conductor of the same size as the other conductors. The application of armored cable shall be limited to the branch circuit wiring extending from a junction box within the immediate area of lighting fixtures or wiring devices. The homerun extending from that junction box to the panelboard shall be installed in conduit.

- b) Metal clad (Type MC), factory assembled cable with 90°C rated copper conductors, individually insulated and enclosed in a metallic sheath of interlocking tape, or a smooth corrugated tube shall be used for branch circuit wiring above suspended ceilings, concealed in dry hollow partitions and block walls. The application of Type MC cable shall be limited to the branch circuit wiring extending from a junction box within the immediate area of lighting fixtures or wiring devices. The homerun extending from that junction box to the panelboard shall be installed in conduit.

5) Flexible steel conduit:

- a) Flexible steel conduit "Greenfield", shall be used for the following applications: for short connections where rigid conduit or tubing is impracticable, from outlet box to recessed lighting fixture with minimum length of 4 ft. and a maximum length of 6 ft., and for final connections to vibrating equipment other than motors and transformers in dry locations only.
- b) For final connections to motor terminal boxes, transformers and other vibrating equipment, the flexible steel conduit shall have polyvinyl sheathing "Sealtite" and a ground conductor. The minimum length of the flexible conduit shall be 18 in. with slack. Connect the ground conductor to the enclosure or raceway at each end.

6) Aluminum conduit:

- a) Shall not be used in or on concrete or masonry, and shall not be used in wet locations.
- b) Maintain clearance between aluminum conduits and surfaces for the following conditions: in moist locations, in interior spaces below exterior finished grade, and boiler rooms.

7) Polyvinyl chloride conduit (PVC):

- a) Shall be used for concrete encased or direct burial underground installations.
 - b) Cut ends square, ream smooth, wipe clean, apply approved solvent cement and quarter turn as drawing up tight.
 - c) Convert to steel conduit using adaptors when entering the building from under-ground locations.
 - d) Maintain a 3 ft. minimum clearance of PVC conduits from hot water and steam lines.
- u. Provide expansion-deflection fittings with bonding jumper at expansion joints and on length of runs in accordance with manufacturer's recommendations.
- 1) For Hazardous Locations:
 - a) Conduit shall be galvanized, rigid steel.
 - b) UL approved sealing fittings shall be installed, to prevent passage of flammable gasses or vapors as required by the NEC.
 - 2) For Wet, Damp, or Moist Locations:
 - a) Provide sealing fittings, to prevent passage of water vapors, where conduits pass from warm to cold locations, such as refrigerated spaces, air conditioned spaces, or similar areas.
- v. Sleeves:
- 1) Sleeves shall be provided in accordance with the following guidelines:
 - a) Set required sleeves and inserts in place during progress of construction to avoid cutting of completed work.
 - b) Provide sleeves for raceway passing through floors and foundations. Determine exact location of sleeves in field to avoid interference with structural members or equipment of other trades.
- w. Fire-Stops
- 1) Where wiring, conduits, cable trays, wireways, and other electrical raceways pass through fire partitions, fire walls,

or floors, install an approved fire-stop that provides an effective barrier against the spread of fire, smoke and gases. Firestop material (Heat activated putty and a high temperature fiber material) shall be packed tight and shall completely fill clearances between raceways and openings. It shall be applied concurrently with the installation of the wiring. The fire stop fittings shall have a U.L. classified hourly rating equal to the fire rating of the floor or wall.

- 2) Floor, exterior wall, and roof seals shall also be made watertight. Mineral wool, oakum, grout or duct seal stuffed into or around penetrations shall not be used.

x. Outlet Boxes:

- 1) Set boxes square and true with the building finish. Boxes shall be secured to the building structure by adjustable strap irons.
- 2) Verify outlet locations in finished spaces with Architectural Drawings of interior details and finishes. In locating outlets, allow for overhead pipes, ducts, and variations in arrangement, thickness in finish, window trim and other architectural construction details. Correct any inaccuracy resulting from failure to do so without any additional expense to the Owner.
- 3) Refer to Commissioner any condition that would place an outlet box in an unsuitable location, such as a molding, break glass in wall finish, or behind a radiator.
- 4) Mount outlet boxes for similar equipment at uniform heights. Where mounting height or location of outlets is not shown or specified, mount outlet as best suited for equipment connected thereto, or as directed.
- 5) Close all unused openings in outlet boxes with knockout closers manufactured for this purpose. Provide blank plates on outlet boxes in which no device is installed or device installed does not provide a suitable cover.
- 6) Provide barriers between switches connected to different phases for voltages exceeding 150 volts to ground.
- 7) Outlet boxes for fixtures recessed in hung ceilings, shall be accessible through the opening created by the removal of the fixture.
- 8) Securely fasten exposed outlet boxes by attaching to permanent inserts or lead anchors with machine screws.

Adequately support all boxes during construction to prevent movement.

y. Panelboard, Junction and Pull Boxes:

- 1) Panelboard, junction and pull boxes shall be located clear of other trades equipment, accessible, supported from the building structure, and independent of the conduits.
- 2) Conceal junction and pull boxes in finished spaces.
- 3) Coordinate size of motor terminal boxes with motor branch circuit conduit and wiring.

END OF SECTION

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SECTION 16123 - WIRE AND CABLE (600 VOLTS)PART 1- GENERAL

1.1 DESCRIPTION OF WORK

- A. The requirements of this Section apply to wire and cable work specified elsewhere in these Specifications.
- B. The work includes providing wire and cable complete with all accessories in accordance with Drawings and Specifications and as required for a complete system. Wiring size referenced in this Section shall be AWG, except as noted. For special wiring for individual systems refer to respective Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in the manufacture of wire and cable of specified types and ratings, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide wire and cable which has been listed and labeled by Underwriters' Laboratories, and comply with applicable portions of National Electrical Manufacturers Association Standards.
- C. Comply with National Electrical Code (NFPA No. 70) and local electrical codes which apply for construction and installation of wire and cable. Where discrepancies arise between codes, the most restrictive code shall apply.

1.3 SUBMITTALS

- A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work, and submit shop drawings.

PART 2- PRODUCTS

2.1 600 VOLT WIRE AND CABLE

- A. Conductors:
 - 1. All conductors shall be copper.
 - 2. No. 10 and smaller conductors shall be ASTM Standard, solid, copper. No. 8 and larger conductors shall be ASTM standard, stranded copper.
 - 3. Communications and signal wiring shall conform to the recommendations of the system manufacturers and shall be as specified in respective Sections of these Specifications.
- B. Insulation:

1. Rubber and thermoplastic insulation shall comply with ASTM and IPCEA standards.
2. Minimum insulation shall be UL rated for 75EC. Types THW, THWN, USE, RH, RHW.
3. Insulation rated 90EC may be used in lieu of the above. Types FEP, MI, PFA, RHH, THHN, XHHW.
4. Conductor ampacity rating shall be based on 75EC insulation.
5. Types and application:
 - a. THW shall be used for interior branch circuit and feeder wiring.
 - b. THWN and THHN may be provided for rewiring in existing conduit.
 - c. Conductors with insulation rated 90EC shall be provided in high ambient temperature areas and for branch circuit wiring connecting the fluorescent fixtures.
 - d. Types USE and UF cable shall be provided for direct burial feeders and branch circuits.
 - e. Bare conductors shall be permitted for grounding where so indicated in GROUNDING Section of Specifications.
 - f. Type SFF-2 conductors shall be provided in wiring channels at continuous fluorescent fixtures and in ambient temperatures over 90EC.
 - g. For low voltage system wiring (Communications, signaling alarm, remote controls, etc.) installed above suspended ceilings, approved signaling cable without conduit shall be permitted. When installed in air handling plenums signaling cable shall have flame retardant insulation UL classified as low smoke/low flame, with fluoropolymer resin jacket approved for installation in air handling plenums without conduit. Signaling cable installed without conduit shall be adequately harnessed, bundled and tied at 4 foot intervals by individual system and marked with identification tags.

C. Wire Sizes

1. For General Use:
 - a. No. 12 minimum copper wire shall be used for lighting and power.
 - b. No. 10 minimum copper wire shall be used for 15 Ampere circuits, at 120 Volts, over 90 ft. in length, and for 20 Ampere circuit, at 120 Volts, over 60 ft. in length.

- c. No. 10 minimum copper wire shall be used for 20 Ampere circuits, at 265 Volts, over 175 ft. in length.
2. For Control and Alarm Wiring, unless otherwise noted:
 - a. No. 14 minimum copper wire.
 - b. No. 12 minimum copper wire for 120 Volt circuits over 60 ft. in length.
3. For Other Voltages and Phases and for Longer Circuit Lengths:
 - a. Size wire as required to maintain NEC (NYCEC) permissible voltage drop.
4. Raceways:
 - a. Increase raceway sizes for larger wire sizes in conformance with NEC requirements.

D. Color Coding

1. Phase wires shall be color-coded as follows:
 - a. 120/208 Volt system:

Black	-	A phase
Red	-	B phase
Blue	-	C phase
2. Neutral conductors shall be white for 120/208 Volts.
3. Equipment ground wire shall have a green outer covering throughout.
4. Where color-coded cable is not available, certify in writing and request permission for overlap color taping conductors (minimum length 6 in.) in accessible locations.
5. Conductors for control circuits and signal systems shall also be consistently color coded to avoid confusion and permit easy identification of conductors. The IPCEA color code shall be used wherever possible. No two wires in the same raceway shall be the same color, unless provided with flameproof linen identification tags on each end.

2.2 APPROVED MANUFACTURERS

- A. WIRE AND CABLE UNDER 600 VOLTS
- B. For Wire and Cable:
 1. Pirelli Cable Corp.

2. Basic Wire & Cable Corp.
 3. Triangle
 4. Okonite
 5. Or approved equal
- C. For Wire and Cable Termination and Connections:
1. Thomas and Betts Corp.
 2. Burndy Corp.
 3. Elastimold
 4. G&W Electric Co.
 5. Or approved equal.

PART 3- EXECUTION

3.1 GENERAL

- A. Install wire and cable in accordance with the NEC, The National Contractors Association's "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended functions.
- B. 600 Volt Wire and Cable:
1. Wire and cable shall not be drawn into conduit and raceways until all conduit work is complete, joints made up tightly and the entire run secured in place.
 2. The inside of conduits and raceways shall be dry and clean before conductors are pulled.
 3. Care shall be exercised in pulling to avoid damage to the wire or cable. Lubricants shall be used for pulling wire or cable if the character of the pull might otherwise damage the conductors, insulation or jacket. No thermoplastic wires shall be pulled at temperatures lower than 0°C.
 4. Cables shall be supported at the upper end of all risers and at intermediate points as required by the NEC. Supports shall be O.Z. Type "R", insulation wedges or Kellens grips, or approved equal.
 5. Seal conduit with a non hardening compound approved for the purpose, where cable or wire enter building from underground.
 6. Cable spacers shall be installed where required. Spacers shall consist of galvanized or cadmium plates, steel or malleable iron threaded conduit and fittings and inserts of non-metallic insulating material with openings adequate

- to accommodate cables being spaced. Cable spacers shall be O.Z. Mfg. Co., Inc. Type E or Type EL, with grounding lug, or approved equal.
7. Not more than 3 lighting or convenience receptacle circuits shall be installed in one (1) conduit, unless otherwise indicated on Drawings.
 8. The Contractor installed service cables containing four (4) or more parallel conductors per phase shall have cable limiters at both ends of each conductor. Limiters shall be rated 600 Volts, 200,000 Amperes RMS interrupting capacity and shall have waterproof sleeves. The requirements for cable limiters shall be coordinated with the Utility Company prior to installation.
 9. Type AC armored cable (BX) shall be installed in accordance with specific NEC requirements, Article 333. Supports and hangers shall be provided every four (4) feet of cable run.
 10. Type MC metal clad cable shall be installed in accordance with NEC requirements, Article 334. Supports and hangers shall be provided every (4) feet of cable run.
 11. Direct burial cables shall be covered with a 1 in. thick by 8 in. wide white-pine board pressure-treated with a non-creosote type wood preservative, placed over 3 in. layer of clean, well-tamped sand. Under all paving and at crossover of all other utilities, direct burial cables shall be installed in PVC conduit and encased in concrete, or installed in rigid steel conduit with PVC jacket.
 12. Thermoplastic wires shall not be installed in computer area raised floors.
 13. Provide individual raceways for two pole ungrounded circuits.
 14. In certain systems, equipment furnished by an approved manufacturer may require a different number and arrangement of conductors from those indicated on the Drawings. In such cases, the Contractor for the work under this Division shall comply with such requirements at no additional cost to the Owner.
 15. In the event the Contractor for the work under this Division or Section chooses to furnish and install a system or item of equipment of different arrangement from that shown or specified, he shall furnish and install any additional wiring and conduit required by the system at no additional cost to the Owner.
 16. In wireways and large pull boxes, lace and tie off conductors in groups of 3 phases and neutral (if used) to limit conductor unbalanced loading. Conductor group shall be as installed in conduit.
 17. Tag all feeders and risers in all pull boxes and in all gutter spaces through which they pass. Tags shall be engraved white core nameplates identifying feeders as shown on the Drawings or the circuit protective device from which

they originate.

18. Leave all wires with sufficient slack at terminals ends for convenient connections and fixtures and for convenient servicing. Stow loose ends neatly in outlet box.

C. Terminations, Splices and Connections:

1. Splices and taps shall be made in accessible boxes, panelboard fittings, gutters, terminal panels, etc. only. Materials shall be compatible with the conductors, insulations and protective jackets on the cables and wires.
2. All copper conductors No. 8 & larger shall be terminated, spliced, and tapped with color-keyed compression connectors, as manufactured by Thomas & Betts Co., Series 54000, Ideal Industries Series 87000, or approved equal. The manufacturers recommended tooling shall be used. Mechanical type connectors shall not be used.
3. All copper conductors No. 10 AWG & smaller shall be terminated and spliced with Ideal Industries wing-nut wire connectors, or approved equal compression connectors. The flame-retardant, thermoplastic insulated type shall be used to isolate the terminal from other metal parts and equipment.
4. Splices and joints shall be insulated with materials approved for the particular use, location, voltage, and temperature. Insulation shall be not less than that of the conductors being joined.
5. Plastic electrical insulating tape shall be flame retardant, cold and weather resistant.

D. Cable Tying:

1. All circuit and control wiring in cabinets, panels, pullboxes, wireways, and junction boxes shall be tied and held with nylon Ty-Rap cable ties as manufactured by Thomas & Betts Co., or approved equal.
2. Wire identification ties fastened to conductors at the point of attachment to terminal blocks and equipment components shall be nylon, self-locking Ty-Raps as manufactured by Thomas & Betts Co., and Ideal Industries Series Ty-51M, 53M, or approved equal.

E. Tags:

1. Cables shall be tagged in all pull boxes, wireways and wiring gutters of panels. Where two or more circuits run to or through a control device, outlet box or junction box, each circuit shall be tagged as a guide in making connections.
2. Tags for feeders shall indicate feeder number, size, phase, voltage, origin and termination. Feeder tags shall identify all phases individually.

3. Tags for control and alarm wiring shall indicate type of control or alarm, size of wire and origin and termination.
4. Tags shall be Thomas Betts Co., Ideal Industries, wire-marker dispenser type, self laminated wire markers.

F. Lubrication:

1. Wire lubricating compound shall be suitable for the wire insulation and conduit with which it is used, and shall not harden or become adhesive. Lubricating compound shall be Ideal Industries Yellow 77 Type, or approved equal. Lubricating compound shall not be used on wire for isolated type electrical power systems.

G. Inspection:

1. Contractor shall examine the areas and conditions under which wire and cable are to be installed, and notify Architect in writing of conditions detrimental to proper and timely completion of the work.
2. Do not proceed with the work until unsatisfactory conditions have been corrected.

H. Installation:

1. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

3.2 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection:

1. Inspect for physical damage and proper connection in accordance with single line diagram.
2. Cable connections shall be tightened using a calibrated torque wrench.

B. Electrical Test:

1. Megger conductors phase-to-phase and phase-to-ground for continuity and insulation tests before connection to utilization devices for the following:
 - a. 100 percent of feeders.
 - b. 10 percent of branch circuits
 - c. 100 percent of 3-phase motor branch circuits.
2. Verify phase rotation for all 3-phase motor circuits.

C. Perform tests prior to connecting equipment and in presence of authorized representatives.

- D. Exercise suitable and adequate safety measures prior to, during, and after the high potential tests, including placing warning signals and preventing people and equipment from being exposed to the test voltages.
- E. Submit certified written report of test results to Architect.
- F. Correct installation of or replace cable testing below manufacturer's standards.
- G. Subsequent to wire hook-ups, energize circuit and demonstrate functioning in accordance with requirements.

END OF SECTION

SECTION 16141 - WIRING DEVICES AND INSTALLATION COMPONENTSPART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. This Section is to coordinate with and be complementary to the General Conditions of the Work, wherever applicable to Mechanical Work.
- B. Section 15000 - Special Requirements for Mechanical and Electrical Work shall apply.
- C. Section 16000 - General Provisions for Electrical Work shall apply.
1. Generally, the location of devices and outlet boxes in finished rooms or spaces shall be where indicated. In the case of special rooms and areas, e.g., operating rooms, locations shall be obtained from Architect and from his scaled drawings of interior details and finish. All local switches near doors shall be located at strike side of door as finally hung, whether so indicated on the plans or not, unless specifically indicated otherwise.
 2. Except as otherwise indicated or where shown on Architect's details, the following dimensions from finish floor to center of outlet shall be established.

a.	Bracket outlets in stairs	7'-6" in stairs
b.	Bracket outlets in toilets	as required to clear top of lavatory mirror or behind medicine cabinet when light is part of cabinet.
c.	Receptacle outlets, unless otherwise noted	1'-6"
d.	Receptacle outlets in mechanical spaces	3'-0"
e.	Wall switch outlet	4'-0"
f.	Wall switch outlet at borrowed lights	3'-0"
g.	Wall push button	4'-0"
h.	Bell	8'-0" or 8" below finished ceiling
i.	Fire alarm station	4'-0"
j.	Fire alarm bell or horn,	8'-0" or 1'-0"

	strobe light	below finished ceiling
k.	Telephone outlet	1'-6"
l.	Telephone outlet for wall phone	4'-0"
m.	Receptacles at counters, or multi-outlet system (Plugmold)	4'-0" or as required
n.	Motor controllers	5'-0"
o.	Safety and disconnect switches	5'-0"
p.	Panelboards (lighting and power) finished floor to top.	6'-6" above
q.	Exit lights, where wall mounted	2" above door bottom of light

- D. In centering outlets allow for overhead pipes, ducts, etc., and for variation in thickness of fireproofing and plastering. Allowances shall also be made for window trims, paneling, counters, casework, etc. Any inaccuracies resulting from failure to comply with the above must be corrected without additional expense to the Owner.
- E. Receptacles listed in this Section of the Specification shall be of the type indicated, or approved equal to the Manufacturers listed. Where furnished under this Section of the Specification, provide matching plugs for each receptacle.
- F. Where indicated, switch and receptacle shall be combined.

1.2 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and made ready for operation by the Owner, all wiring devices in accordance with Drawings and Specifications.

1.3 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of wiring devices and installation components, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide wiring devices and installation components produced by a manufacturer listed as an Approved Manufacturer in this Section.
- C. Provide equipment whose performance, under specified conditions, is certified by the manufacturer.

1.4 SUBMITTALS

- A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include manual motor starters, multioutlet systems, wireways, floor boxes, receptacles and local wall switches.

1.5 GUARANTEE

- A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work.

PART 2- PRODUCTS

2.1 WIRING DEVICES

A. Local Wall Switches:

1. Switches shall be heavy duty, toggle, quiet type, fully enclosed in composition cases.
2. Switches shall be rated 20 amp, 120/277 volt, AC.
3. Switches shall be as indicated below, or approved equal:
 - a. Single Pole: Hubbell No. 1221
 - b. Double Pole: Hubbell No. 1222
 - c. 3 Way: Hubbell No. 1223
 - d. 4 Way: Hubbell No. 1224
4. Key switches of equivalent rating and grade to above switches shall be provided where indicated on Drawings.
5. Where it is not possible to set the switch box flush with the wall, furnish raised edge plates.
6. Where more than one switch is being installed, provide multiple gang switch plates for number of switches as indicated.
7. Gang switch plates for five or more switches (or receptacles) shall be engraved with titles as directed by Architect.
8. Switches installed in hazardous areas shall be explosion proof type in accordance with the NEC.

B. Receptacles:

1. Receptacles shall be the grounding type, (except as otherwise noted) composition base, meeting NEMA standards, publication WD-1-1971.

2. Where it is not possible to set the outlet box flush into the wall, furnish raised edge plates. Convenience receptacle shall be mounted with ground pole up, except those mounted above counter levels.
3. Receptacles shall be as indicated below or approved LEVITON Equivalent.
 - a. Duplex Convenience Receptacles: 125 Volts, 2-Pole, 3-Wire, U ground slot type.
 - 1) 20 Amp. Hubbell No. 5362 (20 Amp circuits). 5362A
 - 2) 15 Amp. Hubbell No. 5262 (15 Amp circuits). 5262A
 - 3) Or approved equal
 - b. Single Receptacles: 20 Amp, 125 Volts, 2-Pole, 3-Wire, locking type LEVITON No. 2310., or approved equal NOT UL.
 - c. Duplex Receptacles: 20 Amp, 125 Volts, 2-Pole, 3-Wire, grounded, twist-lock type, Hubbell No. 7580-G. NOT UL, no equal.
 - d. Outdoor Receptacles: 20 Amps, 125 Volts, 2-Pole, 3-Wire, U=5362 ground slot type, duplex convenience receptacle, with weatherproof cover, LEVITON No. 4926 or approved equal (W / P cover only)
 - e. Ground Fault Interrupter Duplex Receptacles, 20 Amp: LEVITON No.6899 and 6898-HGR or approved equal when on emergency circuit.
 - f. Ground Fault Interrupter Duplex Receptacles, 15 Amp: LEVITON No. 6599 and 6599-R or approved equal when on emergency circuit.

2.2 INSTALLATION COMPONENTS

A. Surface Mounted Multioutlet System:

1. Multi-outlet system shall consist of surface mounted all steel raceways for use with number and type of wiring devices installed as described hereinafter or shown on the Drawings. System shall be as manufactured by Wiremold, or approved equal, complete with all fittings required for a complete installation.
 - a. Plugmold 3000 - Raceway with buff finish shall be 2¾" high by 1-7/16" deep with snap on cover and shall contain brackets for mounting of grounding type duplex receptacles located 24" on centers and rated 20 Amperes, 120 Volts, unless otherwise indicated on Drawings by Symbol, and having the capability of being installed wherever desired within the raceway. All branch circuit wiring shall be run within the raceway.

- b. Plugmold 2000 - Raceway with buff finish shall be 1-9/32" high by 3/4" deep designed to receive two-circuit "Snapicoil" with 3-wire single receptacles 18" on centers and rated 20 Amperes, 120 Volts.
- c. Plugmold G-4000 - Raceway shall be constructed of cold rolled galvanized steel, gray baked enamel finish. Raceway shall be 1 3/4" deep by 4 3/4" wide, composed of a base member, single cover and a divider to provide a surface mounted dual compartment metallic raceway system for a power and low voltage distribution. Grounding type duplex receptacles located 24" on centers and rated 20 Amperes, 125 Volts and telephone jacks or connectors located as indicated shall be provided. For computer data outlets provide appropriate covers with bushed holes coordinated with system installer.
- d. Wiring devices shall be as specified under "Outlet Boxes and Wiring Devices" with plates having finish to match that of multioutlet system raceway. Each receptacle cover shall be indent stamped with the voltage and Ampere rating of that receptacle.

B. Wiring Troughs:

- 1. Wiring troughs shall be 4" x 4" or 6" x 6", brake-formed of code gauge (No. 16 gauge minimum) steel, furnished in standard 10-foot sections with knockouts, as required. Wiring troughs shall be of the screw-on cover type and shall have a high grade enamel finish baked on a chemically-cleaned and zinc-phosphatized surface providing maximum resistance to corrosion. Wiring troughs for use in radiology rooms shall be of type and configuration shown on Drawings.
- 2. Wiring troughs shall be furnished with all the required components, such as square junction boxes, 90-degree elbows, T-shaped pull boxes, crossover pull boxes, box-connecting couplings, fittings and screw-on cover plates. Lengths of individual sections shall be provided in accordance with installation requirements.

C. Occupancy Sensors

- 1. General
 - a. Sensors shall control lighting in the sensed area only. Specific models shall be applied as per Drawings.
 - b. The Contractor shall be responsible for a complete and operable system.
 - c. Occupancy sensors shall be installed as per manufacturer's recommendations.

- d. Sensor and control unit manufacturer must have experience in the lighting controls industry.
- e. Contractor shall be responsible for contacting the manufacturer for proper placement and adjusting of sensor.

2. Passive Infrared Occupancy Sensors

- a. The passive infrared sensors shall be capable of detecting presence, in the floor area to be controlled, by detecting changes in the infrared energy. Small movement shall be detected such as when a person is writing seated at a desk. Sensor shall cover up to 1000 square feet, with a field of view of 180 degrees.
- b. The passive infrared sensor shall utilize a temperature compensated dual element sensor and a multi-element fresnel lens.
- c. Sensor shall have a daylight filter which ensures that the sensor is insensitive to short-wavelength infrared waves such as those emitted by the sun.
- d. Fresnel lens shall be Poly IR 2 or 4 based material to offer superior performance in the infrared wavelengths. Lens shall have grooves facing in to avoid dust and residue build up which effects IR reception. The multi-element fresnel lens system shall have 4 vertical layers and up to 19 horizontal layers.
- e. The sensors shall not protrude more than 1½ inches from the wall or ceiling.
- f. Time delay range shall be adjustable from 15 seconds to 15 minutes. Sensitivity adjustment shall range from off at "O" to maximum at "10".
- g. Adjustments and mounting hardware shall be concealed under a removable cover to prevent tampering with adjustments and hardware.
- h. Sensors shall be a two-wire completely self-contained control system. Power supply shall be an internal transformer and switching mechanism shall include a latching dry contact relay, compatible with electronic ballasts, compact fluorescent and inductive loads. Triac and other harmonic generating devices shall not be acceptable.
- i. Sensor shall be capable of switching from 50 to 800 Watt incandescent or fluorescent loads at 120 Volts and 50 to 1000 Watts at 277 Volts.

- j. Sensor shall have daylight feature adjustable from 5 to 400 footcandles that holds lighting "off" when a desired footcandle level is present.
- k. Sensor shall have a 100% off override switch with no leakage current to the load or ground.
- l. Passive infrared sensor shall be Model WI 277 A, with dual switch plate Model ASP-112 where indicated on Drawings, or Model WPIR 1000, as manufactured by The Watt Stopper, Inc. or approved equal.

3. Ultrasonic Occupancy Sensors

- a. The occupancy sensors shall be capable of detecting presence in the floor area to be controlled by detecting doppler shifts in transmitted ultrasound.
- b. The ultrasonic frequency shall be 25 KHZ at + or - 0.005. Occupancy sensors shall be precision crystal controlled and shall not interfere with each other when two or more are placed in the same area. Ultrasonic circuit shall be solid state crystal controlled with advanced signal processing.
- c. Detection shall be maintained when a person moves only within or a maximum distance of twelve inches either in horizontal or vertical manner at the approximate speed of 12 inches per second. The sum of this distance, volume and speed present the average condition occupancy sensors must meet in order that the light will not go off when a person is reading or writing while seated at a desk.
- d. Each sensor shall be furnished with a shunt provision which will enable an occupant to by-pass the sensor in the event of failure. This by-pass provision pin or device shall remain in the sensor and be visible from the floor as a constant reminder that the automatic function has been by-passed.
- e. The sensors shall be ceiling mounted and not protrude more than 1.5 inches. Other mountings shall be as indicated on Drawings.
- f. Sensors shall have a multi-directional transmitter with temperature and humidity resistant, 25 KHZ tuned ultrasonic receivers. Ultrasonic receivers shall be temperature and humidity resistant with less than 6dB shift in the humidity range of 10% to 90% and less than 10dB shift in the temperature range of -20E to 60EC.
- g. Where indicated on Drawings, sensors shall be wired in parallel to allow coverage of large areas.
- h. Time delay range shall be adjustable from 15 seconds to 15

minutes. Sensitivity adjustment shall range from off at "0" to maximum at "10".

- i. Sensors shall operate on 24 volts DC power, current draw is 20 milliamps and shall be UL listed.
- j. Power supply shall be provided by UL listed Power Pack consisting of a transformer and contact closure relay. Power out of the transformer shall be 100 ma, 24 VDC and shall be capable of operating a maximum of three occupancy sensors. Power packs shall have a ½ inch threaded nipple for attachment to standard ½ knockout enclosures. Model A-277D.
- k. Ultrasonic occupancy sensor shall be Model W-2000 H (Corridors), Model W-2000 A (Mechanical Equipment Rooms and where shown), Model W-500 A (Toilets and where shown) as manufactured by The Watt Stopper, Inc. or approved equal.

4. Dual (Passive Infrared/Ultrasonic) Occupancy Sensors

- a. The occupancy sensors shall be capable of detecting presence in the floor area to be controlled by detecting doppler shifts in transmitted ultrasound and passive infrared heat changes.
- b. Upon entering a space, motion from both technologies must be sensed before lighting will be turned on. After this has occurred, detection in either technology shall hold lighting on for the set time period. Sensors shall have a retrigger time delay where only one motion is necessary to turn on the lights within 5 seconds after turning off.
- c. Ultrasonic sensors shall be volumetric in coverage. Detection shall be maintained when a person moves only within or a maximum distance of twelve inches either in a horizontal or vertical manner at the approximate speed of 12 inches per second. The sum of this distance, volume and speed, represent the average condition an occupancy sensor must meet in order that the lights will not go off when a person is reading or writing while seated at a desk.
- d. Sensors shall cover a minimum of 1500 square feet when mounted at 12 feet, shall be wall mounted and not protrude more than 1.5 inches.
- e. Each sensing technology shall have independent sensitivity adjustments and LED display. Sensitivity adjustment shall range from off at "0" to maximum "10" for each technology. Time delay range shall be adjustable from 15 seconds to 15 minutes.
- f. Sensors shall operate range on 24 volts DC power, power draw is 25 milliamps.

- g. Sensor shall have an adjustable internal photo sensor with a 24 VDC output after occupancy and a minimum light level is obtained. Adjustable from 5 to 400 footcandles.
- h. Ultrasonic circuit shall be solid state, controlled with advanced signal processing and crystal accuracy.
- i. Ultrasonic receivers shall be temperature and humidity resistant with less than a 6dB shift in the humidity range of 10% to 90% and less than a 6dB shift in the temperature range of -20E to 60EC.
- j. Power supply shall be provided by UL listed Power Pack that consists of a transformer and contact closure relay in one package. Power output of the transformer shall be 100 ma, 24 VDC and shall be capable of operating a minimum of two dual sensors.
- k. Occupancy sensor shall be Model DT-100 with Model A 277-D power pack and CM-100 bracket as manufactured by the Watt Stopper, Inc. or approved equal.

D. Digital Timer and Clock

1. The digital clock/timer shall be a dual display unit. Each display shall have four 2.7 inch digits. Each digit shall consist of 35 discrete red LED's that illuminate to form the numbers. The clock/timer shall have a galvanized steel back box for flush wall mounting and shall be finished with a brushed stainless steel trim. The unit shall be installed where indicated on the plans in accordance with the manufacturer's instructions.
2. The digital clock/timer shall have solid-state circuitry to provide precise and reliable timekeeping for elapsed time indicator or time of day indication. The clock shall display 24-hour time. A clock set button shall be mounted on the stainless steel trim.
3. The timer, when activated by the count button, shall count by seconds to 59 minutes and 59 seconds. The count shall be held by pressing the hold button and resumed by again pressing the count button. The timer shall reset instantaneously when the reset button is pressed. The timer shall immediately begin to count.
4. The timer shall be capable of displaying both time of day and elapsed time. A mode button shall change the display between clock and timer modes. The unit shall have two separate displays mounted in a common enclosure indicating both elapsed time and time of day simultaneously.
5. A remote control panel shall be furnished with the digital timer. This panel shall be a two-gang stainless steel plate containing the timer control buttons and shall be located as indicated on the plans. The contractor shall provide a two-gang electrical box for the control panel and the

control wiring between the display unit and the control panel.

6. The complete digital clock/timer assembly shall be listed by Underwriters' Laboratories, Inc.
7. The digital clock/timer shall be Model NO. SCT2, as manufactured by Post Glover, or approved equal.

E. Electronic Time Switch

1. Time switch shall be 24-hour programmable. All programming and clock setting shall be accomplished with the use of two slide switches and four push buttons. It shall be possible to preset up to eight events (4 ON/OFF) to automatically repeat on a daily basis. It shall be possible to override the program at any time by placing the selector switch in the manual position.
2. Enclosure with side-hinged door shall be drawn steel in gray finish designed for flush mounting.
3. Ratings: 120V supply
 120 V or 277V Load
4. Time switch shall be Model ET 100C-2T2365GA (flushmount with lock), as manufactured by Intermatic, Inc., or approved equal.

F. Drop Cord

1. Drop cord shall consist of 3 #12 AWG oil resistant type SO cable with straight male thread cord grip (.625"-.750" diameter range) and 4" square, two gang, malleable iron, type FD outlet box with ¾" hub, housing two 20A, 125V, 2-pole, 3-wire duplex receptacles. Length of cable shall be as required to have outlet box suspended 5 feet AFF.
2. Components
 - a. Ceiling flush mounted 4" outlet box equipped to accommodate the drop cord.
 - b. Cord Grip - Hubbell 074-01-018 CG612, or approved equal.
 - c. Two-Gang Box - Appleton Electronic Co. FD-2-75, or approved equal.
 - d. Cover Plate - Appleton Electric FSK-2DR, or approved equal.
 - e. Receptacles - Hubbel #5362, or approved equal.

G. MANUFACTURERS

1. WIRING DEVICES

Harvey Hubbell Incorporated
Bryant Electric Co.
Leviton
Or approved equal

2. SURFACE MOUNTED MULTIOUTLET SYSTEM

Wiremold
NEPCO
Isoduct
Or approved equal

PART 3 - EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where wiring devices and installation components are to be installed, determine space conditions and notify Commissioner in writing of conditions detrimental to proper and timely completion of the work
- B. Contractor shall examine location where wiring devices and installation components are to be installed, determine space conditions and notify Commissioner in writing of conditions detrimental to proper and timely completion of the work.
- C. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wiring devices and installation components where shown, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that installation complies with requirements and serves intended purposes.
- B. Coordinate with other work as necessary to interface installation of wiring devices and installation components.
- C. Installation shall comply with the requirements of NEC and NECA, "Standard of Installation."
- D. Install devices only after wiring is completed.
- E. Install receptacles and switches only in electrical outlet boxes which are clean, free from debris, excess building materials, etc.
- F. At time of completion, replace items which have been damaged, including those burned and scorched by faulty plugs.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of wiring devices and installation components, and after connection to power source, test wiring devices and installation components to demonstrate compliance with requirements. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.
- B. Test wiring devices and installation components to ensure electrical continuity of grounding connections.

END OF SECTION

SECTION 16170 - GROUNDING AND BONDINGPART 1- GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all grounding in accordance with Drawings and Specifications and as required for a complete system.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of the type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 3 years. Refer to Approved Manufacturers in this Section.
- B. Provide equipment whose performance under specified conditions is certified by the manufacturer and comply with applicable publications of NFPA and UL.
- C. Grounding shall comply with National Electrical Code (NFPA 70) for construction and installation.
- D. For patient care area electrical power systems, grounding shall conform to Article 517 of the NEC.

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include manufacturer's catalog cuts of splice kits, ground rods and ground wire.

PART 2- PRODUCTS

2.1 GROUNDING

- A. Ground rods shall be copper clad steel not less than $\frac{3}{4}$ inch diameter and 10 foot long.
- B. Ground clamps shall be bronze, solderless type with bronze screws suitable for receiving required or specified conductors.
- C. Grounding conductors shall be UL and NEC approved types, copper, with insulation color identified green, except where otherwise shown on the Drawings, or specified.

2.2 MANUFACTURERS

GROUND RODS

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SECTION 16180 - POWER, CONTROL AND ALARM WIRING SYSTEMSPART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all power wiring from service equipment to distribution and utilization equipment, and control and alarm wiring for equipment and systems within the building, except as noted, in accordance with Drawings and Specifications.

1.2 QUALITY ASSURANCE

- A. Power, control, and alarm wiring systems (NFPA 70) for construction and installation.

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work, and submit shop drawings.

PART 2- PRODUCTS

2.1 RACEWAYS

- A. Raceways and installation components shall be as specified in Section Raceway and Installation Components.

2.2 CONDUCTORS

- A. Conductors shall be as specified in Section Wire and Cable.

2.3 DISCONNECT SWITCHES AND MANUAL MOTOR STARTERS

- A. Disconnect switches and manual motor starters shall be as specified in another Section of the Specification.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine locations where power, control and alarm wiring is to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

Drawings and/or on the description of control requirements in other Division of these Specifications describing the Mechanical Work, or on control diagrams submitted by Equipment Manufacturers.

4. Actual wiring between equipment and devices shall be done from point-to-point wiring diagrams showing the terminal connections on each piece of equipment. Obtain the individual equipment wiring diagrams from the Contractor who supplies the mechanical systems and equipment to be wired, and prepare neat point-to-point diagrams showing the actual wire and conduit and interconnections between the various equipment and control devices. After installation, correct these diagrams to show the "As-Installed" conditions for the Record.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of power, control and alarm wiring, and after associated systems have been energized, test power, control and alarm wiring to demonstrate compliance with requirements. Field correct or replace defective wiring, and retest.

END OF SECTION

SECTION 16426 - DISTRIBUTION SWITCHBOARDSPART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the owner, distribution switchboards in accordance with Drawings and Specifications.

1.2 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in the manufacturer of distribution equipment of the types and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years. Refer to list of Approved Manufacturers in this Section.
- B. The distribution switchboards shall be designed, assembled and tested in accordance with applicable standards of NEMA, IEEE and ANSI, and shall be listed and labeled by Underwriters Laboratories.
- C. Comply with the NEC for construction and installation of (NFPA 70) distribution equipment as applicable.
- D. Provide distribution equipment whose performance under specified conditions is certified by the manufacturer.

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include:
 - 1. Dimensional layout on Architectural background drawings.
 - 2. Single line diagram and outline drawing.
 - 3. Manufacturer's catalog cuts.

PART 2- PRODUCTS

2.1 SWITCHBOARDS

- A. Furnish and install where indicated a dead front type, completely metal enclosed, self-supporting structural switchboard independent of wall supports. Voltage rating shall be as indicated on the Drawings. It shall consist of the required number of vertical sections bolted together to form one rigid switchboard 90d" high. The sides and rear shall be covered with removable screw-on plates. All edges of front covers or hinged front panels shall be formed.
- B. Equipment shall comply with the latest applicable standards of NEMA, ANSI & U.L.
- C. All wiring, necessary fuse blocks and terminal blocks within the switchboard shall

- K. Coordinate with and obtain approval of Utility Company for distribution equipment requirements including all metering prior to installation.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of equipment, and after connection to power source, test equipment to demonstrate compliance with requirements. When possible, field-correct malfunctioning units, then retest to demonstrate compliance. Replace equipment which cannot be satisfactory corrected.
- B. Prior to energization of distribution equipment:
 - 1. Megger check phase-to-phase and phase-to-ground insulating resistance levels of conductors.
 - 2. Check distribution equipment for continuity, and for short circuits.
- C. Set all circuit breaker trip ratings for maximum coordination with upstream and downstream devices, including ground fault trips where supplied.
- D. Subsequent to wire and cable hook-ups, energize distribution equipment and demonstrate functioning in accordance with requirements.

END OF SECTION

SECTION 16440 - SAFETY AND DISCONNECT SWITCHES

PART 1- GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all safety and disconnect switches (fused and unfused) in accordance with Drawings and Specifications.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of the type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Safety and disconnect switches shall comply with applicable standards of NEMA and shall be listed and labeled by Underwriters' Laboratories, Inc. Switches shall be approved for service where required, (and approved for use in New York City in accordance with NYCEC).
- C. Comply with NEC (NFPA 70) for construction and installation of safety and disconnect switches.
- D. Provide safety and disconnect switches produced by a manufacturer listed as an Approved Manufacturer in this Section.
- E. Provide equipment whose performance under specified conditions is certified by the Manufacturer.

1.3 SUBMITTALS

- A. Refer to Section 15000 Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include switch dimensions, ratings and NEMA enclosure types.

PART 2- PRODUCTS

2.1 SWITCH INTERIOR

- A. All switches shall have switch blades which are fully visible in the OFF position when the door is open. Switches shall have removable arc suppressors, where necessary to permit easy access to line-side lugs. Lugs shall be UL listed for aluminum and/or copper cables and front removable. All current carrying parts shall be plated. 30A thru 100A switches shall have provisions for field installed fuse pullers. Switches shall include solid neutral where required.

2.2 SWITCH MECHANISM

- A. Switches shall have a quick-make and quick-break operating handle and mechanism which shall be an integral part of the box, not the cover. Switches shall have a defeatable dual cover interlock to prevent inadvertent opening of the switch door in the ON position or closing of the switch mechanism with the door open. Handle position shall indicate if switch is ON or OFF. Handle shall have provision for padlock.

2.3 ENCLOSURES

- A. Enclosures shall be NEMA 1 enclosure except as otherwise noted or required with multiple knockouts on all sides and back, hinged door, and cover interlock which prevents door from opening when switch is in ON position. Enclosure shall have provisions for positive padlocking in ON and OFF positions.
- B. For exterior installations, the enclosures shall be NEMA 3R (raintight).
- C. All enclosures shall be the NEMA types which are most suitable for the environmental conditions of the area.

2.4 RATINGS

- A. Switches shall be rated for voltage, poles, amperes, and horsepower, as required or shown on Drawings. All switches shall be rated for maximum available fault current as required and/or as noted.

2.5 FUSES

- A. Fused safety and disconnect switches shall be provided with fuses of class, type, and rating as required or shown on Drawings.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine locations where safety and disconnect switches are to be installed and notify Architect/Engineer in writing of conditions detrimental to proper and timely completion of work.
- B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install safety and disconnect switches as required by all applicable codes and as shown on Drawings. Install safety and disconnect switches in accordance with manufacturer's written instructions, the applicable requirements of NEC, recognized industry practices, and applicable portions of NECA's "Standard of Installation".
- B. Coordinate with other work as necessary to interface installation of safety and disconnect switches with other equipment in the area.

- C. Coordinate safety and disconnect switch installation work with electrical raceway and cable work as necessary for proper interface.
- D. Install disconnect switches within sight of motor-driven appliances, and motors and controllers, unless otherwise indicated.
- E. Provide nameplate on switch, indicating equipment served.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of safety and disconnect switches, test and inspect system to ensure compliance with requirements. When possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment which cannot be satisfactorily corrected.
- B. Close all switches to check for proper energization of all loads.

PART 4- MANUFACTURERS

4.1 SAFETY AND DISCONNECT SWITCHES

- A. Square D
- B. Westinghouse
- C. General Electric
- D. Or approved equal

END OF SECTION

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SECTION 16470 - PANELBOARDS - LIGHTING AND DISTRIBUTIONPART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the providing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all panelboards in accordance with the Specifications and Drawings.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of panelboards and enclosures whose products have been in satisfactory use in similar service for not less than 3 years. Refer to list of Approved Manufacturers in this Section.
- B. Panelboards, enclosures and accessories shall be listed and labeled by Underwriters' Laboratories, and shall comply with standards of NEMA and NEC (NFPA 70) for construction and installation (and be approved for use in New York City in accordance with NYCEC).

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include panelboard dimensions, schedules with all pertinent manufacturers' data; molded case circuit breakers and/or fuses with all appropriate ratings; and cabinets.

PART 2- PRODUCTS

2.1 PANELBOARDS

A. Construction:

1. Electrical panels shall be dead-front type construction equipped with overcurrent protective devices as scheduled on the Drawings. They shall be complete with cabinet, trim, hinged door, lock directory and such additional features and components as herein specified or shown on the Drawings. Construction of panelboards shall be in all respects satisfactory to the Commissioner and subject to his/her approval.
2. Design panels for 3-Phase, 4-Wire, 120/208 Volt, service as scheduled on the Drawings.
3. Panel interior shall be factory-assembled complete with overcurrent protective devices as shown on the Drawings. Interiors shall be designed and as-sembled so that any individual overcurrent protective device can be replaced without disturbing adjacent units or removing main bus. No additional drilling or tapping of bus work shall be required to change or add branch circuit overcurrent devices. Spaces scheduled on the Drawings shall have all required busing provided for the installation of

future circuit breakers.

4. Branch circuits shall be arranged using double row construction except when narrow column panels are indicated. A nameplate shall be provided listing panel designation, type, and ratings.
5. Unless otherwise noted, full size insulated neutral bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices. The Contractor shall balance the load on all three phases. Neutral bussing shall have a suitable lug for each outgoing feeder requiring a neutral connection. A ground bus shall be included in all panels.
6. In multi-section panels install a power distribution block in the enclosure of one of the sections to permit the termination of the incoming feeder conductors as well as the extension of jumpers to the lugs of each main circuit breaker. Wire size of jumpers shall match that of the incoming feeder size. In the case of multiple- conductor feeders, reduce the size of jumpers in compliance with the NEC tap rules.
7. Panelboards shall be multi-section panels where required to comply with NEC Article 384, whether or not indicated on the drawings.

B. Bus:

1. All main bus bars shall be copper sized in accordance with UL standards to limit the temperature rise on any current carrying part to a maximum of 50EC above an ambient of 40EC maximum.

C. Circuit Breakers:

1. Panel circuit breaker overcurrent protective devices shall be as scheduled on the Drawings and as specified. All breakers shall be bolted-on thermal magnetic type unless otherwise indicated, carrying the Underwriters' Laboratories label. Plug-in breakers are not acceptable. Each breaker shall have the following features:
 - a. Magnetic blow-out or other approved arc- quenching devices.
 - b. Two and three-pole breakers shall have non- conductive barriers between poles with separate tripping element in each leg, and with common trip operation.
 - c. A single-operating handle shall open all poles. Two and three pole breakers with handle ties are not acceptable. All handles shall have clearly marked "ON" and "OFF" positions. It shall be impossible to maintain breakers in closed position under overload condition.
2. Where called for in Schedules on Drawings, provide combination circuit breakers and ground fault interrupters. Such units shall be single-pole,

120V molded case breakers with UL label or listing.

3. Where circuit breakers are used as switches for 120-volt fluorescent lighting circuits, circuit breakers shall be approved for switching duty and shall be marked SWD.
4. Panel circuit breakers shall be bolted-type rated for 10,000 RMS symmetrical amperes minimum interrupting rating at 120/208 volts. Provide higher interrupting ratings where scheduled on the Drawings. For these breakers, provide higher rated frame to meet the duty indicated.
5. Panelboards shall be provided with a main circuit breaker, wherever panel feeder exceeds 200 amperes or more than one panel is served by the same feeder. All multi-section panels shall be provided with a main circuit breaker for each section.
6. Tandem circuit breakers shall not be utilized.

D. Cabinets:

1. Cabinets shall be flush or surface-mounted, as shown or scheduled on the Drawings. Back box shall be of sufficient size to provide minimum gutter space in accordance with National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.
2. The rigidity and gauge of steel shall be as specified by Underwriters' Laboratories (and approved for use in New York City).
3. Trim shall be fabricated of code gauge steel, hot-dip galvanized with hinged door, lock and catch and directory pocket covered with clear plastic shield over directory. Metal shall be chemically cleaned, prime-painted, and finish-coat painted with the manufacturer's standard paint for the application. Trim shall be of door-in-door flush construction. All locks shall be common-keyed. Provide two keys per lock. Locks shall be Yale S511, (or approved equal), each provided with two #47 keys.
4. A directory shall be provided inside each cabinet door. Furnish and install a typewritten circuit directory, not less than 5" x 8" with metal retainer and glass or substantial plastic cover. Ink, pencil, or handwritten directory will not be accepted. Note on each directory, the panel number or designation, the panel feeder size, and the following data for each circuit: Description of load, fuse or breaker size, conduit size and wire size.
5. Align, level and secure panelboards to the building structure. Provide framework of galvanized structural iron when required for installation or indicated on Drawings. Mounting height shall be in accordance with National Electrical Code or as shown on the Drawings.

2.2 FUSIBLE SWITCH DISTRIBUTION PANELS

- A. Protective devices shall be quick-make, quick-break fusible switches. Fusible switches rated 30 to 600 amperes shall have fuse clips suitable for Class (R) (J) fuses and shall be UL listed at 100,000 AIC. Fusible switches 800 amperes through 1200 amperes shall be furnished with Class L fuse clips and UL labels for 200,000 AIC. Switches shall incorporate safety cover interlocks to prevent opening of the cover with a switch in the "on" position or prevent placing the switch in the "on" position with a cover open-provide defeater for authorized personnel. Handles shall have provisions for padlocking and shall clearly indicate the "on" or "off" position.

2.3 CIRCUIT BREAKER DISTRIBUTION PANELS

- A. These panels shall be provided with molded case circuit breakers tested and UL labeled per UL 489.
- B. Breakers 100 ampere through 400 ampere frame sizes shall be thermal-magnetic trip with inverse time current characteristics, unless otherwise noted. As a minimum circuit breaker types shall be equivalent to Square "D" Type FA, KA, LA, MA, or approved equal.
- C. For motor feeder protective devices above 100 ampere provide adjustable instantaneous trip.
- D. Breakers 600 ampere frame and above shall have solid- state trip and rating plugs with trip ratings as indicated on drawings. Rating plugs shall be interlocked so they cannot be interchangeable between frames and interlocked such that the breaker cannot be latched with rating plug removed. Breakers shall have built-in test points for testing all breakers 600 ampere and above. Trip unit shall have adjustable short time delay and adjustable instantaneous pickup. Breakers shall be Westinghouse Seltronic, or approved equal.
- E. Molded case breakers shall have a minimum 42,000 symmetrical -RMS interrupting capacity at 240 volts. (Refer to panel schedules).
- F. Current Limiting Devices: Protective devices with current limiting properties shall be provided as noted on the Drawings and specified herein.
- G. Current Limiting Circuit Breakers
 1. Feeder protective devices as shown shall be molded case air circuit breakers built and tested and UL labeled per U.L. 489.
 2. Circuit breakers shall be equal to Westinghouse type Limit-R and shall be current limiting.
 3. Breakers of 100 ampere frame shall be thermal magnetic trip with inverse time current characteristics. Breakers 400 amp and 250 ampere frame shall be solid-state trip complete with built-in current transformers, solid-state trip unit and flux transfer shunt trip. Breakers shall have easily

changed trip rating plugs with trip ratings as indicated on the drawings. Rating plugs shall be interlocked so they are not inter-changeable between frames and interlocked such that the breaker cannot be latched with rating plug removed. Breakers shall have built in test points for testing long delay and instantaneous and ground fault (where shown) functions by means of 120 volt operated test kit.

4. All current limiting circuit breakers shall be rated at amperes interrupting capacity symmetrical at volts. Current limiting circuit breakers shall protect all molded case breakers down stream as shown on the drawings. No deviations from this provision shall be acceptable. Manufacturers shall submit test data proving the protection, from both peak currents and I^2T energy, of down stream devices.

H. Breakers with Replaceable Current Limiters:

1. Breakers shall incorporate coordinated time delay thermal trip protection and current limiting protection in one assembly. The current limiters shall not be affected when the thermal and/or magnetic trip functions to clear the circuit. Regardless of which tripping device clears the circuit, all poles of the breaker shall simultaneously open. The breaker must not be resetable until current limiters which have functioned have been replaced, tripping device clears the circuit, and all poles of the breaker and cover have been refastened. The limiter shall have a visible means to determine which one has operated.
2. All current limiting breakers shall be UL listed with 200,000 ampere symmetrical interrupting capacity at 240 volts, 480 volts and 600 volts.

2.4 GROUND FAULT PROTECTION

- A. Where indicated on the Drawings provide built-in ground fault protection with adjustable pick-up rating not exceeding 1200 amperes; ground fault time delay shall be adjustable 0.1 to 0.5 seconds. Provide neutral ground fault current transformer for four wire systems. Furnish ground fault test panel with indicating lights to test GF system either with or without tripping the breaker.
- B. Furnish zero sequence ground fault protection system, where indicated on the Drawings, including:
 1. Control power transformer with fused primary and secondary protection.
 2. Zero sequence current transformer.
 3. Ground fault relay with individual continuous current pick-up and time adjustments.
 4. U.L. listed shunt trip.
 5. Ground fault test panel with indicating lights to test GF system either with or without tripping the breaker.

6. Adjustable pick-up rating not to exceed 1200 amperes.
7. Adjustable time delay from .1 to .5 seconds.

2.5 SEPARATE SWITCHES AND CIRCUIT BREAKERS

- A. Where indicated on the Drawings, switches and circuit breakers not constituting part of panelboards, shall be mounted in separate cabinets with gutter space and with latched outer door. Mounting (flush or surface) and NEMA size in accordance with application or as indicated on Drawings.

2.6 MANUFACTURERS

A. PANELBOARDS - LIGHTING AND DISTRIBUTION

1. Square D
2. Westinghouse
3. General Electric
4. Siemens
5. Or approved equal

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where this equipment is to be installed, determine space conditions and notify Commissioner in writing of conditions detrimental to proper and timely completion of the Work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install equipment where shown in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that equipment complies with requirements and serves intended purposes.
- B. Coordinate with other work as necessary to interface installation of panelboard with other equipment in the area.
- C. Installation shall comply with the requirements of the NEC and applicable portion of NECA's "Standard of Installation".
- D. Coordinate installation of panelboards and enclosures with cable and raceways

installation work.

- E. Anchor panels and enclosures firmly to walls and structural surfaces, ensuring panels and enclosures are permanently and mechanically secured. Provide all angle unit and accessories for proper mountings.
- F. Complete typewritten circuit directory card upon completion of work.
- G. For all recessed panelboards, provide two (2) one-inch conduits stubbed up and capped 6 inches above ceiling.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of panelboards, and after connection to power source, test equipment to demonstrate compliance with requirements. When possible, field-correct malfunctioning equipment then retest to demonstrate compliance. Replace equipment which cannot be satisfactorily corrected.
- B. Close all breakers (and switches) to check for proper energization of all loads.

END OF SECTION

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SECTION 16510 - LIGHTING FIXTURESPART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes the furnishing of all labor, materials, equipment, accessories, services and tests necessary to complete and make ready for operation by the Owner, all lighting fixtures in accordance with Drawings and Specifications.

1.2 QUALITY ASSURANCE

- A. Manufacturers - Firms regularly engaged in manufacturer of lighting fixtures whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Lighting fixtures shall be listed and labeled by Underwriters Laboratories, Inc. and shall comply with standards of NEMA, ANSI, OSHA, and National Electrical Code (NFPA 70) for construction and installation.
- C. Ballasts shall comply with Certified Ballasts Manufacturers Association standards and shall carry the CBM mark on the label.
- D. Provide lighting fixtures whose performance under specified conditions is certified by the manufacturer.
- E. Provide lighting fixtures, ballasts, and lamps produced by a manufacturer listed as an Approved Manufacturers in this Section, or as scheduled on the Drawings.
- F. Special designs and/or unique applications of standard units may require samples and mock-ups and other developmental work which, is to be specifically provided by the Contractor.

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work, and submit shop drawings. Shop drawings for each lighting fixture type shall include:
 - 1. Details of construction and finishes.
 - 2. Drawings to scale.
 - 3. Catalog cuts (without required details not acceptable).
 - 4. Electrical ratings, mounting, ballasts, lenses, and lamps.
 - 5. Certified photometric data, where noted.
 - 6. Clear indication of assigned fixture type.
 - 7. Installation instruction where required.
 - 8. Air conditioning data

PART 2- PRODUCTS

2.1 LIGHTING FIXTURES - GENERAL

- A. Furnish, install and connect interior and exterior lighting fixtures as scheduled on the Drawings, and as required for a complete and satisfactory operating system.
- B. Actual location of fixtures shall be as shown on the architectural reflected ceiling plans, or as directed by the Architect. Spaces for fixture insertion will be provided under the Section that covers the ceiling installation. Plaster and other frames shall be turned over to the Section for General Construction for setting and installation. Contractor shall be responsible for obtaining the latest architectural plans, and field verification. The Contractor's attention is directed to the requirements of the acoustical ceiling, particularly to the need for close coordination between the ceiling construction details and lighting fixture design. The Contractor shall be responsible for coordinating mounting hardware to match ceiling type.
- C. Lighting fixture catalog numbers shall be considered only as a guide. All fixtures must incorporate the general and particular requirements included in the Contract Documents. It may be necessary to modify the manufacturer's standard fixture corresponding to the designated type or catalog number.
- D. All methods of construction and details of workmanship, where not specifically described or shown on the Drawings, shall be satisfactory to the Architect and shall be subject to his approval.

2.2 LIGHTING FIXTURES - FABRICATION

- A. Provide required thickness of metal, plastic and composite materials so that all fixtures are rigid, stable, and will resist deflection, twisting, warping under normal installation, and relamping procedures.
 - 1. All luminaire housings minimum 22 gauge cold rolled steel, unless a heavier gauge is specified or required by NEC or Local Codes.
 - 2. All aluminum extrusion housing minimum $\frac{3}{16}$ " thick.
 - 3. All spun, hydroformed, or sheet aluminum reflectors fabricated from #12 aluminum sheets minimum, 15 gauge (.057") or heavier.
 - 4. All acrylic & polycarbonate lenses and/or diffusers minimum c" thick.
 - 5. All glass lenses and diffusers, unless specifically noted otherwise, shall be water white borosilicate or Corning Pyrex #7740 or approved equal finished as described in the Lighting Fixtures Schedule on Drawings. Greenish tint lenses and diffusers are not acceptable.
- B. Provide positive, durable, means of connection at all joints as required. No hollow rivets, unless specifically approved, are acceptable.
- C. Provide neoprene, silicone, rubber, or other appropriate gasketing, stops, and barriers where required to prevent light leak, control sound and vibration, prevent

water leaks and, if pertinent, water vapor penetration.

D. Provide finished product with the following minimum qualities:

1. Ground and/or burr free metal edges.
2. Tight fitting connections, hinges and closures.
3. Clean neat corners, edges, trims and frames.

E. All cast parts, including die-cast members, shall be of uniform quality; free from blow holes, pores, hard spots, shrinkage defects, cracks or other imperfections that affect strength and appearance, or are indicative of inferior metals or alloys.

2.3 FINISHES

A. Fixture finishes shall be applied in a manner that will assure a durable wear resistant surface.

1. Prior to finishing, all surfaces must be free from foreign materials such as dirt, rust, oil, polishing compounds and mold release agents.
2. Where necessary surface cleaned by accepted chemical means shall receive corrosion inhibiting (phosphating) treatment assuring positive paint adhesion.
3. All castings and extrusions machined, sanded or similarly treated, and given minimum one coat of baked-on clear methacrylate lacquer, unless a painted finish is specified.
4. Aluminum surfaces exposed to weather (other than anodized reflectors covered elsewhere) shall receive a duronodic or polyester powder paint finish as specified for corrosion resistance.
5. Sheet steel fixture housings, iron and steel parts, which have not received phosphating treatment ("Bonderizing" or similar process) or are to be utilized in exterior applications, shall be made corrosion resistant by zinc or cadmium plating or hot-dip galvanizing.
6. All exterior (visible) finishes must be approved by the Architect.

2.4 FIXTURE TRIMS

A. Fixtures shall have finish trim designed as specified in the Lighting Fixture Specifications.

B. Provide trim details as shown on the Drawings or as specified. The trim finish and dimensions are subject to the approval by the Architect.

1. Mitered corners shall be smoothed before shop finish is applied. No lapping of trim metal for all flush mounted ceiling trims for rectangular or square recessed fixtures.
2. All exposed ceiling trim and inside reveals on all fixtures shall be painted in a color to match the Architect's sample.

2.5 MARKING OF FIXTURES

- A. Fixtures designed for voltages other than 110-125 volt circuits shall be clearly marked. The furnishing of lighting fixtures with the appropriate ballast voltage shall remain the Contractors responsibility.
- B. Fixtures equipped with ballasts, etc., for operation of rapid start lamps shall be plainly marked "Use Rapid Start Lamps Only". Similarly, fixtures equipped with ballasts, etc. for operation of instant start or other type lamps shall also be plainly marked. Markings must be clear and shall be located to be readily visible to service personnel but invisible from normal viewing angles when lamps are in place.

2.6 LAMPHOLDERS

- A. Screw base sockets for incandescent and high intensity discharge lamps shall be of heavy duty heat resistant porcelain with spring center contacts and plated screw shells. Incandescent base sockets shall be rated 600 Watts at 250 Volts.
- B. Fluorescent lamp sockets operating with an open circuit voltage in excess of 300 volts shall be of the safety type that opens the supply circuit when the lamp is removed from the sockets.

2.7 LAMPS

- A. Provide new lamps for all luminaries specified and shown in Light Fixture Schedule on the Drawings.
- B. Fluorescent lamps shall have a color temperature of 3000EK, and a minimum CRI of 67 and initial lumen output per watt input of 75. Fluorescent lamps shall be energy saving cool white.
- C. Fluorescent lamps shall have a correlated color temperature of 3100EK (warm), and a minimum CRI of 75 and initial lumen output per watt input of 90. Lamps shall have a T8 bulb and medium bipin bases. Fluorescent lamps shall be energy saving, similar to Sylvania Octron FO32/31K, or approved equal, for 48" long lamps, and of equivalent performance for lamps of other standard lengths.
- D. Fluorescent lamps shall have a correlated color temperature of 3500E K (Intermediate), and a minimum CRI of 75 and initial lumen output per watt input of 90. Lamps shall have a T8 bulb and medium bipin bases. Fluorescent lamps shall be energy saving, similar to Sylvania Octron FO32/35K, or approved equal, for 48" long lamps, and of equivalent performance for lamps of other standard lengths.
- E. Fluorescent lamps shall have a correlated color temperature of 4100E K (Cool), and a minimum CRI of 75 and initial lumen output per watt input of 90. Lamps shall have a T8 bulb and medium bipin bases. Fluorescent lamps shall be energy saving, similar to Sylvania Octron FO32/41K, or approved equal, for 48" long lamps, and of equivalent performance for lamps of other standard lengths.
- F. Incandescent lamps shall be rated at 130 volts, unless otherwise specified in Lighting Fixture Schedule.

2.8 FLUORESCENT AND H.I.D. LAMP BALLASTS

- A. All high intensity discharge lamp ballasts shall be energy saving and high power factor (over 90%), HID ballasts shall be autotransformer, constant wattage type, and conform to the following standards:
1. U.L. and ANSI specifications with labels and/or symbols of approval by the U.L. and of certification by the C.B.M./E.T.L., Federal and State Efficiency Standards.
 2. Fixture design, fabrication and assembly shall be designed to prevent overheating or cycling of lamps and ballasts under all conditions.
 3. Provide the lowest sound-rating available for the lamps specified and clearly show their respective sound ratings. Ballasts found by the Architect or Engineer to be unduly noisy shall be replaced without additional cost prior to acceptance of the installation.
 4. Ballasts intended for outdoor uses shall be capable of lamp-starting under any temperature down to -20EF. At conclusion of the work, deliver to City of New York a written certificate guaranteeing all HID lamp ballasts for a full one (1) years after acceptance date. Warranty shall also cover all material and installation costs of replacing the defective ballast with new.
 5. Ballasts for three-lamp operation are acceptable where no dual switching is required.

2.9 FLUORESCENT LAMP BALLASTS

- A. All fluorescent lamp ballasts shall be energy saving and high power factor (over 90%) and conform to the following standards:
1. U.L. and ANSI specifications with labels and/or symbols of approval by the U.L. and of certification by the C.B.M./E.T.L., Federal and State Efficiency Standards.
 2. All ballasts Class "P" indicating approved integral ballast protection. Fuses in the primary leads provided in addition to the Class "P" ballast.
 3. Fixture design, fabrication and assembly shall be designed to prevent overheating or cycling of lamps and ballasts under all conditions.
 4. Provide the lowest sound-rating available for the lamps specified and clearly show their respective sound ratings. Ballasts found by the Architect or Engineer to be unduly noisy shall be replaced without additional cost prior to acceptance of the installation.
 5. Dimmer type ballasts shall be of design recognized and approved under the U.L. component program. These ballasts must coordinate with the dimming control devices specified for the particular application.
 6. Ballasts intended for outdoor uses shall be capable of lamp-starting under any temperature down to -20EF. At conclusion of the work, deliver to City of New York a written certificate guaranteeing all fluorescent lamp

ballasts for a full one (1) years after acceptance date. Warranty shall also cover all material and installation costs of replacing the defective ballast with new.

7. Ballasts for three-lamp operation are acceptable where no dual switching is required.

2.10 ELECTRONIC BALLASTS (FOR FLUORESCENT LAMPS)

A. Fluorescent lamp ballasts shall be high frequency electronic type, operating lamps at a frequency of 20 KHZ or higher with no detectable flicker. They shall conform to the following:

1. Ballasts shall be approved and listed by Underwriters Laboratories, Inc., shall comply with all applicable state and federal efficiency standards and with FCC and NEMA limits governing electromagnetic and radio frequency interference and shall not interfere with operation of other normal electrical equipment. Ballasts shall meet all applicable ANSI and IEEE standards regarding harmonic distortion and surge protection and shall not be affected by lamp failure and shall yield normal lamp life. Lamp current crest factor shall not exceed 1.6.
2. Ballasts shall operate at an input frequency of 60 HZ and an input voltage of 108 to 132 (120V units) or 249 to 305 (277V units) and shall have power factor above 90%. Ballasts must be compatible with the fluorescent lamps used.
3. Ballasts that operate as parallel circuits shall allow remaining lamp(s) to maintain full output if companion lamp(s) fail.
4. Ballasts shall carry three-year warranty, including labor allowance.

2.11 EMERGENCY BATTERY PACKS

A. Fluorescent fixtures designated for emergency use shall be equipped with self-contained emergency battery packs designed to light one lamp upon loss of normal power for 90 minutes. Batteries shall be sealed, maintenance-free nickel cadmium. Pack shall include fully automatic solid state charger, test switch and pilot light for remote mounting.

2.12 WIRING

A. All wiring shall comply with the following standards:

1. All wiring within lighting fixtures, or from the connection to the building wiring system, shall be as specified under Section 16123, "WIRE AND CABLE".
2. Wire leads to the receptacle or connector of any side prong incandescent lamp or any "cool-beam" lamp, or any lamp 200 watts and over shall be SF-2 (silicone rubber insulated) stranded wire.
3. Wiring within fixture housing is to be concealed, except where the fixture design or mounting dictates otherwise.

4. Wiring channels and wireways shall be free from projections and rough or sharp edges throughout, and at points or edges over which conductors must pass and may be subject to injury or wear.
5. Insulated bushings shall be installed at points of entrance and exit of flexible wiring.
6. All joints between fixture wiring shall be made with Buchanan #2008S or Thomas and Betts solderless connectors.

2.13 LIGHTING FIXTURES

A. For lighting fixtures

1. As indicated in Lighting Fixture Schedule on Drawings, or approved equal.

B. For ballasts

1. Advance Transformer Company
2. Electronic Ballast Co.
3. Magnetek Universal Manufacturing
4. Denki Ballast
5. Or approved equal

C. For lamps

1. General Electric Company
2. Osram Corporation
3. Philips Lighting Company
4. Sylvania Electric Products
5. Or approved equal.

PART 3- EXECUTION

3.1 INSTALLATION

- A. Provide and install all lighting equipment described in the Contract Documents and as modified by approved shop drawings. Installation shall be carried out in accordance with N.E.C. (N.Y.C. Electrical Code) requirements, manufacturer's instructions, and with recognized industry practices. Comply with NEMA standards and with applicable portions of NEMCA's "Standard of Installation".
 1. Verify fixture locations with architectural plans, reflected ceiling plans and other references prior to installation.
 2. Check for adequate headroom and non-interference with other equipment, such as ducts, pipes, openings, etc.
 3. In Mechanical Equipment Rooms modify locations and mounting to suit conditions as directed.

4. Install rows of fixtures in straight lines, except as noted. Install fixtures so that fixture doors open from same side.
 5. Notify Architect in writing of conditions detrimental to proper and timely completion of the work.
- B. The housing of recessed lighting fixtures shall be adequately protected during installation.
1. Provide internal blocking or framing to provide perfect linear alignment and to prevent distortion of sides or dislocation of matching parts.
- C. Provide reinforcement for all exterior pole mounted luminaires in accordance with manufacturer's recommendations. Reinforcement shall be designed to prevent overturning or permanent deflection in winds up to 100 mi./hr. or in winds equal to local maximum annual wind velocity, whichever is greater. Existing soil conditions should be taken into account. Include in submissions details of all pole reinforcements for approval by Structural Engineer.
- D. Housing installed directly in concrete shall be fabricated of hot dip galvanized steel or cast aluminum. Where cast aluminum housings are used, give two coats of asphaltum paint prior to installation. To prevent direct contact of housing to concrete, 1/2" thick x 2" diameter solid neoprene grommets shall be furnished at every point light fixture surfaces are mounted to concrete structure.

3.2 SUPPORTS

- A. Provide mounting frames (plaster frames for example) to other trades as required for installation and as called for under other sections of these Contract Documents. Frames are to be finished matte white baked enamel, unless otherwise noted.
- B. Provide bars, angles or other attachment devices for all recessed fixtures. Fixtures shall be securely attached so there is minimum possible movement up, down, or sideways. Fixtures shall be mounted to permit access of wiring. Fastening devices shall be of a positive, locking type, and will not require the use of special tools to apply or remove. Tie shall cannot be used in place of fastening devices.
- C. Fluorescent fixtures three feet in length or greater, or heavy incandescent fixtures shall not be supported directly from a suspended ceiling or the immediate hardware of a suspended ceiling (furring strips, inverted tees, Z-bar clips, etc.) from which the ceiling itself hangs. These fixtures shall be supported from the intermediate structural support system for the ceiling.
- D. Additional running bars, shall be furnished by the Contractor for support of recessed fixtures and shall be utilized by the Contractor for that support. Where additional running bars can be furnished, the Contractor shall support weight of the fixture from the main running bars (black iron) or from the structural steel, or concrete, by means of inserts, hanging rods, Kindorf or Unistrut channels.
- E. Surface mounted or pendant fixtures mounted on suspended ceilings shall be supported by approved running straps, bars or channels from the top of the

ceiling outlet box to the black iron where it exists or to the structural steel or concrete. Surface mounted or pendant fixtures installed on an existing suspended ceiling shall be supported in conformance with existing conditions or as shown on the Drawings.

- F. Where necessary to meet Code requirements, enclosure housing shall be constructed to provide a one-hour fire rating.
- G. Contractor shall be responsible only for the necessary adjustments in ceiling required to install lighting fixtures. Contractor shall verify all ceiling conditions from the Architectural plans and furnish appropriate mounting details for each lighting fixture.
- H. Provide pendant or surface mounted fixtures with required mounting devices and accessories. Coordinate locations of fixtures in mechanical areas, and if required, modify locations and mounting to suit conditions as directed. Provide mounting stems on pendant fixtures of the correct length to uniformly maintain the fixture heights shown on the Drawings, or established in the field.

3.3 ADJUSTMENT

- A. After the installation of lighting fixtures is completed, fixtures so requiring (both interior and exterior units) shall be adjusted after dark under supervision of the Commissioner.

3.4 CLEANING

- A. Lighting fixture mounting frames, plaster rings, etc. are required to be installed prior to the finishing assembly which shall not be installed until the project is "broom clean". When the fixture location or construction cannot permit sequential installation, the Contractor shall carefully protect all reflectors, lenses, flanges, and other visible surfaces.
- B. Before final acceptance by the Architect, all protective (strippable) coatings, dust, finger marks, paint spots and any other materials deleterious to the appearance or functioning of the lighting fixtures must be removed. Abrasive cleaners are not permitted.

3.5 INSPECTION

- A. Contractor shall examine location where the lighting fixtures are to be installed, determine space conditions and notify Commissioner in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.
- C. Upon completion of the installation, lighting equipment must be in first class operating order and free from defects in condition and finish.
 - 1. At time of final inspection, all fixtures and equipment must be installed and lamped with new lamps and side panels, louvers or other necessary components.
 - 2. Fixtures shall be completely clean and free from finger marks, dust,

plaster or paint spots.

3. Any reflectors, lenses, diffusers, side panels or other parts damaged prior to the final inspection shall be replaced at no expense to the Owner.
4. Exterior poles, bollards, bases and other exterior fixtures shall be painted to match factory color where finish is scratched or damaged.
5. Housings shall be rigidly installed and adjusted to a neat flush fit with the ceiling.
6. No light leaks shall be permitted at the ceiling line or from any visible part or joints.

3.6 FIELD QUALITY CONTROL

- A. Upon completion of installation of lighting fixtures, and after energization, test system to demonstrate compliance with the contract requirements. When possible, correct malfunctioning units at the site and retest. Otherwise, remove and replace with new units.

END OF SECTION

SECTION 16721- FIRE ALARM AND SMOKE DETECTION SYSTEM**PART 1 - GENERAL****1.1 DESCRIPTION OF WORK**

- A. The work includes the providing of all labor, material, equipment, accessories, services and tests necessary to complete and make ready for operation by the City of New York, the Fire Alarm System in accordance with the Specification and Plan.
- B. A complete Fire Alarm AND Smoke Detection System shall include but not be limited to:
 - 1. Control unit.
 - 2. Power supplies.
 - 3. Alarm initiating and indicated devices.
 - 4. Conduit and wire.
- C. The system shall operate as a low voltage, general evacuation fire alarm system, which transmits four (4) rounds of selective, alarm signals in the positive, non-interfering, successive (PNIS) manner.
- D. Provide at each manual pull station and at control unit as approved by Architect, Engineer and local authorities having jurisdiction. Index to appear behind a polycarbonate non-scratch lens with stainless steel trim.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of Fire Alarm Systems of types and capacities required and whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide Fire Alarm System and installation components which have been listed and labeled by Underwriters' Laboratories and which have complied with applicable portions of National Electrical Manufacturers Association Standards.
- C. Codes and Standards: System shall comply with applicable provisions of following NFPA Standards for local building codes, and meet requirements of local authorities having jurisdiction. System listed, labeled, or approved by Underwriters' Laboratories, Inc. and/or Factory Mutual System:
 - 1. NFPA 72A Local Protective Signaling System.
 - 2. NFPA 72B Auxiliary Protective Signaling System.
 - 3. NFPA 72E Standard for Automatic Fire Detectors.
 - 4. NFPA 90A Air Conditioning and Ventilating System.
- D. Wiring:
 - 1. Initiating device circuit (IDC).

- a. Two (2) wire:
 - 1) Style A as per NFPA 72D table 3-9-1.
 - 2) Style B as per NFPA 72D table 3-9-1.
 - 3) Style D as per NFPA 72D table 3-9-1.
- 2. Signaling line circuits (SLC).
 - a. Style 1 as per NFPA 72D table 3-10-1.
 - b. Style 2 as per NFPA 72D table 3-10-1.
 - c. Style 3 as per NFPA 72D table 3-10-1.
 - d. Style 4 as per NFPA 72D table 3-10-1.
 - e. Style 5 as per NFPA 72D table 3-10-1.
 - f. Style 6 as per NFPA 72D table 3-10-1.
 - g. Style 7 as per NFPA 72D table 3-10-1.
- E. All components of Fire Alarm System shall be in accordance with Article 760 of National Electrical Code.
- F. All components of Fire Alarm System shall be produced or labeled by one manufacturer.

1.3 SUBMITTALS

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work and submit shop drawings. Shop drawings shall include catalog cuts, list of components, equipment dimensions, riser diagrams including wiring details, component specifications, list of recommended spare parts, description of operation, technical literature, data bulletins, console and monitor layout, including all equipment detailed on Drawings, operating instructions.

1.4 GUARANTEE

- A. Refer to Section 15000 - Special Requirements for Mechanical and Electrical Work.

1.5 PERMITS AND APPROVALS

- A. Secure permits and approvals including wiring diagrams of complete system, prior to installation.
- B. Prior to commencement and after completion of work notify authorities having jurisdiction.

1.6 OPERATION

- A. Upon actuation of any initiating device, all visual lamps shall flash and all alarm signaling units shall sound four (4) rounds of the unique, selective code assigned to the zone of the actuated device.

- B. After the four rounds of code, the system shall automatically and continuously sound the general evacuation signal, until such time as the initiating device has been restored to normal and the fire alarm control unit reset.
- C. All alarm signals shall sound in a positive, non-interfering and successive manner, wherein all zones in alarm shall sound their four rounds of code, without interruption. New alarms shall be sounder in succession. No alarms shall be lost even though initiating devices from two or more zones are activated simultaneously.
- D. Alarms shall be annunciated by zone at the fire alarm control unit. Alarm annunciation lights shall remain lighted until the initiating device is restored to normal and fire alarm control unit reset.
- E. In addition the system shall also perform the following functions:
 - 1. Alarms shall position dampers and operate air handling units to control smoke.
 - 2. Break in initiating loop wiring shall light both the common trouble lamp and the respective zone trouble lamp on the fire alarm control panel, and sound trouble signal.
 - 3. Break in indicating loop wiring shall light the common trouble lamp and "indicating loop trouble" lamp on the fire alarm control unit, and sound trouble signal.
- F. System shall be zoned as follows, unless otherwise noted:
 - 1. Duct smoke detectors: per AC system.
 - 2. Space smoke and fire detectors: per space delineated on Drawings.
 - 3. Other initiating device: per device, such as top of staircase.

1.7 COORDINATION

- A. Contractor shall coordinate with Contractor for installation of duct mounted smoke detectors and with Contractor the location of sprinkler devices.
- B. Coordinate with Architect for final location of devices and appearance.

PART 2- PRODUCTS

2.1 CODED FIRE ALARM SYSTEMS

- A. Autocall
- B. Edwards
- C. Fire Com.
- D. Fire Lite

- E. Gamewell
- F. Honeywell
- G. Johnson Controls
- H. Pyrotronics
- I. Simplex

Or approved equal

2.2 FIRE ALARM CONTROL UNIT

- A. Solid-state.
- B. Modular design.
- C. Integral static protection.
- D. Light-emitting diodes (LED's) for indicating lamps.
- E. Power supply for control unit and associated equipment.
- F. Individual supervisory LED's for:
 - 1. AC power failure.
 - 2. Ground fault detection.
 - 3. Municipal trip disconnect.
 - 4. Low battery.
- G. Supervised indicating loop for polarized alarm signaling devices.
- H. Control for:
 - 1. System reset (momentary).
 - 2. Silence (momentary).
 - 3. Lamp test.
 - 4. AC power failure silence.
 - 5. Battery equalize.
- I. Integral battery charger.
- J. Zone module:
 - 1. Four supervised initiating circuits.
 - 2. Trouble indication per zone.
 - 3. Alarm lamp for each zone.
 - 4. Relay output per zone.
 - 5. Signaling module.
 - 6. Four supervised control circuits.

- K. Signaling module:
 - 1. Four supervised control circuits.
- L. Coder module:
 - 1. Positive non-interfering and successive (PNIS).
 - 2. Coded inputs (per module).
 - 3. Zone coding 1 to 4 digits.
 - 4. Cancel switch.
- M. Upon power failure - automatic transfer to standby batteries.
 - 1. Standby batteries capable of operating fire alarm system for minimum of 24 hours, then operating indicating units for at least five minutes. Batteries shall be totally sealed, not venting any gas, for total maintenance-free operation. Batteries shall operate on a floating charge basis to filter unwarranted spurious noise from the system. Batteries shall not be placed in the same enclosure as fire alarm control unit, but in a separate area with suitable ventilation.
 - 2. It shall be responsibility of fire alarm supplier to advise Engineer, Contractor at bid time of special ventilation requirements not provided as part of fire alarm contract.

2.3 MANUAL PULL STATIONS

- A. Painted red with diagonal white stripe one inch wide from upper left hand corner to lower right hand corner. Stripe shall not obliterate instructions or station number.
- B. Rugged die-cast construction.
- C. Semi-flush mounting.
- D. Auxiliary contacts.
- E. Alarm contacts: gold plated, dry rated 1 mA at 5 VDC minimum.

2.4 SPACE IONIZATION SMOKE DETECTORS

- A. Low voltage, dual chamber mounted, ionization type, factory adjusted.
- B. Factory calibrated, adjusted to sensitivity for Underwriters' Laboratories standards.
- C. Self compensated for ambient temperature, humidity, atmospheric pressure. Field adjustment of sensitivity not required to compensate for above.
- D. Provisions for field sensitivity adjustment to suit unusual conditions. If field

adjusted, full documentation provided for each detector shall include: detector serial number, detector location, calibration procedure, date performed, sensitivity procedure, date performed. Listing of each adjustable device on detector and its setting upon completion of calibration, sensitivity adjustments. Each field adjusted detector shall have a permanently attached unique model and serial number to facilitate future replacements and recalibration/sensitivity adjustments. Documentation to be included in the technical manual.

- E. Provisions to deter unauthorized removal.
- F. Integral, visual alarm indication, 300 degree field of view.
- G. With remote external indication integral indicator shall remain active.
- H. Auxiliary contacts for local interlock, minimum two sets, SPDT, integral or remote mounted, rated 2 Amperes at 120-240V AC and 28V DC, resistive load.
- I. Provisions for remote reset.
- J. Standard 4" x 4" or octagonal electric outlet box mounted.
- K. Prewired plug-in connector.

2.5 SPACE PHOTOELECTRIC SMOKE DETECTOR

- A. Low voltage LED light source.
- B. Multiple cell concept: LED intensity controlled by regulating photo cell circuit matched to smoke detection circuit.
- C. Light refractory principle: rate compensation to increase detection sensitivity upon rapid build-up of smoke.
- D. Alarm condition: smoke reaches 1.5 percent obscuration.
- E. Integral thermal elements; alarm at 135° F (57° C).
- F. Integral visual alarm, 180 degree field of view.
- G. Auxiliary contacts, minimum two sets SPDT. Rated 2 Amperes at 120-240V AC and 28V DC resistive load.
- H. Standard 4" x 4" or octagonal electric outlet box mounted.
- I. Pre-wired plug-in connector.

2.6 DUCT IONIZATION SMOKE DETECTORS

- A. Air sampling tubes to detect products of combustion in air handling system ducts; span entire width of duct.

- B. Direct mounted; or remote as indicated.
- C. Indicator lights; power "ON", alarm.
- D. Test-reset switch.
- E. Meet NFPA 90A requirements.
- F. Auxiliary contacts for local interlock and to AMCS as noted; minimum two sets SPDT.
- G. Provide minimum of one detector and sampling tube for each 15,000 CFM of system air flow or as noted.

2.7 FIXED TEMPERATURE DETECTORS

- A. Alarm at 135°F. (57°C.) and/or 200°F. (93°C.) as noted.
- B. Sensing elements replaceable without removing detector base.
- C. Plug-in, tools required, mounting.
- D. Auxiliary contacts, local interlock at AMCS as noted.
- E. Alarm of temperature rate of rise of 15°F. (9°C.) per minute minimum.

2.8 ALARM BELLS, VIBRATING

- A. Vibrating type.
- B. 24V DC polarized with six-inch gongs.
- C. Minimum sound input at ten ft: 90 db or greater.
- D. Semi-flush mounted, except as noted.
- E. Within protective enclosure.

2.9 ALARM BELLS, SINGLE STROKE

- A. Single-stroke action.
- B. 24V DC polarized with six-inch gongs.
- C. Minimum sound output at ten ft: 90 db or greater.
- D. Semi-flush mounted, except as noted.
- E. Within protective enclosure.

2.10 ALARM HORNS

- A. Indoor, outdoor type.
- B. 24V DC polarized.
- C. Minimum sound output at ten ft; 95 db or greater.
- D. Single or dual projectors as noted.

2.11 AUDIO VISUAL HORNS

- A. High intensity flashing light and horn as a integral unit.
- B. Both components 24V DC polarized.
- C. Light protected by Lexan lens, stenciled with fire.
- D. Light to flash at the rate of two flashes per second.
- E. Minimum sound output at ten ft 95 db or greater.
- F. Single or dual projectors as noted.

2.12 VISUAL ALARM

- A. Modular.
- B. High intensity flashing light.
- C. 24V DC polarized.
- D. Light protected by Lexan lens, stenciled with fire, or approved equal.
- E. Light to flash at the rate of two flashes per second.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall be responsible for ensuring that conduit and wire sizes, quantities and types are suitable for the equipment supplied. The Contractor shall review the proper installation of each type of device with the equipment supplier. All final connections, testing, adjusting and calibrating shall be made under the direct supervision of a trained specialist of the equipment manufacturer.

3.2 RECORD DRAWINGS AND DOCUMENTATION

- A. Provide three sets of detailed written operating instructions to the City of New York.

- B. The drawings of the system shall be submitted on washable mylar at the conclusion of the installation. These drawings shall be as-built and as-approved. All corrective notations on shop drawings shall be neatly incorporated along with all field installation variations.
- C. The record mylars and two prints of the same shall be submitted.

3.3 ACCEPTANCE TESTS

- A. Upon completion prior to all acceptance, perform complete system tests in presence of Commissioner as follows.
 - 1. Actuate all manual indicating devices one at a time and verify proper operation.
 - 2. Actuate all automatic indicating devices one at a time and verify proper operation.
 - 3. Verify:
 - a. Operation of all signaling systems.
 - b. Shut-down of fans.
 - c. Class and type operation of each initiating circuit.
 - d. Operation and correct coding of all indicating devices.
 - e. Battery operation.
 - 4. The Contractor shall certify in writing that these test functions have been completed successfully.

END OF SECTION

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SECTION 16741 - EMPTY RACEWAY SYSTEM (TELEPHONE AND COMPUTER DATA)PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes providing of all labor, materials, equipment, accessories, services, and tests necessary to complete and make ready for operation by the Owner, the telephone and computer data raceway systems in accordance with Drawings and Specifications.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Provide equipment whose performance under specified conditions is certified by the Manufacturer.

1.3 SUBMITTALS

- A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings.

PART 2- PRODUCTS

2.1 TELEPHONE RACEWAY SYSTEMS

- A. Raceways and installation components shall be as specified in Section 16111 - Raceway and Installation Components, unless otherwise noted.
- B. Plywood backboards shall be of dimensions indicated on the Drawings, or required by the Telephone Co., but not less than 6 feet wide, 8 feet high, and $\frac{3}{4}$ inch thick. Plywood backboards shall be fireproof.
- C. Telephone and computer data wall outlets shall be $4\frac{11}{16}$ inch, square boxes, as specified in Section Raceways and Installation Components.
- D. Telephone and data floor outlets shall be floor boxes as specified in Section Raceways and Installation Components, and shall be fully adjustable, both before and after cement pour.
- E. Cover plates for telephone and computer data outlets shall have a $\frac{1}{2}$ inch insulated bushed hole and shall have provisions for mounting on outlet box. Where applicable, cover plates shall be provided with RJ-11 or RJ-45 modular plugs, or combination voice/data plugs. Gauge and finish of plates shall match switch and receptacle plates within the same area.

PART 3- EXECUTION

3.1 INSPECTION

- A. Contractor shall examine location where raceway systems are to be installed and notify Commissioner in writing of conditions detrimental to proper and timely completion of the work.
- B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install telephone and computer data raceway systems, where shown, in accordance with recognized industry practices, to ensure that the installation complies with requirements and serves intended purposes.
- B. Coordinate with other work as necessary to harmonize installation of telephone and computer data raceway systems with other equipment in the area.
- C. Installation shall comply with the requirements of NEC and applicable portions of NECA's "Standard of Installation".
- D. Installation shall conform to the requirements of the Telephone Company and supplier/installer of the computer data system.
- E. Provide plywood backboards as indicated on the Drawings, and otherwise required by the Telephone Company.
- F. Provide telephone and computer data service conduits as indicated on the Drawings.
- G. This Contractor shall contact the Telephone Company to establish the scope of work by the Telephone Company and the work to be performed by the Contractor. Division of responsibility for the computer data system shall be coordinated with the supplier/installer of that system.
- H. The telephone and computer data raceway systems shall consist of empty accessible raceways connecting telephone and computer data outlets to the telephone closets and plywood backboards, (except above suspended ceilings not used as an air plenum, where branch telephone and data cable may be run exposed). Conduit shall be provided for all main runs.
- I. All work relating to the interior telephone and computer data raceway systems shall conform to the requirements of the suppliers of the telephone and data systems. Contractor shall review scope of work with both suppliers prior to installation and make changes required. Workmanship shall conform to the applicable requirements of the various sub-sections as herein specified.
- J. A 1/C #12 bare non-ferrous dragwire shall be provided in all empty telephone and data raceways for use by the system suppliers.
- K. All telephone and data outlets shall be provided with cover plates and appropriate bushed holes or RJ-11 or RJ-45 modular plugs.

- L. Ground the telephone and computer data raceway systems in accordance with NEC, and provide additional grounding in accordance with the system suppliers' requirements.
- M. Where telephone and computer data cables are to be run in an air plenum, the cables shall be a type approved for the purpose or installed in a raceway system in accordance with the NEC.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of telephone and data raceway systems, test and inspect systems to ensure compliance with requirements.

END OF SECTION

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SECTION 16902 - ELECTRIC CONTROLS AND RELAYS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work includes providing of all labor, materials, equipment, accessories, services, and tests necessary to complete and make ready for operation by the Owner, control equipment as required, as shown on the Drawings, and hereinafter specified.
- B. The work includes, but is not limited to, remote control switches, contactors, relays, low voltage control power transformers, timers and photocells.

1.2 QUALITY ASSURANCE

- A. "Manufacturers" - Firms regularly engaged in manufacture of type of equipment required for the application, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Provide equipment whose performance under specified conditions is certified by the Manufacturer.
- C. Control equipment shall comply with applicable standards of NEMA, and shall be listed and labeled by Underwriters Laboratories.
- D. Comply with NEC (NFPA 70) for construction and installation of remote control equipment.
- E. Provide remote control equipment produced by a manufacturer listed as an approved Manufacturer in this Section.

1.3 SUBMITTALS

- A. Refer to Section 15000, Special Requirements for Mechanical and Electrical Work and submit shop drawings.

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Remote Control Switches and Contactors, Relays:
 - 1. ASCO
 - 2. General Electric
 - 3. Square 'D'
 - 4. As indicated on Drawings
 - 5. Or approved equal
- B. Timers and Photocells:
 - 1. Tork Time Controls, Inc.
 - 2. Paragon Electric Co.
 - 3. Intermatic
 - 4. Or approved equal

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SECTION 16903 – CEILING FANS

PART 1 – GENERAL

1.1 WORK

- A. The Contractor shall furnish and install CEILING FANS of the sizes shown on the Plans, in accordance with the plans, specifications, and directions of the Owners' Representative.

1.2 SUBMITTALS

- A. The Contractor shall submit product cuts in accordance with the requirements of the General Conditions.

PART 2 – PRODUCT

2.1 PRODUCT

- A. Fans shall be Pensi 50" diameter 4-blade, model AA-AL-NL-005, manufactured by Modernfan Company, or approved equal. Fans shall be aluminum finish, blade color aluminum, no light, with a wall/remote combo control and stems as required.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install per manufacturers' instructions.

END OF SECTION

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SECTION 16950 - LIGHTING CONTROL PANEL

PART 1 GENERAL

1.1 GREEN BUILDING REQUIREMENTS

- A. The work covered in this section is subject to all of the requirements in the General Conditions of the Specifications. Contractor shall coordinate all of the work in this section with all of the trades covered in other sections of the specification to provide a complete and operable system.

1.2 SYSTEM DESCRIPTION

- A. Install a lighting control system consisting of relay/contacter panel(s), control switches, occupancy sensors, photocells and other controlling devices. The devices are connected by low voltage and line voltage wiring. The general operation of lighting and controlled loads shall include:
1. Interior lighting: Manual switch, photocells and occupancy sensor control on/off with automatic time scheduled shut off.
 2. Scheduled on/off loads: Time on, time off by automatic time schedule with after hour override capability and shutoff.
 3. Exterior lighting: Photocell or astronomic on/time off, time on/photocell or astronomic off.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in the manufacture of lighting control equipment and ancillary equipment, of types and capacities, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. NEC Compliance: Comply with NEC as applicable to electrical wiring work.
- C. NEMA Compliance: Comply with applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.
- D. UL APPROVALS: UL listed under UL 916 Energy Management Equipment.
- E. FCC EMISSIONS: Compliance with FCC emissions Standards specified in Part 15 Subpart J for Class A application.

1.4 SUBMITTALS

- A. Shop Drawings: Submit dimensional drawings of all lighting control system components and accessories.
- B. One Line Diagram: Submit a one-line diagram of the proposed system configuration if it differs from that illustrated in the riser diagram included in the contract drawings.

- C. Typical Wiring Diagrams: Submit typical wiring diagrams for all components including, but not limited to, lighting control panels, relays, contactors, photocells, switches, occupancy sensors and daylighting controls.
- D. Products and Components: Submit product cuts of all products and components.

1.5 MANUFACTURERS

- A. The basis of the specified system is the LP24 lighting control relay panel manufactured by The Watt Stopper, or approved equal. Any other system to be considered must submit descriptive information. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be approved by the Commissioner.

PART 2 PRODUCTS

2.1 RELAY PANELS

- A. Description
 - 1. Lighting Control Panels shall be UL listed and consist of the following:
 - a. Enclosure/Tub: NEMA 1.
 - b. Cover: Surface or Flush as required, hinged, lockable and shall restrict access to line voltage section.
 - c. Interior: Barrier for separation of high voltage (class 1) and low voltage (class 2) wiring. It shall include intelligence boards, power supply and control relays. Clock display and keypad shall be mounted on interior cabinet door for easy user access and programming.
- B. Features
 - 1. Panel shall accept up to eight single pole relays. Relays shall be individual latching relays with 20 Amp load contacts for ballast (including HID, magnetic or electronic type ballasts), tungsten and general purpose loads. Provide isolated auxiliary contacts for pilot light switching. Relays shall use quick connectors and be individually replaceable to facilitate ease of use.
 - 2. Where indicated, panels shall provide space within the high voltage section of the enclosure to accommodate up to 12 multi-pole contactors. Two sections of DIN rail mounting shall be provided as standard. No field drilling or fabrication shall be required for mounting contactors or other accessories within the enclosure.
 - 3. The lighting control panel shall provide a stagger up delay, override push buttons, pilot light outputs, and LED status light indicators for each relay or contactor control channel.
 - 4. The clock shall have a backlight display, user keypad and shall provide 8 channels of time or astronomical control. Preprogrammed lighting control scenarios shall include: scheduled on/off, manual on/scheduled off, manual on/automatic switch sweep off, astronomic or photocell on/off and astronomic or photocell control with scheduled on/off. Time clock

shall provide up to 42 holidays, automatic daylight savings adjustment, astronomic coordinates by major cities, and help screens. Program memory shall be non-volatile and clock shall retain time keeping during power outages for at least 48 hours.

5. The panel shall have 8 universal switch inputs that are low voltage, self-configuring and shall not require programming to accept momentary on/momentary off switch, push button switch (cycling), maintained switch or 24VDC signals from occupancy sensors, photocells or other interfacing devices.
6. Occupancy sensor and time control shall be integrated to allow occupancy sensor control after hours with hold on of lighting during occupancy scheduled time. During occupied time, control scenarios shall be selectable for time schedule of lighting on or occupancy sensor detection of lighting on initially and then hold on of lighting during occupied hours. Control shall provide selectable occupancy sensor blink warning prior to shut off and adjustable occupancy sensor time delay from the time clock keypad.
7. After-hour interior lighting shut off control shall provide a full duration override time of 1 to 240 minutes with a warning blink five minutes prior to shutting the lighting off. An impending shut off will be cancelled and the override period re-initialized through the operation of any assigned switch input.
8. After-hour interior lighting shut off control may be by line voltage power interrupt control to automatic control switches. The lighting control relay panel shall provide a warning blink signal to automatic control switches, thus allowing a five-minute delay prior to shutting off lighting. The lighting shut off event may be cancelled by pressing the automatic control switch push button. The lighting control panel time clock shall provide periodic lighting sweep signals to shut off automatic control switches.

2.2 APPROVED MANUFACTURERS

- A. Watt Stopper/Legrand, or approved equal.
 1. The contractor shall be completely responsible for providing a system that meets this specification in its entirety. All deviations from this specification must be listed and individually signed off by the consultant.
- B. Watt Stopper/Legrand catalog numbers, or approved equal.
 1. Lighting control relay panel: LP24
 2. Low voltage exterior photocell: EM24-A2
 3. Automatic Control Switch: AS-100

PART 3 EXECUTION

3.1 INSTALLATION

- A. All lighting control panels, switches, occupancy sensors, photocells, etc., shall be mounted as indicated on the Reflected Ceiling Plans. All wiring shall be labeled clearly indicating which lighting control panel or device it connects to. Use only properly color-coded, stranded wire as indicated on the drawings. All relays, contactors, and switches shall be tested after installation to confirm proper operation, and all connected loads shall be recorded on the lighting control schedule for each panel.
- B. The lighting control panels shall be mounted in electrical closets or other locations as indicated on the drawings. The relay panel shall be wired to control the power of each load as indicated on the Lighting Control Panel Schedules. All power wiring will be identified with the circuit breaker number controlling the load.

3.2 CONTRACTOR PROVIDED INFORMATION

- A. Contractor shall provide system documentation after the equipment has been installed:
 - 1. Lighting control operational summary sheet.
 - 2. Programming record sheet.
 - 3. System Installation and Operation Manual shall be provided to the owner.

3.3 WARRANTY

- A. Manufacturer shall provide a one year warranty for all system components.

END OF SECTION

APPENDIX

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Bronx River House
Appendix

Geotechnical Data Report

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Geotechnical Data Report

for

Bronx River Greenway River House Bronx, New York

Prepared For:

Kiss + Cathcart Architects
44 Court Street, Tower C
Brooklyn, NY 11201

Prepared By:

Langan Engineering & Environmental Services
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9 May 2012
5788404



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INTRODUCTION

This geotechnical data report presents the results of our geotechnical engineering study for the proposed Bronx River Greenway River House project at Starlight Park (Starlight Park project). The Starlight Park project includes the River House, a multipurpose field, playground areas, a parking lot, lawns and associated site infrastructure. All services were performed in accordance with the Langan Engineering and Environmental Services Inc., P.C. (Langan) proposals to Kiss + Cathcart Architects dated 29 June 2007 and 7 February 2011.

Our geotechnical engineering study included a field investigation, an evaluation of the subsurface conditions and analysis of laboratory test data for foundation support of the proposed River House and associated utilities.

Architectural information was provided by Kiss + Cathcart Architects; structural information was provided by Robert Silman Associates (Silman). Survey information is taken from the topographic survey, prepared by Langan, dated 30 September 2010, last revised 20 January 2012. All elevations reported herein correspond to the Borough President of Bronx Datum (BPBD)¹.

SITE DESCRIPTION

The proposed Starlight Park project, in the West Farms section of Bronx, New York, is on an irregularly-shaped parcel bordered by the East Tremont Avenue to the north, Westchester Avenue to the south, the Bronx River to the east and the Sheridan Expressway (Interstate 895) to the west. A site location map is reproduced as Drawing No. 1.

At the date of this report, the multipurpose field and playground areas are complete; the River House, parking lot and utility corridor are not yet started. The River House and parking lot sites were used as construction staging areas during the building of the multipurpose field and playgrounds. Existing grades in the area of the River House and parking lot range from about el 10 to el 12; existing along the proposed utility corridor are generally flat at about el 11 to 13.

We have reviewed the National Flood Insurance Rate Maps (FIRM) for the City of New York (Community-Panel No. 360497 0084F) published by the Federal Emergency Management Agency (FEMA). Based on our review, the site is within Flood Hazard Area X, areas determined to be within 1% annual chance floodplain (100-year flood); the base flood is at el 11.4. The relevant portion of the FEMA is reproduced as Drawing No.2.

¹ BPBD is 2.608 ft above the U.S. Coast and Geodetic Survey Datum mean sea level at Sandy Hook, New Jersey, 1929, (NGVD).

PROPOSED DEVELOPMENT

The Starlight Park project includes construction of a boathouse (the River House), a boat launch, playgrounds, multi-use fields and parking. Utility construction will connect existing services at the park entrance to a future comfort station. The River House and parking lot will be at the south end of Startlight Park, immediately north of a bend in the Bronx River. The proposed River House will be a single story structure for boat storage, class rooms and office space with a footprint area of about 7,000 square ft. Top of finished floor will be at about el 13; ground surface in the parking lot will be at about el 11.

The proposed 700 ft long utility corridor will be constructed along the west side of Starlight Park. The proposed utilities will include a new 8-inch diameter ductile iron water pipe, a concrete encased 6-inch HDPE sanitary force main, electric, gas, telecom services and a pump station. A 130 ft section of 36-inch diameter storm pipe will be relocated around the proposed River House.

Finished grades within the utility corridor will generally match existing grades with local changes between about 6 and 12 inches. Subgrade for the utility work will be typically about 6 ft below existing grade with local excavations extending to about 13 ft below existing grade.

SUBSURFACE INVESTIGATION

Previous Investigation

It is our understanding that a subsurface investigation was performed for Con Edison as part of the Focused Remedial Investigation. A total of 29 borings were drilled by others in 2002 throughout the proposed Starlight Park; 2 borings (SB -17 and SB-18) are near the proposed River House; four borings (SB-8 through SB-11) were drilled along the alignment of the utility corridor. All previous borings were reportedly drilled to depths ranging from about 15 to 45 ft below ground surface using hollow stem augers. Copies of the historic boring logs are provided in Appendix A.

Langan Subsurface Investigation

The River House borings were drilled to depths ranging from 30 to 40 ft below ground surface by Warren George Inc. between 14 and 21 January 2008 under the full-time special inspection of Langan; borings within the utility corridor were drilled by Warren George Inc. between 16 and 24 February 2011. Boring locations are shown in the attached Drawing No. 3, Boring Location Plan.

Borings were drilled using mud rotary drilling techniques; steel casing provided soil support when necessary. Standard Penetration Tests (SPT)² and split-spoon sampling were conducted continuously to a depth of 12 ft and at 5 ft intervals thereafter, using a two-inch outside diameter

² The Standard Penetration Test (SPT) is a measure of soil density and consistency. The SPT N-value is defined as the number of blows required to drive one foot of 2-inch-diameter split-barrel sampler after an initial penetration of 6 inches, using a 140 pound hammer falling freely from 30 inches.

split spoon sampler driven by a 140-lb hammer in accordance with (ASTM D1586-84). Rock was cored in all borings using 5-ft long NQ-sized double tube core barrels with a diamond-cutting bit.

Recovered soil samples and rock cores were visually examined and classified in the field in accordance with the Unified Soil Classification System (USCS) and assigned classification numbers in accordance with the New York City Building Code (Building Code). Soil classification, standard penetration resistances, rock type and percent recovery were recorded on field logs. Rock core recovery³, and Rock Quality Designation (RQD)⁴ for each 5-ft core run were determined and logged in the field. Copies of the Langan boring logs are provided in Appendix B.

Observation Well

A groundwater observation wells were installed in completed Boring Nos. RH-1(OW) and SP-1(OW). The wells consisted of a 10 ft section of 2-inch diameter PVC screen and solid PVC riser pipe; the bottom of the well screen was extended to about 20 ft below ground surface. The annulus between the original borehole and the PVC pipe was backfilled with filter sand to a level about 2 ft above the top of screen. The top of the filter sand was sealed with about 2 ft of bentonite pellets to prevent surface water from influencing the well readings. A flush mounted steel cover was installed at ground surface to protect the well.

Laboratory Testing

Geotechnical laboratory tests were conducted on representative soil samples obtained from the project to confirm field classifications and to determine correlations to engineering properties of the compressible material. Individual soil samples were selected for laboratory testing based on depth and type of soil.

The laboratory testing program included sieve analysis (ASTM D-422) on four samples, water content (ASTM D-2216) on five samples, Atterberg limits (ASTM D-4318) on three samples, Organic content (ASTM D-2974) on one sample and one-dimensional consolidation ASTM D-1587) on two samples. A copy of laboratory test results are reproduced in Appendix C.

SUBSURFACE CONDITIONS

The generalized subsurface profile consists of fill material overlying organic silt and peat, which in turn overlay sand, decomposed rock, and bedrock. A description of each stratum is given below in order of increasing depth. A representative subsurface profile is presented in Drawing No. 4.

³ Rock core recovery is defined as the percentage of the recovered length of a core divided by the total length of core run.

⁴ RQD is defined as the sum of the lengths of rock fragments 4 inches or greater divided by the total length of core run.

Fill

A layer of fill, predominantly consisting of brown to gray, coarse to fine silty sand, with varying amounts of gravel, decomposed rock, and clay, was encountered in all borings. Boulders, measuring up to about 4 ft across were encountered within the fill layer. The fill ranged in thickness from about 14 to 30 ft. Standard Penetration resistance (N-values) ranged from 7 to over 100 blows per foot (bpf) and typically ranged from 15 to 40 bpf.

The fill material is classified as Building Code Class 7.

Organic Silt and Peat

A layer of gray to brown organic silt with varying amounts of peat and gravel was encountered below the fill in all borings excluding Boring SB-9, which was reported to have fill to top of rock. The thickness of the organic silt and peat layer ranged from about 3 to 8 ft. N-values in the organic silt and peat ranged from 3 to 18 bpf with an average of 9 bpf.

Three representative sample from the organic layer were sent to the laboratory for Atterberg Limits and Organic Content; two undisturbed soil samples were sent to the laboratory for consolidation testing. Test results indicate that the organic silt corresponds to USCS Classification of MH with liquid limits between 70 and 101, plastic limits between 45 and 62, plasticity indices between 25 and 39 and natural water contents between 30 and 101%. Organic content was reported to be 10%. Although the estimated preconsolidation pressure of the tested soil samples was above 2 tons per square ft, it is noted that an undisturbed sample of peat was not obtained and therefore not tested.

The organic material is classified as OH in accordance with USCS and Building Code Class 6; Organic Silts and Organic Clays.

Sands

A layer of gray to brown, sand and gravel encountered below the organic silt or fill material in all borings, except for Boring SB-9. Thickness of the sand and gravel layer ranged from about 3 to 18 ft. N-values within the sand and gravel layer ranged from 9 to over 100 bpf and typically ranged from 25 to 80 bpf, averaging 62 bpf.

The sand is classified as Building Code Class 3.

Weathered Rock

A layer of gray granular weathered rock was encountered above the bedrock in Boring N os. RH-1(OW), RH-2, RH-3, SB-18, SP-1(OW), SP-2 and SP-3. Where encountered, the depth to top of decomposed rock ranged from about 15 to 25 ft below surface grade. The thickness of the decomposed rock layer ranged from about 2 to 10 ft. N-values in the weathered rock typically exceeded 100 bpf; rock core recoveries attempted in the weathered rock were generally less than 35 percent.

The decomposed rock is classified as Building Code Class 1d.

Bedrock

Gray mica schist bedrock was encountered in all borings except the SB-series borings, where auger refusal was reported. The bedrock is slightly to moderately weathered rock of fair to good quality that generally increases in quality with depth. Depth to top of bedrock ranged from about 20 to 30 ft below surface grade. Rock core recoveries ranged from 50 to 100%. RQD ranged from 35 to 100%.

The mica schist bedrock may be classified as Building Code Classes 1a, 1b and 1c.

Groundwater

Groundwater levels were monitored in Observation Well LB1(OW) during the course of the field investigation. The stabilized water level was measured at about 6 ft below ground surface, corresponding to about el 1.5.

LIMITATIONS

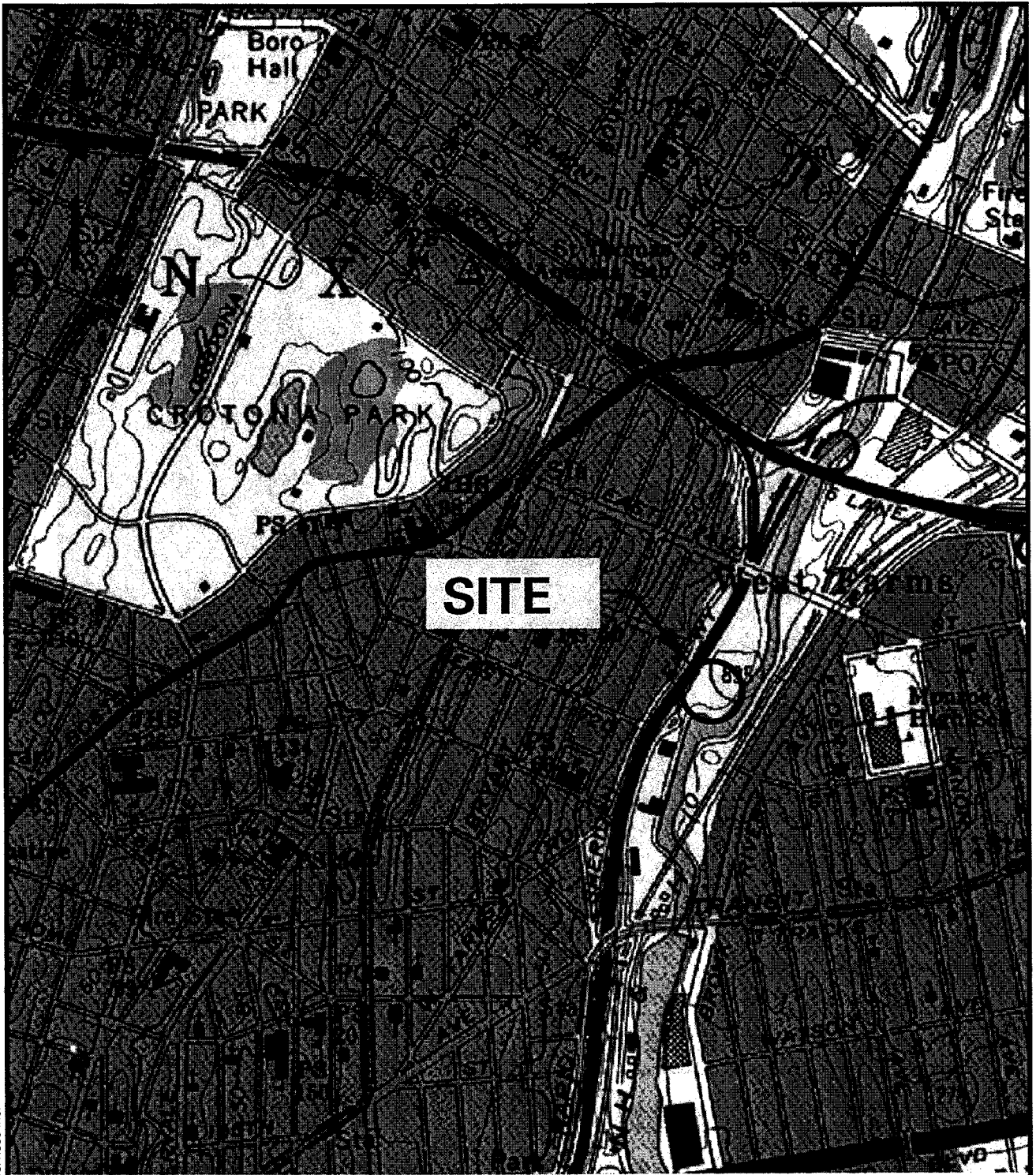
The information provided in this report are based on subsurface conditions inferred from a limited number of borings, as well as information provided by Kiss + Cathcart Architects.

This geotechnical data report has been prepared to assist the Architect and Structural Engineer in the design process and is only applicable to the envisioned project discussed herein. Any proposed changes in structures or their locations should be brought to our attention so that we can determine whether such changes affect our recommendations. Langan cannot assume responsibility for use of this report for any areas beyond the limits of this study or for any projects not specifically discussed herein.

Information on subsurface strata and groundwater levels shown on the logs represents conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to our attention for evaluation as they may affect our recommendations.

Environmental issues (such as potentially contaminated soil and groundwater) are outside the scope of this study.

FIGURES



NOTE:

1. BASE MAP TAKEN FROM USGS CENTRAL PARK QUADRANGLE, DATED 1966, PHOTOREVISED 1979.
REF. CODE: 40073-G8-TF-024



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NJ Certificate of Authorization No: 24GA27996400

BRONX RIVER GREENWAY RIVER HOUSE

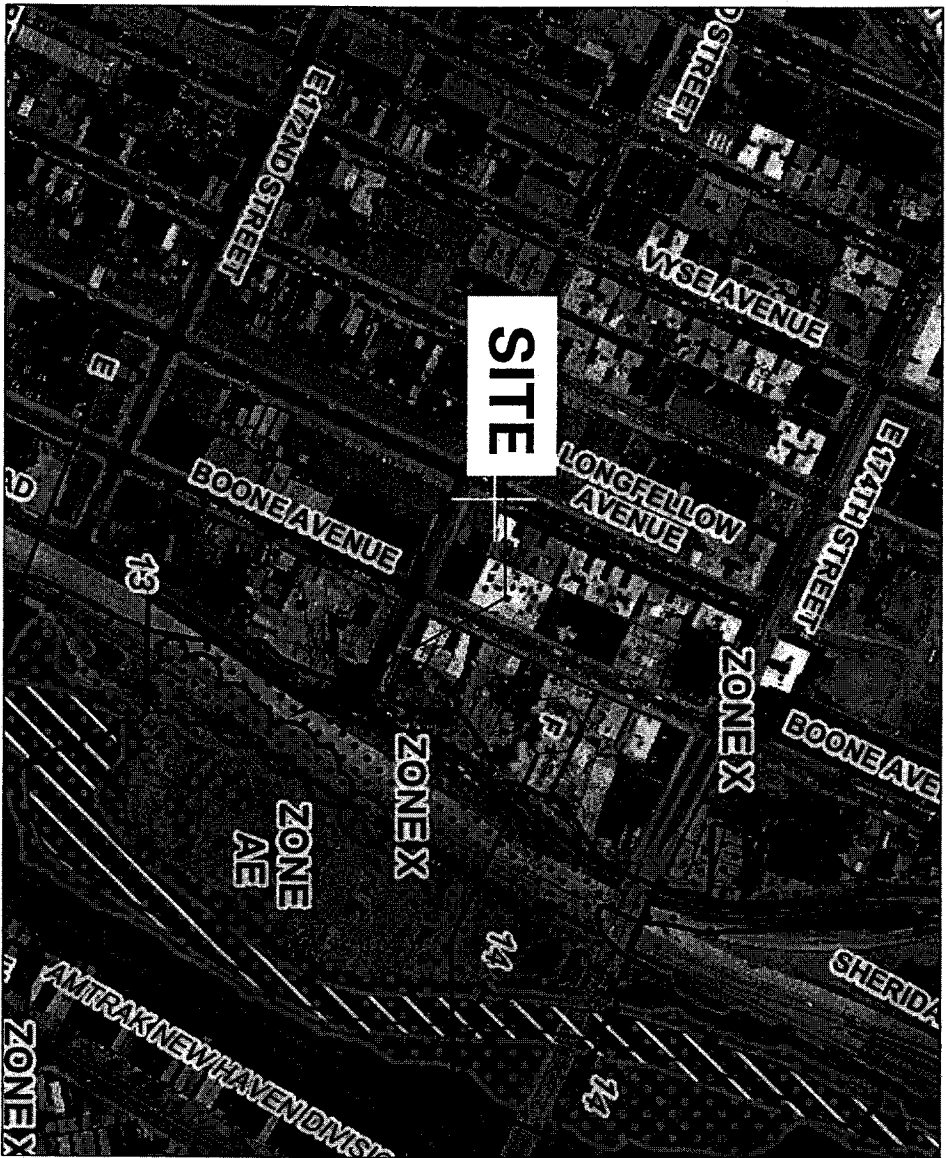
SITE LOCATION MAP

BRONX

NEW YORK

Project No.	Date	Scale	Dwg. No.
5788404	5/8/12	NTS	1

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NOTE:

MAP TAKEN FROM FIRM FLOOD RATE INSURANCE MAP FOR THE CITY OF NEW YORK, NEW YORK, PANEL 201 OF 487 [890497/0201F] EFFECTIVE 5 SEPTEMBER 2007.

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 NJ Certificate of Authorization No. 2450427896400

BRONX RIVER GREENWAY RIVER HOUSE
FLOOD INSURANCE RATE MAP

Project No. 5788404 Date 5/9/12 Scale NTS Draw No. New York 2

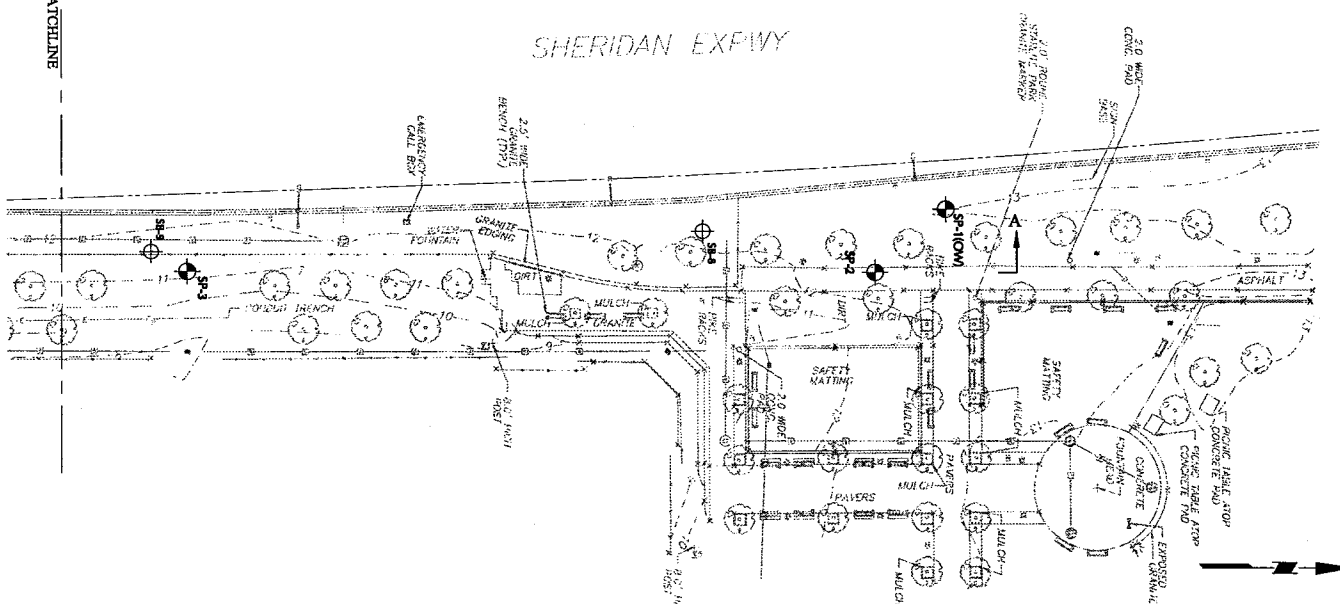
LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO DEMARCATION BY THE ENVIRONMENTAL CONGRESS ACT

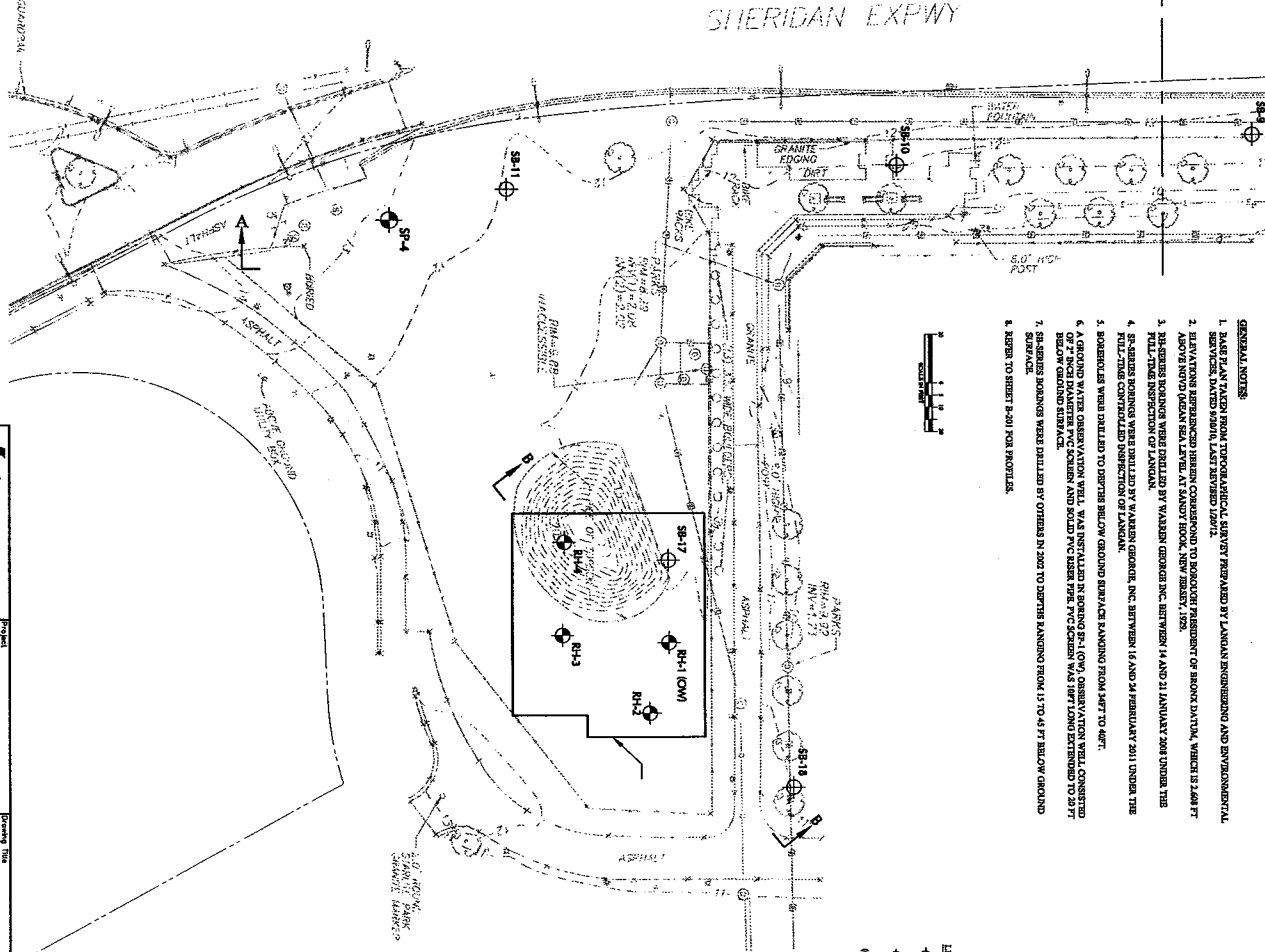
This map shows the Special Flood Hazard Areas (SFHAs) for the Bronx River Greenway River House project. The SFHAs are shown in various colors and patterns. The map is based on the National Flood Insurance Program (NFIP) data for the Bronx River Greenway River House project, as of the date of the map (5/9/12).

- UNDEVELOPED AREAS SUBJECT TO FLOODING**
 Areas shown in white with a dotted pattern. These areas are subject to flooding from the Bronx River Greenway River House project.
- AREAS OF MINOR FLOODING**
 Areas shown in light gray. These areas are subject to flooding from the Bronx River Greenway River House project.
- AREAS OF MODERATE FLOODING**
 Areas shown in medium gray. These areas are subject to flooding from the Bronx River Greenway River House project.
- AREAS OF SEVERE FLOODING**
 Areas shown in dark gray. These areas are subject to flooding from the Bronx River Greenway River House project.
- AREAS OF EXTREME FLOODING**
 Areas shown in black. These areas are subject to flooding from the Bronx River Greenway River House project.
- AREAS OF COASTAL FLOODING**
 Areas shown with a diagonal line pattern. These areas are subject to flooding from the Bronx River Greenway River House project.
- AREAS OF OTHER FLOODING**
 Areas shown with a cross-hatch pattern. These areas are subject to flooding from the Bronx River Greenway River House project.

SHERIDAN EXPWY



SHERIDAN EXPWY



MATCHLINE

MATCHLINE

GENERAL NOTES

1. BASE PLAN TAKEN FROM TOPOGRAPHICAL SURVEY PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, DATED 9/20/11, LAST REVISED 12/20/11.
2. ELEVATIONS REFERENCED HEREIN CORRESPOND TO BENCHMARK RESIDENT OF BROOK DAVENPORT, WHICH IS 2.68 FT ABOVE WOOD DRAIN SEA LEVEL AT SANDY HOOK, NEW JERSEY, 1928.
3. 18-SPRUE BOLLARDS WERE INSTALLED BY WARREN GROUP, INC. BETWEEN 14 AND 21 JANUARY 2008 UNDER THE FOLLOWING CONTROLLED INSPECTION OF LANGAN.
4. 18-SPRUE BOLLARDS WERE INSTALLED BY WARREN GROUP, INC. BETWEEN 16 AND 24 FEBRUARY 2011 UNDER THE FOLLOWING CONTROLLED INSPECTION OF LANGAN.
5. BOLLARDS WERE INSTALLED TO DEFLECT BELOW GROUND SURFACE PAVING FROM 3FT TO 40FT.
6. A GROUND WATER OBSERVATION WELL WAS INSTALLED IN BORING SB-1 (OW). OBSERVATION WELL CONSISTS OF 7 INCH DIAMETER PVC CASING AND SOLID PVC CASER PIPE. PVC CASER WAS LEFT LONG EXTENDED TO 20 FT BELOW GRADING SURFACE.
7. 18-SPRUE BOLLARDS WERE INSTALLED BY OTHERS IN 2002 TO DEFLECT PAVING FROM 15 TO 48 FT BELOW GROUND SURFACE.
8. REFER TO SHEET B-201 FOR PROFILES.



- LEGEND
- AS-BUILT LANGAN BORING LOCATION
 - BORING INSTALLED BY OTHERS
 - OBSERVATION WELL

Warning: It is a violation of the NYS Education Law Article 146 for any person, unless he is acting under the direction of the Superintendent of Education, to alter this item in any way.



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PROJECT
 BRONX RIVER
 GREENWAY RIVER
 HOUSE

ISSUE TITLE
 BORING LOCATION
 PLAN

Project No.	Revision No.	Change No.
111111	1	1
111111	2	2
111111	3	3

3

SOIL BORING (SB-8)

Boring/Well ID:	SB-8	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Steven Wallett	Site Address:	East 173rd Street, Bronx, NY
Date:	6/27/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	22.5'	Driller:	Chris Stratton, Jamie Meyers
Elevation (ground):	18.35' msl	Drilling Method:	Hollow stem auger
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 22.5'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected NM - not measured NA - not applicable Proportions Used: Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%			

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
1	0-2	0.0	8,28, 29,15	24/19	0-19" Brown, FINE to MEDIUM SAND, some coarse gravel (schist), trace silt, dry. 2" layer of black ash at 19"
2					
3	2-4	0.0	9,10, 18,28	24/17	Brown, FINE to MEDIUM SAND and MEDIUM to COARSE GRAVEL, trace silt and rock fragments (schist), dry.
4					
5	4-6	0.0	12,23, 20,9	24/20	0-8" Same as 2' to 4' interval 8-20" Light brown, SILT, trace fine sand and coarse gravel.
6					
7	6-8	NM	13,11, 11,10	24/18	0-12" Brown, SILT and FINE SAND, some fine to coarse gravel, trace brick pieces, dry. 12-18" Black, COAL pieces and ash.
8					
9	8-10	NM	13,17, 7,4	24/12	0-4" Brown, SILT 4-6" Black, SCHIST fractures 6-12" Grey-black, ASH and COAL pieces, dry.
10					
11	10-12	0.0	NM	24/15	0-2" Brown, CLAYEY SILT, some fine to medium gravel, damp. ** 2-10" Black and grey, ASH, some pieces of spent coal, dinkers and slag, wet. 10-15" Olive, SILT and FINE SAND, some fine gravel (angular).
12					
13	12-14	0.0	20,40, 50/1	13/8	Dark brown-brown, MEDIUM to COARSE SAND and FINE to COARSE GRAVEL (angular), some rock fragments, wet.
14					
15	14-16	0.0	5,5, 12,15	24/17	0-2" Same as 14' to 16' interval ** 2-17" Brown, SILT with root mat, moist, slight manure type odor. (PEAT)
16					
17	16-18	0.0	5,5, 10,10	24/19	0-12" Same as above 12-19" Brown, SILTY CLAY with root mat, slightly moist, slight swampy odor.
18					
19	18-20	0.0	6,6, 11,11	24/24	0-12" Brown, CLAYEY SILT with root mat, no odor. (PEAT) 12-24" Dark brown, CLAYEY SILT, trace roots.
20					
21	20-22	0.0	NM	24/24	0-2" Same as above 2-19" Dark grey, SILT 19-21" Dark grey, FINE SAND (mottled), piece of schist. ** 21-24" Light brown, COARSE SAND and FINE to COARSE GRAVEL, wet.
22					
23	22-24	NM	50/4"	4/2	ROCK fragment (schist)
24					

Auger refusal at 22.5 feet below grade

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SOIL BORING (SB-9)

Boring/Well ID:	SB-9	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Lucinda Clark	Site Address:	East 173rd Street, Bronx, NY
Date:	6/20/02 & 6/21/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	35'	Driller:	Richie Comfort, Mike Sarrow
Elevation (ground):	16.94' msl	Drilling Method:	Hollow stem auger/Corer barrel
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 35'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected NM - not measured Rock Quality Designation - 80%			
NA - not applicable Proportions Used: Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%			

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
1	0-2	0.0	2,5, 2,10	24/19	0-3" Dark brown, SILT, little vegetation, trace fine sand, dry. (TOPSOIL) 3-5" SCHIST pieces 5-10" Dark brown with brown mottling, FINE to MEDIUM SAND, little silt, trace coarse sand, roots and glass, dry.
2					10-19" Brown, FINE to COARSE SAND, some silt and gravel, trace roots and fibers.
3	2-4	0.1	6,8, 6,12	24/12	Brown, FINE to COARSE SAND, some silt and gravel, trace roots, fibers slag and ash.
4					
5	4-6	NM	13,5, 10,12	24/14	0-12" Brown, FINE to MEDIUM SAND, some silt, little coarse sand, trace schist, moist. 12-14" GRAVEL (3" diameter), some ash, moist.
6					
7	6-8	0.0	9,17, 8,11	24/18	0-9" Brown, FINE to MEDIUM SAND, little silt, trace schist, moist. 9-15" COARSE GRAVEL (2.25" diameter) 15-18" Brown, FINE to COARSE SAND, little silt, moist, no odor.
8					
9	8-10	NA	5,13, 6,5	24/0	No recovery
10					
11	10-12	817	8,7, 5,5	24/7	0-4" COARSE GRAVEL (2.25" diameter) 4-7" Dark brown, WOOD, little fine to coarse sand, trace silt and gravel, strong wood odor not associated with MGP, wet.
12					
13	12-14	13.9	21,15, 12,13	24/15	Dark brown, FINE to COARSE GRAVEL (angular), little fine to coarse sand and wood, trace silt, wet, pungent wood odor.
14					
15	14-16	4.0	12,23, 17,19	24/17	** Black, FINE to COARSE GRAVEL (subrounded to subangular) some fine to coarse sand, trace silt and brick, wet, medium-slight MPG odor, trace sheen. tip: 2" diameter piece of harden black ash (old asphalt).
16					
17	16-18	1.6	8,8, 13,29	24/17	0-11" Dark grey, FINE to COARSE SAND, some silt, trace fine to coarse gravel, high dilatancy, wet, no sheen, slight MGP odor. 11-17" Dark grey, FINE to COARSE SAND, trace fine gravel, wet, no odor.
18					
19	18-20	1.4	6,5, 9,14	24/11	Dark grey, FINE to COARSE SAND, little silt, trace wood, wet, no sheen, slight MGP odor.
20					
21	20-22	3.9	17,31, 92,100/4"	22/20	** Brown, FINE to COARSE SAND, some fine gravel, trace silt, glass and brick, loose, trace MGP odor.
22					

SOIL BORING (SB-10)

Boring/Well ID:	SB-10	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Lucinda Clark	Site Address:	East 173rd Street, Bronx, NY
Date:	6/27/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	31'	Driller:	Richie Comfort, Mike Sarrow
Elevation (ground):	16.72' msl	Drilling Method:	Hollow stem auger
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 31'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected		Proportions Used: Trace - 1-10% Some - 20-30%	
NA - not applicable		Little - 10-20% And - 30-50%	

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
23	22-24	0.0	47,41, 34,29	24/20	Orange brown, FINE to COARSE GRAVEL (rounded and weathered), some fine to coarse sand, trace silt, wet, no odors. tip: Orange brown, FINE SAND.
24					
25	24-26	0.0	2,3, 6,7	24/17	Reddish brown, FINE to MEDIUM SAND, little fine to coarse gravel (subrounded), wet, no odor.
26					
27	26-28	0.0	3,3, 6,13	24/19	Brown, FINE SAND, trace silt, no plasticity, dessication evident, wet, no odor. tip: Brown, FINE SAND, trace silt and fine gravel, no plasticity, dessication evident, wet, no odor.
28					
29	28-30	0.0	7,17, 19,26	24/19	0-7" Brown, FINE SAND, trace silt and fine gravel, no plasticity, dessication evident, wet, no odor. 7-9" Brown, FINE to COARSE SAND, trace fine gravel and silt, no odor. 9-19" Brown, FINE to COARSE GRAVEL, (subrounded-subangular), some fine to coarse sand, little silt, trace weathered schist, no odors.
30					
31	30-32	0.0	9, 100/1"	7/6	** 0-6" Same as 28'9" to 29'7" interval tip: Black, SCHIST piece.
32					

Auger refusal at 31 feet below grade

SOIL BORING (SB-11)

Boring/Well ID:	SB-11	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Lucinda Clark	Site Address:	East 173rd Street, Bronx, NY
Date:	6/21/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	42.5'	Driller:	Richie Comfort, Mike Sarrow
Elevation (ground):	16.62' msl	Drilling Method:	Hollow stem auger/Corer barrel
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 42.5'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected Rock Quality Designation - 67%			
NA - not applicable Proportions Used: Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%			

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
1					Auger down to 6 feet below grade (large boulders/blast rock)
2					
3					
4					
5					
6					
7	6-8	NA	21,24, 9,6	24/5	White, COBBLE piece and rock dust
8					
9	8-10	NA	6,6, 7,5	24/0	No recovery
10					
11	10-12	0.6	4,6, 2,6	24/11	0-4" Dark brown, FINE to COARSE SAND, some silt, trace fine gravel, moist. 4-11" Dark brown, COARSE GRAVEL (subrounded-subangular), little fine to coarse sand, trace silt and wood, wet. (FILL)
12					
13	12-14	0.0	13,17, 16,36	24/24	0-11" Brown, FINE to COARSE GRAVEL (angular-subangular), some fine to coarse sand and silt, wet. ** 11-24" Brown, FINE GRAVEL, some fine to coarse sand, trace coarse gravel and silt. tip: weathered schist
14					
15	14-16	0.2	3,5, 2,9	24/11	Dark brown, SILT, some fine to coarse sand and gravel (angular-subangular)(schist). tip: piece of SCHIST.
16					
17	16-18	0.0	2,2, 8,8	24/16	Dark brown, FINE to COARSE GRAVEL (angular) and SILT, some fine to coarse sand , wet.
18					
19	18-20	2.0	20,27, 55,34	24/19	0-6" Same as 16' to 18' interval 6-19" Brown, FINE to COARSE SAND, some fine to coarse gravel (subrounded-subangular), trace silt., wet.
20					
21	20-22	0.0	49, 100/2"	8/8	Brown, FINE to COARSE SAND, little fine to coarse gravel (subrounded) trace silt., wet.
22					

Consultants, Inc.

SOIL BORING (SB-11)

Boring/Well ID:	SB-11	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Lucinda Clark	Site Address:	East 173rd Street, Bronx, NY
Date:	6/21/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	42.5'	Driller:	Richie Comfort, Mike Sarrow
Elevation (ground):	16.62' msl	Drilling Method:	Hollow stem auger/Corer barrel
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 42.5'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected Rock Quality Designation - 67%			
NA - not applicable Proportions Used: Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%			

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
23	22-24	0.0	17,55, 81,100/2"	20/16	Brown, MEDIUM to COARSE SAND, some fine to coarse gravel (subrounded), trace silt, wet.
24					
25	24-26	NA	100/4"	4/0	No recovery
26					
27	26-28	0.0	21,57, 82,58	24/19	0-9" Brown, FINE to COARSE SAND, little fine gravel (subrounded) and silt, wet. 9-19" Brown, SILT and FINE to COARSE SAND, no plasticity, high dilatancy, wet.
28					
29	28-30	0.0	81, 100/4"	10/10	0-2" Brown, FINE to COARSE SAND, little fine gravel, trace silt, wet. 2-10" Multi-colored, FINE GRAVEL, some medium to coarse, little coarse gravel, sand, trace silt, loose, wet.
30					
31	30-32	10.1	26,32, 36,64	24/21	** Brown, FINE GRAVEL (subangular), some coarse sand, trace silt, wet.
32					
33	32-34	NA	48,63, 86,91	24/5	COARSE GRAVEL (2-3" diameter), wet.
34					
35	34-36	3.1	16,14, 26,28	24/20	Brown, FINE to MEDIUM SAND and SILT, trace fine to coarse gravel (subangular), (weathered schist), tight, wet.
36					
37	36-38	52.8	94,60, 100/1"	13/13	** Grey with brown molting (oxidation), FINE to MEDIUM SAND and SILT, some fine to coarse gravel (subangular), trace black weathered schist, tight, wet.
38					

Auger refusal at 37.5 feet below grade

Cored 5 feet into the bedrock surface to a depth of 42.5 feet below grade

SOIL BORING (SB-17)

Boring/Well ID:	SB-17	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Lucinda Clark	Site Address:	East 173rd Street, Bronx, NY
Date:	6/25/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	34.5'	Driller:	Ritchie Comfort, Mike Sarrow
Elevation (ground):	15.06' msl	Drilling Method:	Hollow stem auger/Corer barrel
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 34.5'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected NM - not measured Rock Quality Designation - 60%			
NA - not applicable Proportions Used: Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%			

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
1	0-2	1.0	8,23, 62,43	24/23	0-3" Light brown, SILT, little fine sand, dry, tight. 3-16" Dark brown, FINE to MEDIUM SAND, little silt and fine to coarse gravel (subangular-subrounded), trace brick and glass, dry. (FILL) 16-23" WEATHERED SCHIST, some oxidation. Tip: FINE to MEDIUM SAND, ash, silt, burnt hydrocarbon odor.
2					
3	2-4	15.4	6,20, 14,18	24/17	** Black, SCHIST FRACTURES (fine to coarse, max 2" diameter) and SILT, some fine to coarse sand (weathered schist), trace brick pieces, burnt hydrocarbon odor. (FILL)
4					
5	4-6	17	10,8, 17,24	24/23	0-18" Black, SILT and FINE to MEDIUM SAND, some fine to medium gravel (subrounded), trace brick, moist, tight, ash odor. 18-23" Dark brown, FINE to MEDIUM SAND, some silt, brick and weathered schist, tight, moist, no odor. (FILL)
6					
7	6-8	6.0	120,55 38,24	24/10	0-4" Dark brown, FINE to MEDIUM SAND, some silt, little fine gravel (subrounded-subangular), trace brick pieces, moist, no odor. (FILL) 4-10" WEATHERED SCHIST (max 2" diameter)
8					
9	8-10	0.3	7,25, 14,6	24/13	Dark brown, FINE to MEDIUM SAND, some silt and fine to coarse gravel (weathered schist), trace brick pieces, ash and glass, moist, no odor. (FILL)
10					
11	10-12	0.1	7,19, 7,3	24/11	0-3" White, COARSE GRAVEL (max 2.5" diameter), dry. ** 3-11" Dark brown, FINE to COARSE SAND and WEATHERED SCHIST (angular), some silt, trace brick, wet, no odor. (FILL)
12					
13	12-14	2.4	2,3, 73,100/4"	22/13	Dark brown, FINE to COARSE SAND and FINE to COARSE GRAVEL (subangular), little silt trace brick, ash and slag, wet, tar odor.
14					
15	14-15	NA	100/2"	2/2	White, COARSE GRAVEL (2.5" diameter), wet, no odor.
16	15-17	NM	1,6, 15,17	24/6	Black, COARSE GRAVEL (2.75" diameter) with dark brown silt, wet, no odor.
17					
18	17-19	NM	20,18, 11,12	24/8	Peach color, COARSE GRAVEL, (2.25" diameter), little sand and fine gravel, trace brick, no odor.
19					
20					Augers were crooked, off set and start at 20 feet below grade
21	20-22	2.0	8,13, 16,14	24/4	** Black (natural color), COARSE GRAVEL (angular), some silt and sand, wet.
22					

SOIL BORING (SB-17)

Boring/Well ID:	SB-17	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Lucinda Clark	Site Address:	East 173rd Street, Bronx, NY
Date:	6/25/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	34.5'	Driller:	Ritchie Comfort, Mike Sarrow
Elevation (ground):	15.06' msl	Drilling Method:	Hollow stem auger/Corer barrel

Well Construction:

Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 34.5'
Sand Pack (from - to):	NA	Well Cover Type:	NA

Notes: ** Analytical sample collected NM - not measured Rock Quality Designation - 60%
 NA - not applicable Proportions Used: Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (Inches)	Penetration / Recovery (Inches)	Soil/Geologic Description
23 24	22-24	7.1	10,4, 2,2	24/3	Black, ORGANIC SOIL, some fine to coarse gravel (angular), little fine to medium sand medium plasticity, sulphur odor.
25 26	24-26	21.4	1,12, 1, 12	24/24	0-6" Black, FINE TO COARSE GRAVEL (angular), some silt, little fine to coarse sand, sulphur odor. ** 6-24" Black, ORGANIC SOIL (silt), low plasticity, strong organic odor.
27 28	26-28	8.9	0,2, 100-100/0"	18/18	0-15" Same as 24'6" to 26' interval 15-18" Grey, FINE SAND and FINE TO COARSE GRAVEL (subangular), slight sulphur odor.

Auger refusal at 29.5 feet below grade

Cored 5 feet into the bedrock surface to a depth of 34.5 feet below grade

SOIL BORING (SB-18)

Boring/Well ID:	SB-18	Client:	Consolidated Edison of New York
Project Number:	013942	Project Name:	Focused Remedial Investigation
Logged By:	Leroy Feeney	Site Address:	East 173rd Street, Bronx, NY
Date:	6/25/02	Contractor:	Aquifer Drilling and Testing
Total Depth:	27.5'	Driller:	Richie Comfort, Mike Sarrow
Elevation (ground):	13.94' msl	Drilling Method:	Hollow stem auger/Corer barrel
Well Construction:			
Riser (from - to):	NA	Bentonite Seal (from - to):	NA
Screen (from - to):	NA	Annular Fill Type/Depth:	NA
Screen Type/Size:	NA	Cement Grout (from - to):	0 to 27.5'
Sand Pack (from - to):	NA	Well Cover Type:	NA
Notes: ** Analytical sample collected		NM - not measured	
NA - not applicable		Proportions Used: Rock Quality Designation - 70%	
Trace - 1-10%, Little - 10-20%, Some - 20-30%, And - 30-50%			

Depth (ft.)	Sample Interval (feet)	PID Headspace (ppm)	Blows / 6 (inches)	Penetration / Recovery (inches)	Soil/Geologic Description
1	0-2	0.2	22,32, 33,32	24/18	0-2" Brown, SANDY SILT, trace fine gravel, dry. 2-15" Black, FRACTURED SCHIST
2					15-18" Brown, SANDY SILT, trace fine gravel and weathered schist, dry.
3	2-4	1.2	18,40, 48,44	24/21	0-7" Brown, SANDY SILT, little fine to coarse weathered rock and schist pieces, trace fine gravel, dry. 7-12" White, FRACTURED ROCK (max 3") 12-16" Brown, SANDY SILT, some fine to coarse gravel and schist pieces, dry.
4					16-21" Grey-black, FRACTURED SCHIST
5	4-6	3.3	15,17, 18,16	24/24	0-12" Brown, SANDY SILT, little fine to coarse gravel and fractured rock, moist. 12-24" Brown-light brown, SILT, some fine sand, little rock fractures and fine gravel, dry. (FILL)
6					
7	6-8	0.7	9,8, 8,8	24/21	0-17" Dark brown, SILT, some fine to medium sand and fine to coarse gravel (subrounded), trace roots and brick pieces, moist. (FILL) 17-21" Black, SILT, little fine sand and fine gravel, trace roots and black ash.
8					0-10" Dark grey, SANDY SILT, little fine gravel, trace roots, moist.
9	8-10	0.7	4,6, 6,9	24/24	10-20" Olive green, FINE SAND, little fine to coarse gravel (max 1.5"), moist. 20-24" Dark brown, SILT, some clay and fractured rock pieces, little fine to coarse gravel, trace brick pieces and roots. (FILL)
10					
11	10-12	1.5	1,1, 2,3	24/24	0-4" Same as 9'8" to 10' interval ** 4-24" Dark brown, SILT with root mat, medium plasticity, dense, moist, organic odor. (PEAT)
12					
13	12-14	1.6	0,1, 2,2	24/16	Same as 10'4" to 12'
14					
15	14-16	NM	NM	NM	No recovery
16					
17	16-18	3.6	1,1, 2,3	24/24	Dark grey, ORGANIC SOIL (clayey) with root mat, some fine sand lenses, dense, sulfur odor, moist. (PEAT)
18					
19	18-20	7	0,1, 1,92	24/24	** Same as 16' to 18' interval
20					
21	20-22	NA	100/1"	1/1	Black fractured schist
22					

Auger refusal at 22.5 feet below grade

Cored 5 feet into the bedrock surface to a depth of 27.5 feet below grade

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Project BRG River House				Project No. 5788401			
Location Starlight Park, Bronx N.Y.				Elevation and Datum Approx. 7.5 BPBD			
Drilling Company Warren George, Inc.				Date Started 1/14/08		Date Finished 1/17/08	
Drilling Equipment Acker Truck Mounted Rig				Completion Depth 40 ft		Rock Depth 30 ft	
Size and Type of Bit 3 7/8" Tricone Roller				Number of Samples Disturbed 6 Undisturbed 1 Core 5			
Casing Diameter (in) 4"		Casing Depth (ft) 20		Water Level (ft.) First 11 Completion 7.3 24 HR. 5.7			
Casing Hammer Donut	Weight (lbs) 300	Drop (in) 30"		Drilling Foreman Antino/Derrick Szymgiel			
Sampler 2" Split Spoon				Inspecting Engineer Erik Mayr			
Casing Hammer Donut	Weight (lbs) 140	Drop (in) 30"					

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blvs/ft Casing min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
						Number	Type	Recov. (in)	Penetr. resist. BL/ft		N-Value (Blows/ft)	
	+7.5				0							
			Brown-green m-f silty SAND, trace fine gravel (moist) [FILL/SM]		1	S-1	SS	10	28 72 100/3"		Refusal	Start drilling at 10:30 Take S-1
					2							Drill to 2'
					3							1/15/2008 Boulders 1' to 4' Take S-2
					4							
					5	S-2	SS	5	13 19 100/2"		Refusal	Hard drilling, boulders 5' to 9' Mix water and revert Take S-3
			Gray f-c SAND, some silt, trace fine gravel, trace mica (moist) [FILL/SM]		6							
					7							
		Class 7			8							
					9							
					10	S-3	SS	7	26 10 15 25		25	
			Gray m-f clayey SAND, some silt, trace mica (moist) [FILL/SC]		11	S-4	SS	2	100/5"		Refusal	Take S-4
			Gray c-f clayey SAND, trace fine gravel, some silt, trace mica (moist) [FILL/SC]		12							
					13							
					14	C-1	NQ					
					15							Drill to 15' Hard drilling Advance casing to 11' Clean out hole Hole collapsed Advance casing to 16'
					16							
					17	S-5	SS	18	4 6 4		10	1/16/2008 Take S-5 Clean out hole for shelby tube Take U-1
		Class 6	Dark brown-gray silty ORGANIC CLAY, some peat (moist) [OH]		18							
					19							
			Dark gray silty ORGANIC CLAY (moist) [OH]		24							
					19	U-1	SH	10				
		Class 3	Gray fine SAND, some silt (moist) [SM]		100							Refusal
					20							

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Project		Project No.											
BRG River House		5788401											
Location		Elevation and Datum											
Starlight Park, Bronx N.Y.		Approx. 7.5 BPBD											
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)			
						Number	Type	Recov. (in)	Penetr. resist BL/in		N-Value (Blows/ft)		
		Class 1d	No recovery	20	3:00	S-6	SS	0	50/0"	10 20 30 40	Drive casing to 20' Clean out hole to 30'		
			Gray hard fractured SCHIST (moist) [DECOMPOSED ROCK]	21	4:00	C-2	NQ	REC=47"/60" = 78%	RQD=36"/60" = 60%				
				22	2:00								
				23	1:00								
				24	1:00								
				25	2:00								
				26	2:00								
				27	2:00	Gray highly weathered ROCK FRAGMENTS (moist) [DECOMPOSED ROCK]	27	2:00	C-3	NQ		REC=19"/60" = 32%	RQD=0"/60" = 0%
				28	2:00								
				29	2:00								
				30	2:00								
				31	4:00								
				32	4:00	Gray hard fractured SCHIST	32	4:00	C-4	NQ		REC=60"/60" = 100%	RQD=45"/60" = 75%
				33	4:00								
				34	4:00								
				35	5:00								
				36	5:00	Gray hard fractured SCHIST	36	5:00	C-5	NQ		REC=60"/60" = 100%	RQD=60"/60" = 100%
				37	5:00								
				38	5:00								
				39	5:00								
	40		End of boring at 40'	40									
				41									
				42									
				43									
				44									
				45									

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Project BRG River House				Project No. 5788401			
Location Starlight Park, Bronx N.Y.				Elevation and Datum Approx. 7.5 BPBD			
Drilling Company Warren George, Inc.				Date Started 1/17/08		Date Finished 1/18/08	
Drilling Equipment Acker Truck Mounted Rig				Completion Depth 30.5 ft		Rock Depth 20.5 ft	
Size and Type of Bit 3 7/8" Tricone Roller				Number of Samples Disturbed 10 Undisturbed - Core 4			
Casing Diameter (in) 3"		Casing Depth (ft) -		Water Level (ft.) First ∇ - Completion ∇ -		24 HR. ∇ -	
Casing Hammer	Donut	Weight (lbs)	300	Drop (in) 30"			
Sampler 2" Split Spoon				Drilling Foreman Derrick Szymgiel			
Casing Hammer	Donut	Weight (lbs)	140	Drop (in) 30"			
				Inspecting Engineer Erik Mayr			

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MATERIAL SYMBOL	Elev. (ft) +7.5	Building Code	Sample Description	Casing blow/ft Comp. min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (in)	Penetr. resist. BL/6in		N-Value (Blows/ft) 10 20 30 40
			Gray-brown m-f silty SAND, trace fine gravel (moist) [FILL/SM]		0	S-1	SS	3	50/3"	Refusal	Take S-1 mix water and revert Clean out hole to 2' Take S-2
			Brown-tan c-f SAND, some silt, trace fine gravel (moist) [FILL/SM]		1						
					2				63		
			Brown-tan c-f SAND, some silt, trace fine gravel (moist) [FILL/SM]		3	S-2	SS	20	57 82	139*	
					4				82		Take S-3
					5	S-3	SS	6	49 57 55	112*	
			Brown c-f silty SAND, some fine gravel (moist) [FILL/SM]		6				44		
					7	S-4	SS	12	25 30 45	75*	Stop at 6' 1/18/2008 Take S-4
		Class 7	Brown-white granular DECOMPOSED ROCK, mica (moist) [FILL/SP]		8				35		
					9	S-5	SS	2	100/2"	Refusal	Take S-5
			Gray granular DECOMPOSED ROCK, trace brown m-f silty sand (moist) [FILL/SP]		10						
					11	S-6	SS	1	100/1"	Refusal	Clean out hole to 10' Lost mud Mix water and quik-gel
			Brown m-f silty SAND, trace decomposed rock fragments (moist) [FILL/SM]		12						
					13						
					14						Very hard drilling at 14'
					15						
					16						
					17						
					18	C-1	NQ		REC=16"/48" =33% RQD=10"/48" =21%		
		Class 1d	Pink QUARTZ and schist boulders, some cobbles		19						
					20						

-8.5

Class 7

Class 1d

SPIN

100

4:00

3:00

12:00

12:00

Project		Project No.								
BRG River House		5788401								
Location		Elevation and Datum								
Starlight Park, Bronx N.Y.		Approx. 7.5 BPBD								
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blvs/ft Coring min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
						C-2 Number	Type	Recov. (in)	Penetr. resist. BL/6in	
	-13.0	Class 1b	White-pink hard fractured QUARTZ	10:00	20	C-2	NQ	100%	50%	REC=6"/6" =100% RQD=3"/6" =50%
	6:00			21	C-3	NQ	REC=51.5"/60" =86%	RQD=42"/60" =70%		
	6:00			22						
	6:00			23						
	6:00			24						
	6:00	25	Class 1c	Gray hard fractured SCHIST	6:00	26	C-4	NQ	REC=30"/60" =50%	RQD=23"/60" =38%
	6:00	27								
	6:00	28								
	6:00	29								
	6:00	30								
	-23.0		End of boring at 30.5'		31					
					32					
					33					
					34					
					35					
					36					
					37					
					38					
					39					
					40					
					41					
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Project BRG River House				Project No. 5788401			
Location Starlight Park, Bronx N.Y.				Elevation and Datum Approx. 7.5 BPBD			
Drilling Company Warren George, Inc.				Date Started 1/18/08		Date Finished 1/21/08	
Drilling Equipment Acker Truck Mounted Rig				Completion Depth 35.5 ft		Rock Depth 25.5 ft	
Size and Type of Bit 3 7/8" Tricone Roller				Number of Samples Disturbed 9 Undisturbed 1 Core 2			
Casing Diameter (in) 4"		Casing Depth (ft) 13		Water Level (ft.) First ∇ - Completion ∇ - 24 HR. ∇ -			
Casing Hammer Donut	Weight (lbs) 300	Drop (in) 30"		Drilling Foreman Bob Verpent			
Sampler 2" Split Spoon				Inspecting Engineer Erik Mayr			
Casing Hammer Donut	Weight (lbs) 140	Drop (in) 30"					

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MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring min/ft	Depth Scale	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (in)	Penetr. resist. BL/6in	N-Value (Blows/ft)		
	+7.5				0	S-1	SS	5	30 100/4"		Refusal	Start drilling at 11:10 Take S-1 Hard drilling at 1'
			Brown m-f silty SAND, trace fine gravel (moist) [FILL/SM]		1							
					2	S-2	SS	5	100/5"		Refusal	Clean out hole to 2' Take S-2
			Brown c-m SAND, some granular brick, trace silt (moist) [FILL/SP-SM]		3							
					4							Clean out hole to 4' Take S-3
			Brown dark gray c-f SAND, some silt, trace fine gravel (moist) [FILL/SM]		5	S-3	SS	6	20 25 100/5"		Refusal	Clean out hole to 6' Take S-4
					6							
		Class 7	WOOD, gray fine gravel, some brown c-f sand, trace silt		7	S-4	SS	6	42 58 56		114*	Drive casing to 8' Take S-5
					8							
			Gray granular fragmented DECOMPOSED ROCK, brown c-f silty SAND (moist) [FILL/SP]		9	S-5	SS	5	58 28 27 100/3"		55*	Clean out hole to 10' Take S-6
					10	S-6	SS	5	100/5"		Refusal	
			Gray granular and fragmented DECOMPOSED ROCK, gray c-f silty SAND (moist) [FILL/SP-SM]		11							
					12							
					13							
					14							
		Class 6	Brown silty ORGANIC CLAY, some peat (moist) [OH]		15	S-7	SS	16	1 2 3 5			Drill to 15' Drive casing to 13' Take S-7 $q_u=0.25$ tsf
					16							
			Gray silty ORGANIC CLAY (moist) [OH]		17	U-1	SH	18				Take U-1
					18							
					19	S-8	SS	6	13 100/4"		Refusal	
		Class 3	Gray fine silty SAND, trace fine gravel (moist) [SM]		20							

Project		Project No.									
BRG River House		5788401									
Location		Elevation and Datum									
Starlight Park, Bronx N.Y.		Approx. 7.5 BPBD									
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coming min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (in)	Penetr. resist. BL/6in		N-Value (Blows/ft)
[Cross-hatched symbol]	-18.0	Class 1d	Gray granular and fragmented DECOMPOSED ROCK, trace m-f silty sand	20	20	S-9	SS	2	100/2"	Refusal	17/21/2008 Rig chatter at 20' Mix water and revert
[Downward arrow symbol]	-23.0	Class 1c	Gray, hard fractured SCHIST	10:00	25	C-1	NQ	REC=34.5"/60" =58%	RQD=26.5"/60" =44%	Refusal	Hard drilling at 25'
				14:00	26						
				9:00	27						
				14:00	28						
				20:00	29						
				15:00	30						
[Downward arrow symbol]	-28.0	Class 1b	Gray, hard fractured SCHIST	15:00	31	C-2	NQ	REC=50.5"/60" =84%	RQD=45"/60" =75%	Refusal	
				15:00	32						
				15:00	33						
				15:00	34						
				15:00	35						
			End of boring at 35.5'		36						
					37						
					38						
					39						
					40						
					41						
					42						
					43						
					44						
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Project BRG River House				Project No. 5788401			
Location Starlight Park, Bronx N.Y.				Elevation and Datum Approx. 7.5 BPBD			
Drilling Company Warren George, Inc.				Date Started 1/17/08		Date Finished 1/18/08	
Drilling Equipment Acker Truck Mounted Rig				Completion Depth 35.5 ft		Rock Depth 30.5 ft	
Size and Type of Bit 3 7/8" Tricone Roller				Number of Samples 11		Disturbed 1	Undisturbed 1
Casing Diameter (in) 4"		Casing Depth (ft) 13		Water Level (ft.) First ∇ -		Completion ∇ -	Core 24 HR. ∇ -
Casing Hammer Donut		Weight (lbs) 300		Drop (in) 30"		Drilling Foreman Bob Verpent	
Sampler 2" Split Spoon				Inspecting Engineer Erik Mayr			
Sampler Hammer Donut		Weight (lbs) 140		Drop (in) 30"			

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring min/ft	Depth Scale	Sample Data					Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (in)	Penetr. resist. BL/6in	N-Value (Blows/ft)		
	+7.5		Dark gray m-f silty SAND, some gray medium gravel (moist) [FILL/SM]		0	S-1	SS	7	36	100/5"	Refusal*	Take S-1 Hard drilling at 1'
			Dark gray-brown m-f silty SAND, trace m-f gravel (moist) [FILL/SM]		20	S-2	SS	9	50	70/100/1"	Refusal*	Take S-2 Hard drilling at 3'
			Black m-f silty SAND, mica, oily odor (moist) [FILL/SM]		26	S-3	SS	10	46	87/51/63	138*	Take S-3 Take S-4
		Class 7	Dark gray m-f silty SAND, gray medium gravel, mica (moist) [FILL/SM]		83	S-4	SS	6	56	40/60/100/5"	100*	Take S-4
			Dark gray m-f silty SAND, some mica, trace m-f gravel, trace brick (moist) [FILL/SM]		100	S-5	SS	9	33	42/100/3"	Refusal*	Drive casing to 8' Clean out hole to 8' Take S-5 Heavy rig chatter at 9' Take S-6
			Dark gray m-f silty SAND, trace mica (moist) [FILL/SM]		100	S-6	SS	6	20	20/100/3"	40*	Heavy rig chatter at 12' Drive casing to 13'
	-7.5		Brown silty ORGANIC CLAY, some peat (moist) [OH]		15	S-7	SS	19	3	2/5/7	7*	Take S-7 $q_u=1.0$ tsf
		Class 6	Brown silty ORGANIC CLAY, some peat, trace fine gravel (moist) [OH]		17	S-8	SS	3	5	7/11/14	18*	Take S-8 Stop at 19'

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Project		Project No.									
BRG River House		5788401									
Location		Elevation and Datum									
Starlight Park, Bronx N.Y.		Approx. 7.5 BPBD									
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (ft)	Penetr. resist BL/ft		N-Value (Blows/ft)
		Class 6	Gray clayey ORGANIC SILT, trace peat (moist) [OH]		20			2			1/18/2008 Clean out hole to 20' Take S-9 $q_u=0.5$ tsf
	-15.0				21	S-9	SS	24	1		Take U-1
		Class 3	Gray gravelly SAND and clayey ORGANIC SILT (moist) [SG]		22	U-1	SH	6			
			Gray m-f gravelly SAND, some silt (moist) [SG-SM]		23						
	-18.0		Gray c-f silty SAND, some silt (moist) [SM]		24	S-10	SS	2	100/3"	Refusal	Take S-10
					25	S-11	SS	2	100/4"	Refusal	Take S-11
		Class 1b	Gray, hard fractured SCHIST		26						
				5:00	27						
				5:00	28	C-1	NQ				
				5:00	29						
				5:00	30			REC=50.5"/60" =84%			
	-23.0			5:00	31						
		Class 1a	Gray, hard fractured SCHIST		32						
				4:00	33	C-2	NQ				
				4:00	34			REC=58"/60" =97%			
				4:00	35						
	-28.0		End of boring at 35.5'	4:00	36						
					37						
					38						
					39						
					40						
					41						
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Project				Project No.							
River House				5788403							
Location				Elevation and Datum							
Sheridan Expressway, Bronx, N.Y.				Approx. 12 (BPBD)							
Drilling Company				Date Started		Date Finished					
Warren George, Inc.				2/23/11		2/24/01					
Drilling Equipment				Completion Depth		Rock Depth					
Mobile-61 Truck Mounted Drill Rig				34 ft		29 ft					
Size and Type of Bit				Number of Samples		Disturbed					
2 7/8" & 3 7/8" Tricone Roller Bit				9		1					
Casing Diameter (in)				Casing Depth (ft)		Water Level (ft.)					
4" Flush joint Steel Casing				24		First Completion 24 HR.					
Casing Hammer				Weight (lbs)		Drop (in)					
Donut				300		30					
Sampler				Drilling Foreman							
2" O.D. Split Spoon/NX Core Barrel				Mike Machaline							
Sampler Hammer				Inspecting Engineer							
Donut				Pragnesh Shah							
Weight (lbs)				140							
Drop (in)				30							
MATERIAL SYMBOL	Elev. (ft) +12.0	Building Code	Sample Description	Casing blws/ft Coring min/ft	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
					Depth Scale	Number	Type	Recon. (in)		Penetr. resist. Bl/6in	N-Value (Blows/ft)
			TOPSOIL (Grass)								
			Brown c-f SAND, some silt, trace gravel, trace wood, bricks (moist) [FILL/SM]	49	S-1	SS	14	22	38	50	Set up on hole LB-1 (OW) on 2/23/2011 Take S-1 (0'-2')
			Brown silty m-f SAND, trace brick, trace gravel, trace wood (moist) [FILL/SM]		S-2	SS	16	12	14	25	Take S-2 (2'-4')
			Brown silty m-f SAND, some gravel, trace asphalt pieces (moist) [FILL/SM]		S-3	SS	9	24	12	36	Advanced 4" casing to 4' Clean the hole to 4' Take S-3 (4'-6')
			Fragments of ROCK with brown m-f sand, some silt (moist) [FILL/SM]	58	S-4	SS	5	27	11	31	Take S-4 (6'-8')
			Brown-black silty m-f SAND, some gravel (moist) [FILL]		S-5	SS	2	13	21	34	Advanced casing to 9' Clean hole to 10' Rig chatter at 5' and between 6' to 8' Take S-5 (8'-10')
		Class 7	Brown-black m-f sandy GRAVEL, some silt (moist) [FILL/GP-GM]	52	S-6	SS	10	12	12	24	Advanced casing to 9' Clean hole to 10' Rig chatter at 5' and between 6' to 8' Take S-6 (10'-12')
			Black sandy m-f GRAVEL, some silt, trace roots (moist) [FILL/GP-GM]	28	S-7	SS	4	20	11	19	Heavy rig chatter at 13' Roller bit to 15' and clean the hole Take S-7 (15'-17')
			Green silty organic CLAY, trace sand (moist) [OH]		WH-1	SH	24	PUSH	PUSH	PUSH	Clay at tip of spoon at 17' Take WH-1 (17'-19') Shelby tube from 17' to 19'
			Green clayey SILT, some sand (wet) [ML]		S-8	SS	18	6	7		Take S-8 (19'-21') Advanced 4" casing to 19'

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Project			Project No.							
River House			5788403							
Location			Elevation and Datum							
Sheridan Expressway, Bronx, N.Y.			Approx. 12 (BPBD)							
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blaes/ft Coring min/ft	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
					Depth Scale	Number	Type	Recov. (in)		Penetr. resist. Bl./6in
	-11.5	Class 3b	Green-brown m-f SAND, some silt, trace gravel (wet) [SM]	20	S-8	SS	18	7	10	Roller bit to 21' and clean the hole Advance casing to 24' Roller bit to 25' and clean the hole Take S-9 (25'-27') Spoon refusal at 25' Very slow drilling between 21'-25' Refusal Roller bit to 29', very hard at 29' Core from 29'-34' Set observation well in LB-1 at 20'
				21				51		
				22						
				23						
				24						
				25	S-9	SS	1	100/1"		
				26						
				27						
				28						
				29						
-17.0	Class 1a	Black-decomposed ROCK, trace m-f sand and silt (moist) [DECOMPOSED ROCK] Black-dark gray MICA SCHIST with quartz inclusion, hard to very hard, slightly fractured [ROCK] Black MICA SCHIST with quartz inclusion, hard to very hard, slightly fractured [ROCK]	30	C-1 NX CORE BARREL						
			31	REC=54'/60" =90%						
			32	RQD=60'/60" =83%						
			33							
			34							
			35							
-22.0			36							
			37							
			38							
			39							
			40							
			41							
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Project River House		Project No. 5788403	
Location Sheridan Expressway, Bronx, N.Y.		Elevation and Datum Approx. 12 (BPBD)	
Drilling Company Warren George, Inc.		Date Started 2/22/11	Date Finished 2/23/01
Drilling Equipment Mobile-61 Truck Mounted Drill Rig		Completion Depth 39 ft	Rock Depth 34 ft
Size and Type of Bit 2 7/8" & 3 7/8" Tricone Roller Bit		Number of Samples Disturbed 11	Undisturbed 1 Core 1
Casing Diameter (in) 4" Flush joint Steel Casing	Casing Depth (ft) 24	Water Level (ft.) First ∇	Completion ∇ 24 HR. ∇
Casing Hammer Donut	Weight (lbs) 300	Drop (in) 30	Drilling Foreman Mike Machaline
Sampler 2" O.D. Split Spoon/NX Core Barrel		Inspecting Engineer Pragnesh Shah	
Sampler Hammer Donut	Weight (lbs) 140	Drop (in) 30	

MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blow/ft Coreing min/ft	Depth Scale	Sample Data				N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recon. (in)	Penetr. Resist. (BLU/ft)			
	+12.0				0							
	+11.6		4" to 5" ASPHALT PAVEMENT									Warren George, Inc. on site at 7:00 AM
			Brown black silty m-f SAND, trace bricks, trace mica schist (moist) [FILL/SM]	41	1	S-1	SS	10	6	25*		Langan on site at 7:15 AM on 2/22/2011
			Brown silty m-f SAND, trace brick, trace gravel (moist) [FILL/SM]		2	S-2	SS	9	12			Set up on hole LB-2 and start drilling at 8:45 AM on 2/22/2011
					3				13			Drilled through asphalt pavement
					4				8			Take S-1 (6"-2'-6")
					5				12			Take S-2 (2'-6"-4'-6")
					6	S-3	SS	7	14			Advanced casing to 4'
			Brown silty m-f SAND, trace bricks, trace gravel (moist) [FILL/SM]	39	7				16			Clean hole to 5'
					8	S-4	SS	5	18			Take S-3 (5'-7')
		Class 7	Brown-black silty m-f SAND, trace gravel (moist) [FILL/SM]		9				12			
					10				6			Advanced casing to 9'
					11	S-5	SS	1	12			Clean hole to 10'
			Piece of GRAVEL at tip	28	12				8			Heavy rig chatter at 8'-9"
					13	S-6	SS	1	9			Take S-5 (10'-12')
					14				2			Piece of gravel at tip
			Black pieces of GRAVEL, trace black m-f sand, trace silt (wet) [FILL/GP]		15				4			
					16	S-7	SS	21	11			Advanced casing to 14'
					17				8			Clean hole to 15'
		Class 6	Light green silty organic CLAY, some wood pieces (moist) [OH]	22	18	W-1	SH	18	15			Take S-6 (12'-14')
					19				12			
					20	S-8	SS	18	11			Advanced casing to 14'
			Light green silty CLAY, some wood pieces (moist) [OH]		21				8			Clean hole to 15'
		Class 3b			22				4			Take S-7 (15'-17')
					23				3			Highly organic odor 15'-17'
					24				4			
					25				4			Take W-1 (17'-19')
					26				4			Push shelly tube from 17' to 19'
					27				4			
					28				4			
					29				4			
					30				4			
					31				4			
					32				4			
					33				4			
					34				4			
					35				4			
					36				4			
					37				4			
					38				4			
					39				4			
					40				4			
					41				4			
					42				4			
					43				4			
					44				4			
					45				4			
					46				4			
					47				4			
					48				4			
					49				4			
					50				4			

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Project		Project No.											
River House		5788403											
Location		Elevation and Datum											
Sheridan Expressway, Bronx, N.Y.		Approx. 12 (BPBD)											
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing Size (in) / Core Size (in)	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)			
						Number	Type	Recov. (in)	Penetr. resist. BL/6in		N-Value (Blows/ft)		
	-16.5	Class 3b	Green m-f SAND, some rock fragments, trace silt, trace gravel, slight organic odor (moist) [SM]	31	20	S-8	SS	18	6		Rig chatter at 21' Clean hole to 23' Take S-9 (23'-25') Spoon refusal at 23' Advance casing to 24' Heavy rig chatter between 23'-24'-6" Clean hole to 25' Take S-10 (25'-27')		
			Possible BOULDER or COBBLE		21			20					
					22								
					23	S-9	SS	0	100/0"			Refusal	
					24								
					25			28					
					26	S-10	SS	15	17			31	
					27			14	20				
					28								
					-22.0	Class 1d	Green-black sandy m-f GRAVEL, some mica schist (moist) [DECOMPOSED ROCK]	87	29				
	30	S-11		SS			2		55	100/2"	Refusal		
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	-27.0	Class 1a	Black to dark gray MICA SCHIST, quartz inclusion, hard to very hard, slightly fractured [ROCK]	4.00	34						Roller bit to 34' and clean the hole Very hard drilling at 34' Advanced core barrel to 34' Core from 34' -39'		
					35								
					36								
					37								
					38								
					39								
					40								
	41												
	42												
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Project River House				Project No. 5788403			
Location Sheridan Expressway, Bronx, N.Y.				Elevation and Datum Approx. 11 (BPBD)			
Drilling Company Warren George, Inc.				Date Started 2/17/11		Date Finished 2/18/01	
Drilling Equipment Mobile-61 Truck Mounted Drill Rig				Completion Depth 40 ft		Rock Depth 35 ft	
Size and Type of Bit 2 7/8" & 3 7/8" Tricone Roller Bit				Number of Samples 11		Disturbed 11	
Casing Diameter (in) 4" Flush joint Steel Casing		Casing Depth (ft) 14		Water Level (ft.) First		Undisturbed Completion	
Casing Hammer Donut		Weight (lbs) 300		Drop (in) 30		Core 1	
Sampler 2" O.D. Split Spoon/NX Core Barrel				Drilling Foreman Mike Machaline			
Sampler Hammer Donut				Weight (lbs) 140		Drop (in) 30	
				Inspecting Engineer Pragnesh Shah			

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MATERIAL SYMBOL	Elev. (ft) +11.0	Building Code	Sample Description	Casing Size/ft Casing min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
						Number	Type	Recov. (in)	Penetr. Resist Bl/ft		N-Value (Blows/ft) 10 20 30 40	
					0						Start drilling LB-3 at 11:40 AM on 2/17/2011 Take S-1 (0'-2')	
			Dark brown silty m-f SAND, trace fine gravel, trace roots, trace quartz pieces (moist) [FILL/SM]		1	S-1	SS	8	6	12		
			Dark brown silty m-f SAND, trace fine gravel (moist) [FILL/SM]		2	S-2	SS	1	50/6"		Refusal	Take S-2 (2'-2'-6") Refusal at 2'-6"
					3	S-3	SS		9			Take S-3 (3'-5')
			Yellow-black SILT, some m-f sand, trace gravel (moist) [FILL/ML]		4	S-3	SS	8	7	14		Advanced casing to 4' Roller bit to 4', heavy rig chatter at 2'-6" Take S-4 (5'-7')
					5	S-4	SS		9			
			Brown-black silty c-f SAND, trace gravel, trace mica schist (moist) [FILL]		6	S-4	SS	10	13	26		
			Brown c-f SAND, trace silt, trace gravel (moist) [FILL]		7	S-5	SS		11			Take S-5 (7'-9') strong chemical odor in sample
		Class 7	Black-gray silty SAND, trace wood, trace gravel, strong organic odor (moist) [FILL/SW-SM]		8	S-5	SS	13	12	21		
					9	S-6	SS		11			Advanced casing to 9' Clean hole to 9', dark black wash, odor Take S-6 (9'-11')
			Gray m-f SAND, some silt, trace gravel (moist) [FILL/SM]		10	S-6	SS	3	13	22		
					11	S-7	SS		9			Take S-7 (11'-13') strong odor
			Dark gray clayey SILT, some m-f sand, trace gravel, trace fibers, strong organic odor (wet) [FILL/ML]		12	S-7	SS	5	5	15		
					13				11			
					14				8			
					15	S-8	SS		3			Advance casing to 14' Clean hole to 15' Dark brown wash 12'-14' Take S-8 (15'-17') clay with wood fibers in sample
			Green silty CLAY, trace fine sand, trace wood fibers, organic clay (moist) [OH]		16	S-8	SS	20	2			
		Class 6			17				2			Take W-1 (shelby tube) no recovery
			No recovery		18	W-1	SH	0	PUSH			
					19				PUSH			
					20	S-9	SS	3	14			Take S-9 (19'-21') Very hard drilling at 19'-9", spoon refusal at 19'-9"
		Class 3a			20				100/3"		Refusal	

Project		Project No.										
River House		5788403										
Location		Elevation and Datum										
Sheridan Expressway, Bronx, N.Y.		Approx. 11 (BPBD)										
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Casing blws/ft Coring min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)		
						Number	Type	Recov. (ft)	Penetr. resist BL/6in		N-Value (Blows/ft)	
									10 20 30 40			
	-12.5	Class 3a	Black-gray fine SAND with rock fragments and silt (moist) [SM]	75	20						Clean hole to 19' 2/17/2001 end of day 2/18/2011 Warren George, Inc on site 7:00 AM Langan on site at 7:30 AM Downtime 8:20 to 10:20 Bring 3" casing and water tank Roller bit to 23' and clean the hole Hit boulder, spoon refusal at 23' Clean the hole to 25' Rig chatter between 22' -24' Hard drilling, rig chatter Advance 3" casing to 25' Take S-10 (25'-27')	
				21								
				22								
				23								
				24								
				25								
				26	S-10	SS	9	75				135
				27				77				
				28				58				
				29				47				
	-24.0	Class 1d	Gray MICA SCHIST mixed with silt m-f sand (moist) [DECOMPOSED ROCK]		30					Slow drilling between 25' -30' Gray-green wash with mica schist Clean hole to 30' Take S-11 (30'-32') Slow drilling		
				31	S-11	SS	10	26			118	
				32				31				
				33				87				
				34				100/3"				
				35								
				36								
				37								
				38								
				39								
	-29.0	Class 1a	Black-gray MICA SCHIST with quartz inclusion, hard to very hard, slightly fractured [ROCK]	9:00	40					Roller bit to 35' and clean the hole Very hard drilling at 35' Start coring 35'-40'		
				7:00	41							
				8:00	42							
				8:00	43							
				8:00	44							
				6:00	45							
			End of boring at 40'									

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Project River House			Project No. 5788403		
Location Sheridan Expressway, Bronx, N.Y.			Elevation and Datum Approx. 12 (BPBD)		
Drilling Company Warren George, Inc.		Date Started 2/16/11		Date Finished 2/17/01	
Drilling Equipment Acker Truck Mounted Drill Rig			Completion Depth 35 ft		Rock Depth 26 ft
Size and Type of Bit 2 7/8" & 3 7/8" Tricone Roller Bit			Number of Samples 8	Disturbed 8	Undisturbed -
Casing Diameter (in) 4" Flush joint Steel Casing	Casing Depth (ft) 9		Water Level (ft.) First	Completion 24 HR.	Core 2
Casing Hammer Donut	Weight (lbs) 300	Drop (in) 30	Drilling Foreman Mike Machaline		
Sampler 2" O.D. Split Spoon/NX Core Barrel			Inspecting Engineer Pragnesh Shah		
Sampler Hammer Donut	Weight (lbs) 140	Drop (in) 30			

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MATERIAL SYMBOL	Elev. (ft) +12.0	Building Code	Sample Description	Coring min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (in)	Penetr. resist. BL/6in		N-Value (Blows/ft) 10 20 30 40
			Dark brown m-f SAND, some silt, some fine gravel, trace quartz, trace brick (moist) [FILL/SM]		0				26		Warren George, Inc on site at 10:30 AM Langan on site at 9:00 AM on 2/16/2011 Set up on hole LB-4 at 11:45 AM Take S-1 (0'-2') Take S-2 (2'-4') Advanced casing to 4' Roller bit to 4' and clean the hole Very hard drilling at 3'-6" Take S-4 (4'-6') Refusal at 4'-9" Heavy rig chatter at 5' Take S-5 (8'-10') Advanced casing to 9' Roller bit to 10' and clean the hole Roller bit to 15' and clean the hole Take S-6 (15'-17') Hard drilling 15'-16', ric chatter
			Dark brown c-f SAND, some silt, some gravel mixed with quartz (moist) [FILL/SM]		1	S-1	SS	13	27	45*	
					2			31			
					3	S-2	SS	8	38	72*	
					4			40			
					5	S-3	SS	2	30	Refusal	
			Dark brown silty m-f SAND, trace rock fragments, trace gravel (moist) [FILL/SM]		6			100/3"			
					7	S-4	SS	2	16	30*	
			Green-black ROCK FRAGMENTS, trace fine sand (moist) [FILL/GP]		8			18			
		Class 7			9	S-5	SS	10	12	38*	
			Green-black ROCK FRAGMENTS, some silt, trace fine sand, trace gravel [FILL/GP-GM]		10			29			
					11	S-6	SS	5	16	29*	
			Green-black silty ROCK FRAGMENTS, some m-f sand, trace gravel (moist) [FILL/GP-GM]		12			17			
					13			17			
					14						
					15			30			
					16	S-7	SS	2	41	50*	
			Brown-white GRAVEL, quartz pieces, trace brown m-f sand with silt, trace mica schist (wet) [GP]		17			19			
					18			8			
		Class 2b			19						
					20						

Project		Project No.									
River House		5788403									
Location		Elevation and Datum									
Sheridan Expressway, Bronx, N.Y.		Approx 12 (BPBD)									
MATERIAL SYMBOL	Elev. (ft)	Building Code	Sample Description	Coring min/ft	Depth Scale	Sample Data				Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)	
						Number	Type	Recov. (ft)	Penetr. resist. BL/6in		N-Value (Blows/ft)
	-14.0	Class 2b	Red-dark brown GRAVEL, quartz and mica schist pieces, trace m-f sand with silt (wet) [GP]	20		S-8	SS	3			Roller bit to 20' and clean the hole Take S-7 (20'-22') 2/17/2011 Warren George, Inc on site at 7:00 AM Langan on site at 7:15 AM Start drilling from 25' Clean hole to 25' Take S-8 (25'-27') Spoon bouncing back Start coring at 25' Pieces of boulder between 25'-26' Recovery of boulder 6" Core from 30'-35'
			Piece of BOULDER in core barrel (25'-26')	21		S-9	SS	2	50/0"	Refusal	
				22							
				23							
				24							
				25							
				26							
				27							
				28							
				29							
	-18.0	Class 1b	Gray-green MICA SCHIST, hard, fractured	30	2:00	C-1	NX CORE BARREL	REC=32"/48" =67%	RQD=27"/48" =56%		
				31	3:00						
				32	3:00						
				33	6:00						
				34	4:00						
	-23.0	Class 1a	Gray-green MICA SCHIST with quartz inclusions, hard to very hard, fractured rock	35	3:00	C-2	NX CORE BARREL	REC=52"/60" =87%	RQD=42"/60" =70%		
			Gray-green MICA SCHIST with quartz inclusion, hard to very hard, fractured rock	36	6:00						
			End of boring at 35'	37							
				38							
				39							
				40							
				41							
				42							
				43							
				44							
				45							

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Langan #5788401

LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS							CONSOLIDATION			REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	Method	INITIAL CONDITIONS		
											VOID RATIO (-)	SATUR-ATION (%)	
LB-1	U-1	18-20						113.0					
LB-1	U-1	18.35	56.9										
LB-1	U-1	18.6	48.0	70	45	25	MH	103.3	69.8	D2435	1.254	97	C08011
LB-1	U-1	18.85	49.3										
LB-1	U-1	19.35	48.7										
LB-3	U-1	17-19						129.5					
LB-3	U-1	17.15	101.1										
LB-3	U-1	17.65	79.8										
LB-3	U-1	17.9	65.8	101	62	39	MH	96.4	58.1	D2435	1.708	97	C08012
LB-3	U-1	18.15	30.3										

Note: (1) USCS symbol based on visual observation and Atterberg limits reported.

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SAMPLE INFORMATION

Boring: LB-1
 Sample: B
 Depth: 18.60 feet
 Elevation:
 Type:
 Description: 3-inch thin wall tube
 MH, gray clayey SILT, some f. sand;
 peat pockets noted.
 LL = 70, PL = 45, PI = 25

SPECIMEN INFORMATION

(NOTE: Initial and final states refer to beginning and end of test)

Initial height: 0.61 inch
 Diameter: 2.50 inch
 Initial water content: 48.0 %
 Initial total unit weight: 103.3 pcf
 Initial dry unit weight: 69.8 pcf
 Initial void ratio: 1.254
 Initial degree of saturation: 97 %
 Final water content: 45.0 %
 Final total unit weight: 106.9 pcf
 Final dry unit weight: 73.8 pcf
 Final void ratio: 1.133
 Final degree of saturation: 100 % (assumed specific gravity = 2.52)

TEST SUMMARY

Construction Method: Casagrande (Log)
 Estimated preconsolidation stress (tsf): 2.8 (Range: 2.5 to 2.9)
 Estimated in situ effective overburden stress (tsf):
 Compression Ratio (strain per log cycle stress): 0.213
 Swell Ratio (strain per log cycle stress): 0.480
 Swell Index (void ratio per log cycle stress): 0.028
 Recompression Ratio (strain per log cycle stress): 0.015
 Recompression Index (void ratio per log cycle stress): 0.034
 Remarks:

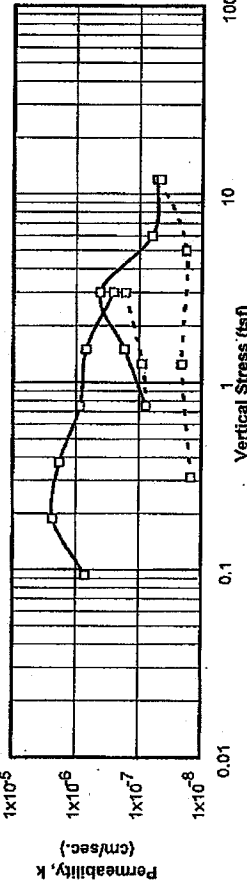
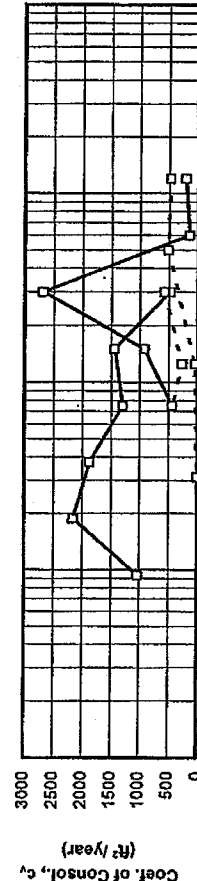
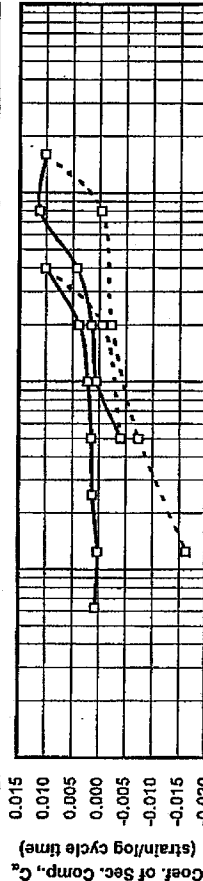
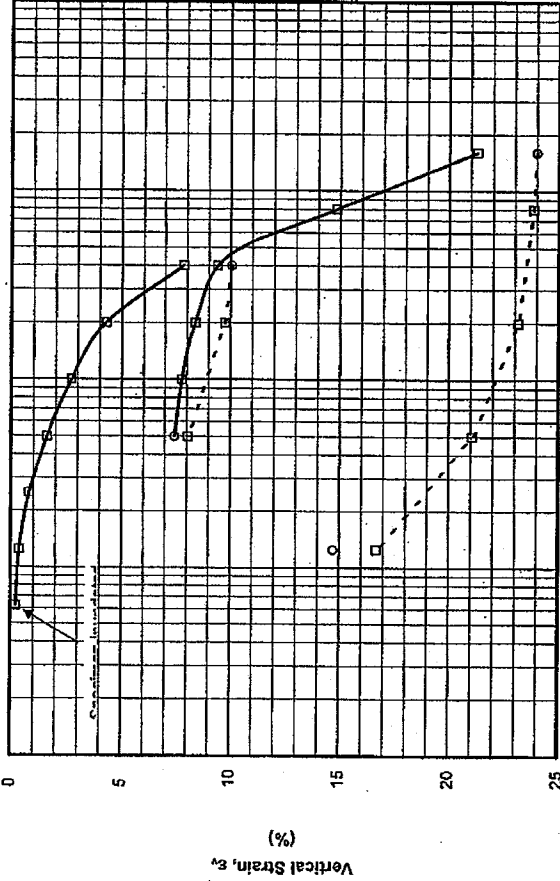
LEGEND: End of primary End of Stage Loading Unloading

Test Date: 2/1/08 Tested By: CMJ/GET Checked By: CMJ

Langan #5788401

ONE DIMENSIONAL
 CONSOLIDATION TEST
 Boring: LB-1 Depth: 18.60 feet

Geotesting Services, Inc. Project No. 31737700-811 February 2008



PROJECT: Langan #5788401
 PROJECT NO.: 31737700-811
 BORING: LB-1
 SAMPLE: B
 TEST: C08011
 DEPTH, feet: 18.6
 BY: CMJ/GET
 TEST DATE: 2/1/2008

Initial height: 0.612 inch
 Initial water content: 48.0 %
 Initial dry density: 69.8 pcf
 Initial total density: 103.3 pcf
 Initial saturation: 97 %
 Initial void ratio: 1.254

Final height: 0.579 inch
 Final water content: 45.0 %
 Final dry density: 73.8 pcf
 Final total density: 106.9 pcf
 Final saturation: 100 %
 Final void ratio: 1.133
 Final strain: 5.5 %

EQUIPMENT:
 Load Frame No.: 5
 Ring Diameter: 2.5 inch

SPECIMEN DESCRIPTION: MH, gray clayey SILT, some f. sand;
 peat pockets noted.

Load No.	Load (tsf)	d ₁₀₀ (inch)	t ₁₀₀ Strain (%)	t ₁₀₀ Void Ratio (-)	Final Strain (%)	Final Void Ratio (-)	G	LL	PL	PI	C _α	C _v (ft ² /year)	Constrained Modulus (tsf)	Permeability (cm/sec)
1	0.063	0.0014	0.234	1.248	0.235	1.248	2.52	70	45	25	0.0007	271.98	26.69	3.07E-07
2	0.125	0.0023	0.375	1.245	0.453	1.243					0.0003	1028.35	44.48	6.97E-07
3	0.250	0.0050	0.814	1.235	1.312	1.224					0.0013	2162.42	28.45	2.29E-06
4	0.500	0.0099	1.620	1.217	2.241	1.203					0.0014	1873.62	31.02	1.82E-06
5	1.00	0.0166	2.718	1.192	3.560	1.173					0.0022	1293.41	45.52	8.57E-07
6	2.00	0.0264	4.305	1.157	5.348	1.133					0.0038	1440.44	63.01	6.90E-07
7	4.00	0.0481	7.856	1.077	10.047	1.027					0.0101	474.25	56.34	2.54E-07
8	2.00	0.0597	9.748	1.034	9.621	1.037					-0.0006	576.38	105.66	1.65E-07
9	0.500	0.0494	8.062	1.072	7.427	1.086					-0.0041	260.44	88.96	8.83E-08
10	1.00	0.0476	7.767	1.079	7.933	1.075					0.0005	433.77	169.41	7.72E-08
11	2.00	0.0513	8.382	1.065	8.886	1.053					0.0015	917.31	162.68	1.70E-07
12	4.00	0.0576	9.399	1.042	11.279	0.999					0.0042	2682.66	196.55	4.12E-07
13	8.00	0.0910	14.854	0.919	16.876	0.873					0.0112	150.99	73.33	6.21E-08
14	16.0	0.1303	21.271	0.774	24.005	0.713					0.0101	212.89	124.68	5.15E-08
15	8.00	0.1461	23.857	0.716	23.736	0.719					-0.0003	469.71	309.34	4.58E-08
16	2.00	0.1418	23.162	0.732	22.590	0.745					-0.0023	515.49	864.23	1.80E-08
17	0.500	0.1291	21.088	0.778	20.155	0.799					-0.0074	50.24	72.33	2.10E-08
18	0.125	0.1022	16.690	0.877	14.731	0.922					-0.0164	4.20	8.53	1.49E-08

SAMPLE INFORMATION

Boring: LB-3
 Sample: U-1B
 Depth: 17.90 feet
 Elevation:
 Type: 3-inch thin wall tube
 Description: MH, gray clayey SILT, trace f. sand.
 LL = 101, PL = 62, PI = 39

SPECIMEN INFORMATION

(NOTE: Initial and final states refer to beginning and end of test)

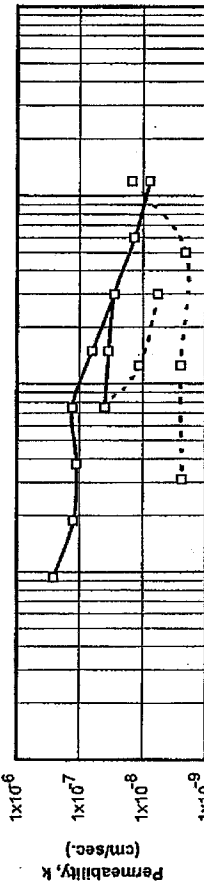
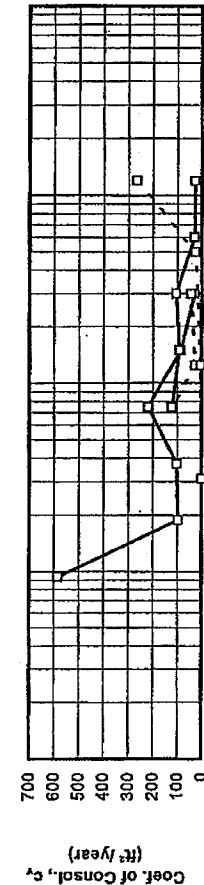
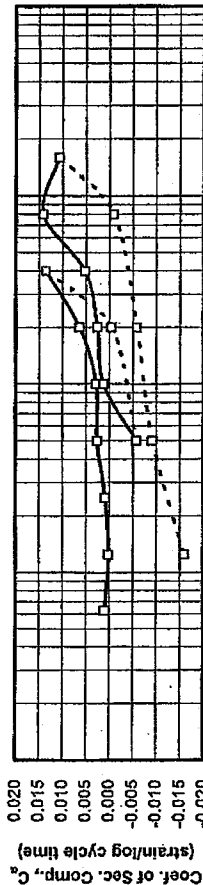
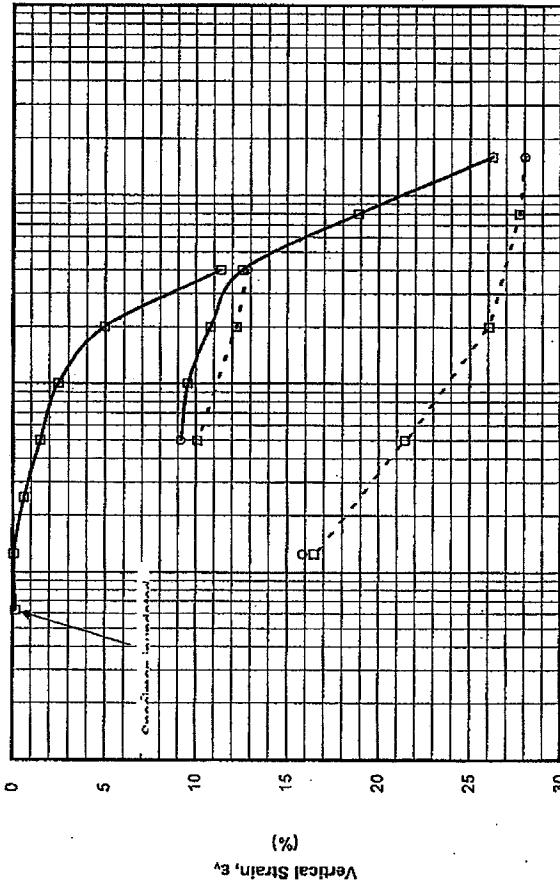
Initial height: 0.62 inch
 Diameter: 2.50 inch
 Initial water content: 65.8 %
 Initial total unit weight: 96.4 pcf
 Initial dry unit weight: 58.1 pcf
 Initial void ratio: 1.708
 Initial degree of saturation: 97 %
 Final water content: 58.5 %
 Final total unit weight: 100.7 pcf
 Final dry unit weight: 63.5 pcf
 Final void ratio: 1.476
 Final degree of saturation: 100 % (assumed specific gravity = 2.52)

TEST SUMMARY

Construction Method: Casagrande (Log)
 Estimated preconsolidation stress (tsf): 2.1 (Range: 2.0 to 2.3)
 Estimated in situ effective overburden stress (tsf):
 Compression Ratio (strain per log cycle stress): 0.247
 Compression Index (void ratio per log cycle stress): 0.669
 Swell Ratio (strain per log cycle stress): 0.036
 Swell Index (void ratio per log cycle stress): 0.097
 Recompression Ratio (strain per log cycle stress): 0.029
 Recompression Index (void ratio per log cycle stress): 0.079
 Remarks:

LEGEND: End of primary End of Stage Loading Unloading

Test Date: 2/1/08	Tested By: CMJ/JGET	Checked By: CMJ
	Langan #5788401	ONE DIMENSIONAL CONSOLIDATION TEST
Boring: LB-3 Depth: 17.90 feet		February 2008
Geotesting Services, Inc.		Project No. 31737700-811



PROJECT: Langan #5788401
 PROJECT NO.: 31737700-811
 BORING: LB-3
 SAMPLE: U-1B
 TEST: C08012
 DEPTH, feet: 17.9
 BY: CMJ/GET
 TEST DATE: 2/1/2008

Initial height: 0.616 inch
 Initial water content: 65.8 %
 Initial dry density: 58.1 pcf
 Initial total density: 96.4 pcf
 Initial saturation: 97 %
 Initial void ratio: 1.708

Final height: 0.563 inch
 Final water content: 58.5 %
 Final dry density: 63.5 pcf
 Final total density: 100.7 pcf
 Final saturation: 100 %
 Final void ratio: 1.476
 Final strain: 8.7 %

EQUIPMENT:
 Load Frame No.: 7
 Ring Diameter: 2.5 inch

SPECIMEN DESCRIPTION: MH, gray clayey SILT, trace f. sand.

Load No.	Load (tsf)	d ₁₀₀ (inch)	t ₁₀₀ Strain (%)	t ₁₀₀ Void Ratio (-)	Final Strain (%)	Final Void Ratio (-)	G	LL	PL	PI	C _v (ft ² /year)	C _α (strain/logt)	Constrained Modulus (tsf)	Permeability (cm/sec)
1	0.063	0.0010	0.160	1.703	0.132	1.704	2.52	101	62	39	356.53	0.0009	39.13	2.75E-07
2	0.125	0.0004	0.069	1.706	0.086	1.705					584.18	0.0001	68.67	2.57E-07
3	0.250	0.0037	0.601	1.691	0.737	1.688					96.82	0.0009	23.47	1.24E-07
4	0.500	0.0093	1.504	1.667	2.014	1.653					101.80	0.0026	27.69	1.11E-07
5	1.00	0.0153	2.487	1.640	3.298	1.618					218.56	0.0027	50.86	1.30E-07
6	2.00	0.0306	4.971	1.573	5.634	1.555					83.10	0.0063	40.25	6.23E-08
7	4.00	0.0701	11.384	1.399	12.823	1.360					29.30	0.0136	31.19	2.83E-08
8	2.00	0.0754	12.242	1.376	12.153	1.378					43.92	-0.0005	233.23	5.68E-09
9	0.500	0.0622	10.095	1.434	9.177	1.459					26.13	-0.0058	69.86	1.13E-08
10	1.00	0.0589	9.554	1.449	9.840	1.441					122.52	0.0013	92.44	4.00E-08
11	2.00	0.0666	10.813	1.415	11.338	1.401					90.54	0.0025	79.39	3.44E-08
12	4.00	0.0775	12.574	1.367	13.356	1.346					105.37	0.0052	113.59	2.80E-08
13	8.00	0.1164	18.894	1.196	20.447	1.154					28.40	0.0141	63.30	1.35E-08
14	16.0	0.1619	26.268	0.996	28.055	0.948					27.55	0.0107	108.49	7.66E-09
15	8.00	0.1710	27.747	0.956	27.659	0.959					264.41	-0.0009	540.75	1.48E-08
16	2.00	0.1606	26.057	1.002	25.545	1.016					24.53	-0.0059	354.93	2.09E-09
17	0.500	0.1322	21.458	1.127	20.904	1.142					2.68	-0.0092	32.62	2.48E-09
18	0.125	0.1015	16.474	1.261	15.873	1.278					0.59665	-0.0160	7.52	2.39E-09

**Langan #5788403
River House Borings, Bronx, NY
LABORATORY TESTING DATA SUMMARY**

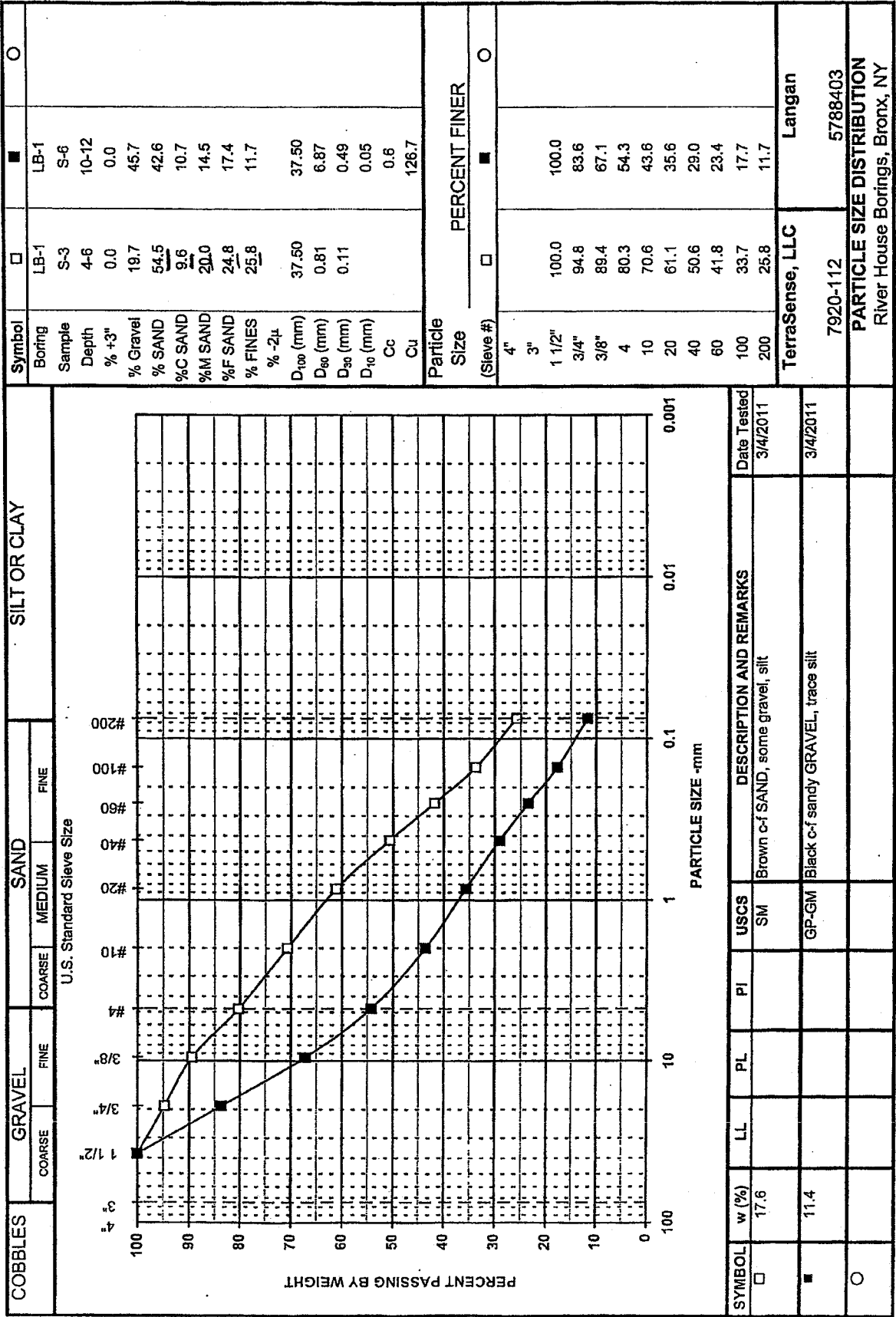
BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS							REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	ORGANIC CONTENT (burnoff) (%)	
LB-1	S-3	4-6	17.6				SM	25.8 ✓		
LB-1	S-6	10-12	11.4				GP-GM	11.7		
LB-2	S-2	2.5-4.5	13.4				SM	24.2 ✓		
LB-3	S-5	7-9	27.3				SW-SM	10.1 ✓		
LB-3	S-8	15-17	89.4	107	47	60	OH		10.2	

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.

Prepared by: JR
Reviewed by: CMJ *CMJ*
Date: 3/8/2011

TerraSense, LLC
45H Commerce Way
Totowa, NJ 07512

Project No.: 7920-112
File: Indx1.xls
Page 1 of 1

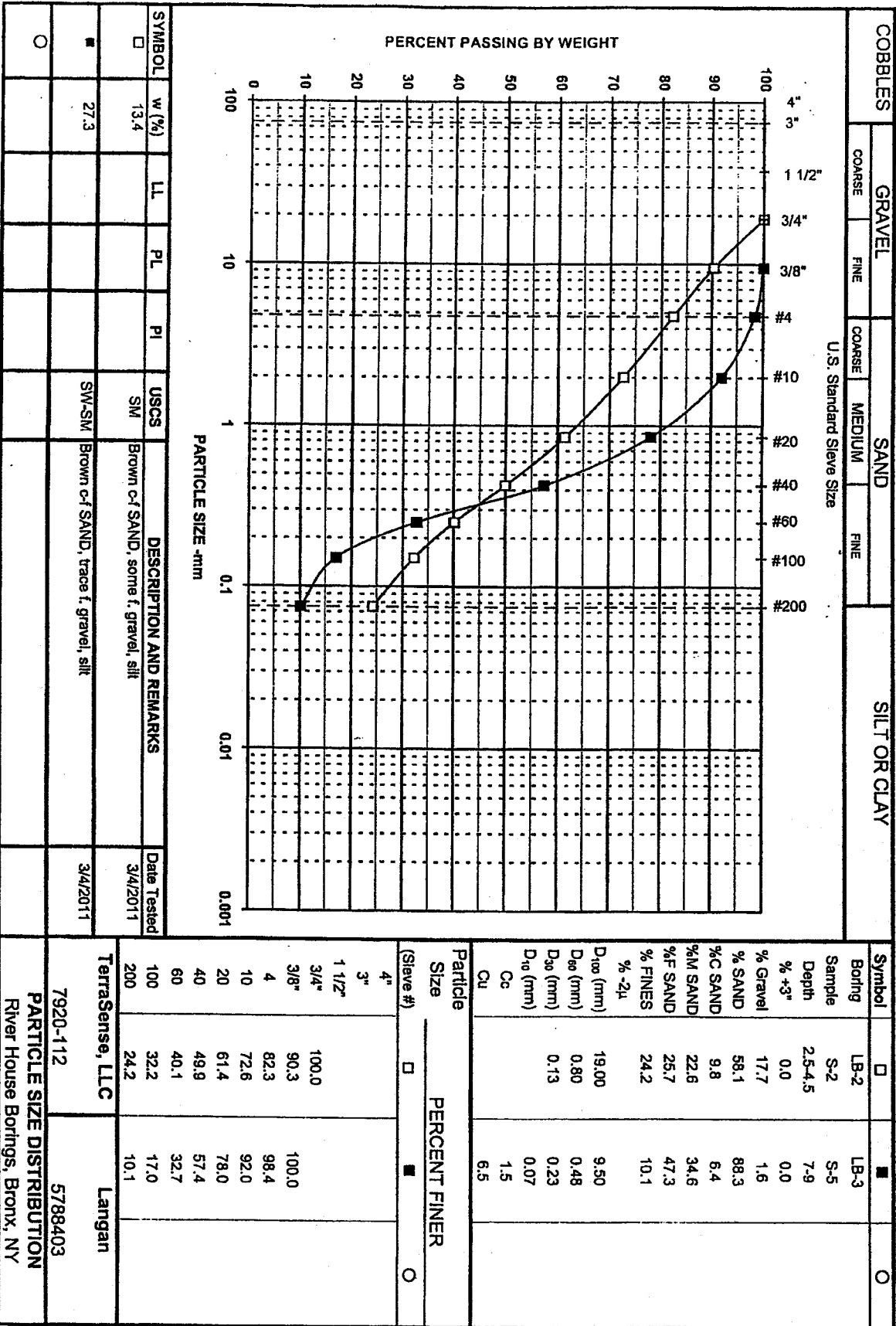


Symbol	w (%)	LL	PL	PI	USCS	Description and Remarks	Date Tested
□	17.6				SM	Brown c-f SAND, some gravel, silt	3/4/2011
■	11.4				GP-GM	Black c-f sandy GRAVEL, trace silt	3/4/2011
○							

Analysis File: 3SV-MasterRev3

TerraSense, LLC
7920-112
Langan
5788403

PARTICLE SIZE DISTRIBUTION
River House Borings, Bronx, NY
stev1a.xls 3/8/2011



Analysis File: 3SV-MasterRev3

siev1b.xls 3/8/2011

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STORMWATER POLLUTION PREVENTION PLAN (SWPPP) COMPLIANCE

Date: _____

To: DDC Parks Unit - Construction
New York City Department of Design and Construction
30-30 Thomson Avenue
Long Island City, NY 11101

From: _____

(Name, address, and telephone number)

TITLE

FOR FURNISHING ALL LABOR, MATERIALS AND EQUIPMENT TOGETHER WITH ALL WORK
INCIDENTAL THERETO NECESSARY OR REQUIRED FOR
THE CONSTRUCTION OF THE BRONX RIVER HOUSE IN THE BOROUGH OF THE BRONX, NY
DDC PROJECT # P1CROT16A

Before undertaking any construction at the site, the Contractor and all subcontractors who will be installing or maintaining all work related to SWPPP compliance shall sign a copy of the following certification statement.

"I hereby certify under penalty that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the Qualified Inspector during a site inspection. I also understand that the owner of operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil, and/or administrative proceedings."

Very Truly Yours,

(Sub)Contractor Name and Title*

***Signatory Requirements:**

The SWPPP and all reports required by the permit and other information requested by NYS DEC or local agency shall be signed by a person described below or by a duly authorized representative of that person.

- a. For a corporation: by (1) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person authorized to and who performs similar policy or decision making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;

A person is a duly authorized representative only if:

- The authorization is made in writing by a person described above and submitted to NYS DEC.
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

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FMS ID: P1CROT16A



**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

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

New Construction of the Bronx River House

**LOCATION: 1041 East 172nd Street
BOROUGH: Bronx 10460
CITY OF NEW YORK**

Contractor _____

Dated _____, 20____

Entered in the Comptroller's Office

First Assistant Bookkeeper _____

Dated _____, 20____

